

Mazingira Bora



TIST

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

English Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Gikumene TIST Cluster members during their Cluster meeting last month.

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TIST Progress in New Areas of Machakos and Nyamira Counties.

Recently, TIST expanded to several new counties, which include Muranga, Machakos, Nyamira, Trans-nzoia, Nandi, Taita-Taveta and Makueni. This month we will share the progress in Machakos and Nyamira counties.

Machakos County

So far, we have established 4 new Clusters namely:

Cluster	No. of Groups formed	Members	New Trees Counted
Kakumini	37	223	4225
Kaluluini	18	109	4281
Mamba	34	199	0
Ndalani	50	312	10633

The following are our current Kakimini Cluster Leaders:

Role	Name	Phone
Leader	David Mutua	+254704433206
Co-Leader	Eunice Mbini	+254710428509
Accountability	Paul Makau Kivuvo	+254718210197
Female Rep.	Eunice Musyoka	+254710428509
Male Rep.	Paul Makau	+254718210197

The following are our current Kaluluini Cluster Leaders:

Role	Name	Phone
Leader	Mukai Peter	+254711351861
Co-Leader	Theresia Karanja	+254724599436
Accountability	Robert Kimaile	+254718719930
Female Rep.	Theresia Karanja	+254724599436
Male Rep.	Robert Kimaile	+254718719930

The following are our current Mamba Cluster Leaders:

Role	Name	Phone
Leader	Joseph Kiiro Nzioka	+254718217381
Co-Leader	Josphine Kanini	+254715176961
Accountability	Francis Musembi	+254717159951
Female Rep	Josphine Kanini Nzina	+254715176961
Male Rep.	Joseph Kiiro Nzioka	+254718217381

The following are our current Ndalani Cluster Leaders:

Role	Name	Phone
Leader	Christine Nthenya	+254714260544
Co-Leader	Catherine Maingi	+2540700710745
Accountability	Simon Kioko	+254700710745
Female Rep.	Catherine Maingi	+254725610569
Male Rep.	Simon Kioko	0700710745

Nyamira County – 4 Clusters.

Cluster	No. of Groups formed	Members	New Trees Counted
Ratera	70	440	24763
Makairo	31	196	7701
Etono	15	99	8942
Ekerenyo	29	184	2686



Other Clusters that are in the process of formation include Matorola Cluster with 8 groups; Kebirigo Cluster with 5 groups; Kamwarani Cluster with 4 groups; and Gesura Cluster with 6 groups.

The following are our current Ratera Cluster Leaders:

Role	Name	Phone
Leader	Stephen Okundi	+254701681426
Co-Leader	Valentinah Mumo	+254710397059
Accountability	Richard Okiega	+254712051041
Female Rep.	Valentinah Mumo	+254710397059
Male Rep.	Richard Okiega	+254712051041

The following are our current Makairo Cluster Leaders:

Role	Name	Phone
Leader	Robert Mong'are	+254702976637
Co-Leader	Everlyline Momanyi	+254716340090
Accountability	Peter Makori	+254727707703
Female Rep.	Everlyline Momanyi	+254716340090
Male Rep.	Peter Makori	+254727707703

The following are our current Ekerenyo Cluster Leaders:

Role	Name	Phone
Leader	Frolence Onserio	+254705452760
Co-Leader	Shadrack Omenyi	+254737271329
Accountability	Pauline Nyongi	+254700678643
Female Rep.	Pauline Nyongi	+254700678643
Male Rep.	Shadrack Omenyi	+254737271329

The following are our current Gesura Cluster Leaders:

Role	Name	Phone
Leader	Benard Magoma	+254712288547
Co-Leader	Isabellah Chenge	+25495018542
Accountability	Chrisantus Rioba	+254715120629
Female Rep.	Isabellah Chenge	+25495018542
Male Rep.	Chrisantus Rioba	+254715120629

The following are our current Kamwarani Cluster Leaders:

Role	Name	Phone
Leader	Wilson Ongere	0710970595
Co-Leader	Rose Moraa Momanyi	0717330803
Accountability	Samwel Mang'aria	0728951578
Female Rep.	Rose Moraa Momanyi	0717330803
Male Rep.	Samwel Mang'aria	0728951578



TIST: Best Practices in Practicing Agroforestry.

Agro forestry refers to growing trees and shrubs together with agricultural crops or livestock. The overall aim of agro forestry is to increase the productivity of the land through the use of trees. Trees have many benefits for the farmer:

- Building material
- Fuel wood
- Fruits and other food
- Fodder
- Soil stabilization
- Soil fertility
- Moisture retention
- Wind shelter
- Erosion control, especially by rivers
- Medicines
- Shade

Agroforestry practices: There are many different techniques and new methods are being discovered all the time. Some techniques are successful in one place, while not so useful in other areas. The following are some common methods of agro-forestry:

1. Hedges: This involves selecting a tree species which can be placed in a line and which have benefits for the land. Hedges require little space, control erosion, and can produce leaves for fodder or mulch. An example of hedging is to plant a row of trees around the field boundary. Recommended spacing is around 2m – 3m with the best design including a mixture of tall and short trees.

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

The most suitable trees are leguminous ones (ones that fix nitrogen for the soil). Spacing between rows of trees should be at least 5m. The tree rows need to be weeded and pruned regularly. The trees cannot grow too tall otherwise they will compete with the crops for soil nutrients and light. The pruned leaves can be added to the soil to improve the soil fertility.

Trees that are pruned to be shrub-like will not be suitable for TIST payments since they won't sequester much carbon, but they will improve the agricultural land and provide many other benefits to the farmer. In drier areas, this may not be a good approach or more space between trees and crops may be needed so that they do not compete too much for nutrients and water.

3. Windbreak: This is planting wide strips of trees to provide a windbreak, which protects crops from the oncoming wind. You begin by planting large trees in the center, smaller trees for the next two rows and low shrubs, then bushes and grasses on the outside. The advantage of windbreaks is that the farmer does not have to sacrifice an entire plot of land for trees. It only takes a strip of land, and the benefits can improve yields by 30% in some areas. Please note that poorly planned windbreaks can damage crops more because it can channel the wind through gaps. Find someone experienced in this to help you design your windbreak.

4. Fallow cropping: This is where farmers stop growing crops on a piece of land and let trees take over to help restore soil fertility.

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

6. Grazing improvement: You accomplish this by managing trees on grazing land to help provide wood and fodder.

7. Woodlots: Small woodlots can be grown on unused or unproductive land, e.g. woodlots planted on stony outcrops or in gullies. Woodlots can also be planted on cropland to serve as a windbreak, or they can be planted on fallow land. Please note that TIST trees have to be correctly spaced in order to grow fully and remain in the ground long-term. Some of the above agro-forestry methods are best practices for agriculture, but may not qualify for TIST tree payments.



TIST: Soil Fertility.

What is soil?

Soil is the uppermost layer of the earth. It contains air, water, organic matter and mineral matter.

How is Soil formed?

The weathering (breakdown) of rocks provides the minerals needed to support plant life. Plants are then added to the soil as organic matter. As more rock is broken down and more organic matter is added, so more water can be held in the soil, further promoting plant growth

Why is organic matter important?

Organic matter (mainly formed through the decomposition of plant material) releases a lot of nutrients, which are available for uptake to new plants. It also supports the life of beneficial microorganisms in the soil, helps with water infiltration and helps to bind the soil together.

What determines the type of soil found?

- *The climate:* both the temperature and water availability affect the rate of weathering of rock.
- *Organisms:* bacteria, fungi and worms amongst many others live in the soil. Some play a key role in mixing the soil, such as earthworms. Soil organisms help decompose organic matter, and some help plants to fix nitrogen (e.g. Rhizobium bacteria).
- *Topography:* the shape of the land. For example, soil on slopes is generally thinner and more easily eroded than the soil found collected in valleys.
- *Parent material:* the type of rock the soil is formed from.
- *Human behavior:* the way we use and care for our soil (or not) will greatly affect its fertility.

The texture of the soil you have depends on how much sand, silt and clay it is made from. The diagram on the following page shows you the main categories of soil texture. The texture of the soil and structure influence how easily roots can penetrate the soil, and how much water can be retained.

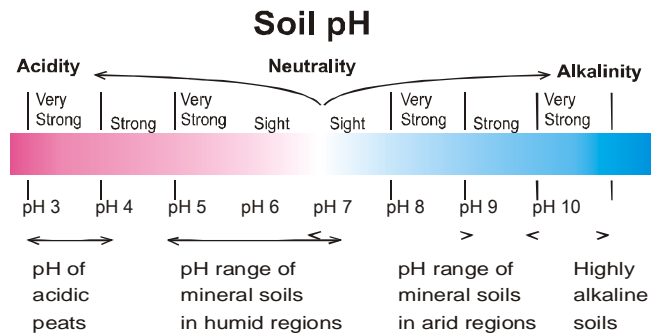
Why is soil pH important?

How acidic or alkali a soil is (its pH) affects how available soil nutrients are for plant uptake and what type of soil organism life can be supported. Generally most soil nutrients are more soluble (and therefore available for plant absorption) when in an acidic soil compared to a neutral or alkaline soil. However, if the soil is too acidic many bacteria cannot grow, and this will affect the rate of decomposition of organic matter. Most good topsoils have a pH between 5.5 and 7.5 and are relatively dark in color.

What is a fertile soil?

A fertile soil is one that has an available supply of all the nutrients needed to support plant life.

- *Primary nutrients:* nitrogen, phosphorus, potassium.
- *Secondary nutrients:* sulphur, magnesium, calcium.
- *Micronutrients:* iron, manganese, boron, chlorine, zinc, copper, molybdenum, nickel.



Strategies to improve soil fertility

- Consider adding nitrogen (in the form of green manure from nitrogen-fixing plants) and phosphorus (in the form of rock phosphate).
- Collect and use livestock manure and urine. This is better in composted form. Fresh sources may contain too much ammonia content (which may harm plants) and may contain higher amounts of pathogens (disease-causing organisms). Composted manure contains fewer pathogens. If you do use fresh manure, use moderately and leave a minimum of two months in between applications.
- Add organic matter through composting (details below).
- Practice conservation agriculture best practices as described in previous units:
 - o Crop rotation.
 - o Intercropping.
 - o Agroforestry.
 - o Planting leguminous cover crops.
 - o Leaving land fallow.
 - o Use of mulch.
 - o Using conservation farming holes.
 - o Reduce water erosion through tree planting, terraces, fanya juu .
- Consider intercropping with Pigeon pea (Cajanus cajan), Dolichos lablab, Mucuna pruriens, Crotalaria, Canavalia.
- Consider adding ash, which is rich in calcium and potassium carbonate.
- Add lime if you know your soil is too acidic
- It is best not to add additional minerals (apart from those found in compost) without testing the soil first to see what nutrients and minerals are actually needed.
- There may be some circumstances when you need to apply inorganic chemical fertilizers. Use accordingly to the manufacturer instructions and research which ones are most ecologically sound for your area through getting advice from your extension officers



Composting.

Compost manure is a natural fertilizer to help your crops grow. It is better than chemical fertilizer because it is natural and has no damaging effects

for the crops and environment. Composting is one of the easiest, cheapest and most effective ways of improving soil fertility.

Nitrogen	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)
<ul style="list-style-type: none"> Leguminous crops that are used as green manures or as mulch provide between 20 to 80 kg N / acre which can be used by subsequent crops. Blood meal/ leather meal 12-15% N. They are applied directly to the crops. Urines from all species contain pure urea (up to 1% N)- It is not a stupid idea to urinate on the compost heap! Poultry manure 8-20 kg N/t Pig manure 3-5 kg N/t Goat / sheep manure 2-4 kg N/t Cattle manures 2-3 kg N/t Compost * 1 kg N/t Manure teas and plant teas provide easily available nitrogen and can be used as top dressing or foliar feeds. 	<ul style="list-style-type: none"> Rock Phosphate 20-33% Bone meals 12-25% Poultry manure 10-25 kg/t Pig manure 3-6 kg/t Goat/sheep 2.5-4 kg/t Cattle manure 2-3 kg/t Compost * 4kg/t 	<ul style="list-style-type: none"> Wood ash 3-7% Goat / sheep manure 12 kg/t Cattle manure 5-12 kg/t Poultry manure 5-12 kg/t Compost * 6 kg/t Pig manure 3-7 kg/t Urines: 1-3 kg/t
<p>• Content of purely vegetative compost. If compost is prepared with livestock manures, rock phosphate and wood ash, the product will have higher nutrient contents.</p> <p>Nutrient contents of manures and composts are highly dependent on handling and storage and on feed quality!</p>		

What can be used for compost?

- Crop residues, weeds, dead leaves, any trimmed vegetation, manure and urine from livestock, bedding from livestock, kitchen food waste from fruit and vegetables, ash, shredded paper and cardboard.
- Don't use meat, dairy products, fats, oils, metal or plastic.

General best practices for composting:

- Choose a shaded area for your compost.
- Cover with banana leaves or a plastic sheet.
- Sprinkle with water during the dry season.
- Protect from rain (which will wash nutrients away).
- As a general guide aim for:
 - One third 'green vegetation' (grass clippings, fruit, vegetables, egg shells, nut shells, manure, weeds, plants).
 - One third 'brown vegetation' (dry leaves, straw, sawdust, cardboard and fine crop residues).
 - One third bulky material such as chopped branches and larger crop residues.
 - Ensure you use plant material that has not yet seeded, and do not use diseased material.
 - Layer the materials in a pile or in a hole. Air is needed for compost, so mix the materials together and do not compact the material down.
- Water the pile of material, cover and leave so that material decomposes over the next couple of months. You can occasionally mix the material.
- If the material becomes slimy or smelly over time it may be too wet or have too much green vegetation. Add more brown vegetation if this is the case, and mix.
- Try to have your batch of material ready for mixing, watering, covering and leaving 2-3 months before the rainy season so it will be useful for the planting season.

- The compost should be brown and crumbly when ready. You can sieve the material to get a finer mixture, and add the larger pieces back into the compost pile for the next batch.
- Some of the TIST groups use a more specific method, which they have found effective. They have described the process below:

Preparation of compost manure by some TIST groups:

- 1) Choose an area 4m x 4m for your compost pit
- 2) Clean the area.
- 3) Dig a hole of diameter 3 - 4m and 1.5m deep
- 4) Collect all the remains of the crops you have and cut them into small pieces. (e.g. the leaves and stalks of maize, millet, beans).
- 5) Put these crops remains into the hole up to a depth of 0.5m.
- 6) Then add 5 liters of ash.
- 7) Next add about 30cm (or as much as available) of animal dung (e.g. dung from pig, cow, goat or chicken).
- 8) Next put another layer of crop leaves and stalks (0.5m).
- 9) Add another 5 liters of ash
- 10) Add the leaves and stalks again until the hole is almost filled.
- 11) Finally, add a layer of soil until the hole is filled
- 12) While filling the hole with soil, put a long stick in the middle of the hole so it reaches the bottom.
- 13) Leave the compost pit for 90 days (3 months).
- 14) During this period use your dirty water to water the compost pit. For example, after cleaning your house or clothes, empty the used water over the compost pit. If you have animals you can also pour animal urine over the pit.
- 15) Try to water the compost pit in this way every day, or whenever water is available.
- 16) After the 90 days the manure will be ready. Use the stick as a thermometer – when the compost is ready it should be hot and you may even see steam coming from the stick after you have removed it.

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TIST

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Kimereu Version

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Amemba ba Gikumene Cluster bari mucemanone mweri muthiiru.

Inside:

Witi na mbere gwa TIST nturene injeru ciakaunti cia Machakos na Nyamira.

Page 2

TIST: Mitire iria miega buru riria ukuandaniria imera na miti na kinya gwika ndithia. *Page 4*

TIST: Unoru bwa muthetu. *Page 5*



Witi na mbere gwa TIST nturene injeru ciakaunti cia Machakos na Nyamira.

Orua TIST niyaramitwe mianka ndene ya kaunti ingi. Amwe na cio ni Muranga, Machakos, Nyamira, Trans – nzoia, Nandi, Taita – Taveta na Makeni. Mweri juu turibwira nteto cia witi na mbere kiri kaunti cia Nyamira na Machakos

Kaunti ya Machakos

Mwanka nandi nutwambirite Cluster inya injeru jacio:

Cluster	Namba ya ikundi biria biambiritue	Amemba	Miti imieru iria itari
Kakumini	37	223	4225
Kaluluini	18	109	4281
Mamba	34	199	0
Ndalani	50	312	10633

Aja ni maritwa ja atongeria betu baria batongeretie Cluster ya Kakimini nandi

Giti gia Utongeria	Ritwa	Namba ya Thimu
Mutongeria munene	David Mutua	+254704433206
Mutongeria mutetheria	Eunice Mbini	+254710428509
Mukaria wa nteto	Paul Makau Kivuvo	+254718210197
Murungamiri wa muka	Eunice Musyoka	+254710428509
Murungamiri wa ntumurume	Paul Makau	+254718210197

Baba nibo arungamiri ba nandi ba Cluster ya Kaluluini

Giti gia Utongeria	Ritwa	Namba ya Thimu
Mutongeria munene	Mukai Peter	+254711351861
Mutongeria mutetheria	Theresia Karanja	+254724599436
Mukaria wa nteto	Robert Kimaile	+254718719930
Murungamiri wa muka	Theresia Karanja	+254724599436
Murungamiri wa ntumurume	Robert Kimaile	+254718719930

Baba nibo atongeria ba nandi ba Cluster ya Mamba

Giti gia Utongeria	Ritwa	Namba ya Thimu
Mutongeria munene	Joseph Kiiro Nzioka	+254718217381
Mutongeria mutetheria	Josphine Kanini	+254715176961
Mukaria wa nteto	Francis Musembi	+254717159951
Murungamiri wa muka	Josphine Kanini Nzina	+254715176961
Murungamiri wa ntumurume	Joseph Kiiro Nzioka	+254718217381

Baba nibo atongeria ba nandi ba Cluster ya Ndalani

Giti gia Utongeria	Ritwa	Namba ya Thimu
Mutongeria munene	Christine Nthenya	+254714260544
Mutongeria mutetheria	Catherine Maingi	+2540700710745
Mukaria wa nteto	Simon Kioko	+254700710745
Murungamiri wa muka	Catherine Maingi	+254725610569
Murungamiri wa ntumurume	Simon Kioko	0700710745

Kaunti Ya Nyamira – Cluster Inya

Cluster	Namba ya ikundi biria biambiritue	Amemba	Miti imieru iria itari
Ratera	70	440	24763
Makairo	31	196	7701
Etono	15	99	8942
Ekerenyo	29	184	2686



Cluster ingi iria iri mubangone jwa kuthithua ni amwe na Matorola iria iri na ikundi binana, Cluster ya Kebirigo iri na ikundi bitano, Cluster ya Kamwarani na ikundi bina amwe na Cluster ya Gesura iri na ikundi bitantu.

Baba nibo atongerira ba nandi ba Cluster ya Ratera

Giti gia Utongerira	Ritwa	Namba ya Thimu
Mutongerira munene	Stephen Okundi	+254701681426
Mutongerira mutetheria	Valentinah Mumo	+254710397059
Mukaria wa nteto	Richard Okiega	+254712051041
Murungamiri wa muka	Valentinah Mumo	+254710397059
Murungamiri wa ntumurume	Richard Okiega	+254712051041

Baba nibo atongerira ba nandi ba Cluster ya Makairo

Giti gia Utongerira	Ritwa	Namba ya Thimu
Mutongerira munene	Robert Mong'are	+254702976637
Mutongerira mutetheria	Everlyline Momanyi	+254716340090
Mukaria wa nteto	Peter Makori	+254727707703
Murungamiri wa muka	Everlyline Momanyi	+254716340090
Murungamiri wa ntumurume	Peter Makori	+254727707703

Baba nibo atongerira ba nandi ba Cluster ya Ekerenyo

Giti gia Utongerira	Ritwa	Namba ya Thimu
Mutongerira munene	Frolence Onserio	+254705452760
Mutongerira mutetheria	Shadrack Omenyi	+254737271329
Mukaria wa nteto	Pauline Nyongi	+254700678643
Murungamiri wa muka	Pauline Nyongi	+254700678643
Murungamiri wa ntumurume	Shadrack Omenyi	+254737271329

Baba nibo atongerira ba Nandi ba Cluster ya Gesura

Giti gia Utongerira	Ritwa	Namba ya Thimu
Mutongerira munene	Benard Magoma	+254712288547
Mutongerira mutetheria	Isabellah Chenge	+25495018542
Mukaria wa nteto	Chrisantus Rioba	+254715120629
Murungamiri wa muka	Isabellah Chenge	+25495018542
Murungamiri wa ntumurume	Chrisantus Rioba	+254715120629

Baba nibo atongerira ba nandi ba Cluster ya Kamwarani

Giti gia Utongerira	Ritwa	Namba ya Thimu
Mutongerira munene	Wilson Ongere	0710970595
Mutongerira mutetheria	Rose Moraa Momanyi	0717330803
Mukaria wa nteto	Samwel Mang'aria	0728951578
Murungamiri wa muka	Rose Moraa Momanyi	0717330803
Murungamiri wa ntumurume	Samwel Mang'aria	0728951578



TIST: Mitire iria miega buru riria ukuandaniria imera na miti na kinya gwika ndithia.

Agroforestry ni uandaniri miti na ithaka amwe na imera bia irio kana ndithia. kuungania guku kwendagwa nikenda maciara ja muunda jaingia gukurukira utumiri bwa miti. miti iria baita inyingi kiri murimi:

- Mpao cia guaka
- Nkuu
- Matunda na irio bingi
- Irio bia ndithia
- Kurikia muthetu
- Kunoria muthetu
- Gwika ruuji muthetune
- Gukunikira imera kuumania na ruugo
- Kunyiyia gukamatwa kwa muthetu, mono ni nduujji
- Ndawa
- Kirundu

Mitire iria miega buru riria ukuungania miti, ithaka, ndithia na imera: Kurina njira inyingi mwanya na njira injeru iria ikumenyekana igita rionthe. njira imwe ni injega nturere imwe indi citumirika nturere ingi. Aja ni mitire imwe iria itumikaga mono:

1. Ndwego: Bubu ni gutaara mthemba jwa muti juria juumba kuandwa na laini na juria jukoongera muunda baita. ndwego nicitumagira kanya kanini, ikanyiyia ukamati bwa muthetu na nojuthithie mabura ja kuriwa ni ndithia kana gukunikira muthetu. Miti niendekaga gutaranua na mita ijiri gwita ithatu. njira iria njega buru ni kuungania miti iminene na iminini.

2 Kuandaniria miti igitenie na iankene na imera: Aja miti iandagwa itarenie mita ijiri kana nkuruki na milaini igitenie muunda. no kwithirwe kurina laini imwe ya miti , riu laini ijiri kana ithatu cia imera, riu laini ingi ya miti, riu imera, o ou.

mung'uanano jwa bubu ni kuanda milaini ya mpempe iankene na ya muti jugwitwa leucaena kana kauwa na marigu.

Miti iria miega buru ni iria ikagira nitrogen muthetune. Milaini ya miti itaranie na mita ithano. milaini ya miti nibati kurimirwa na kugitwa mathangu o nhyuma ya o igita. miti itibati kunenea mono nontu igacindanira irio na weru na imera.

mathangu jaria jagitwaa no jongerwe muthetune kujunoria.

miti iria igitagwa biang'i na mathangu igakara ta kithaka itibua kuriwa ni TIST niuntu itijukia ruugo ruruthuku rurwingi, indi ikathongomia muunda jwa imera na ie murimi baita ingi inyingi. Ndene ya ntuura injumu, iji ti njira injega kana gutarania gukunene nkuruki gukendeka nikenda itacindanire irio na ruuji mono.

3. Kunyiyia ruugo: Guku ni kuanda miti imingi na laini nikenda inyiyia ruugo, untu buria burigagiria imera kuumania na ruugo. uambagia kuanda miti iminene gati gati na iminini milaini iu ithingatite iiri na miti imikui, riu ithaka na nyaki oome buru. wega bwa miti iji ya kunyiyia ruugo ni ati murimi atianda muunda junthe miti. miti ijukagia kamunda kanini na baita ciomba kwongera maciara na gicunci mirongo ithatu kiri igana ndene ya ntuura imwe. Menya ati miti ya kunyiyia ruugo itibangi bwega no ithukie imera nkuruki niuntu no itongerie ruugo gukurukira bianya.

Cuaa muntu uandite kairi agutethie kubangira miti yaku ya kunyiyia ruugo.

4. Kuanda miti icokia unoru bwa muunda: Aja ni aria arimi batigaga kuanda imera muundene na bakareka miti ikajujukia junthe nikenda itetheria gucokia unoru bwa muunda.

5. Kuandaniria: aja miti itarenie nainya na umwe iandagwa amwe na imera bia irio. miti imiega ni iria iti mathangu jamaingi na iria yongagira nitrogen muthetune.

6. Kuthongomia urithi: uthithagia uju na njira ya kubangania miti ndene ya muunda jwa kurithia nikenda yongera mpao na irio bia ndithia.

7. Kuanda miti imingi amwe: Milaini ya miti no iandwe ndene ya muunda jutigitumirwa mung'uanano milaini ya miti iandi antu kurina maiga kana migurune. miti no iandwe kinya miundene ya irio nikenda inyiyia ruugo kana ikaandwa muundene kenda iujura ku icokia umoru bwa muthetu. Itu menya ati miti ya TIST no mwaka itaranie uria ibati nikenda ikura buru na ikara muthetune igita riraja. Njira imwe cia kungania urimi na miti ni mitire imiega nkuruki kiri urimi, indi miti iji itiumba kuriwa ni TIST.



TIST: Unoru bwa muthetu.

Muthetu nimbi?

Muthetu ni gicunci kia iguru buru kia nthi. Jwithagirwa jurina ruugo, ruuji, biria biorete na kinya mineral.

Muthetu juthithagua atia?

Kunangwa kwa maiga nikuejanaga mineral iria ciendekaga kiri imera nikenda bitigakue. Imera riu nibiongagirwa muthetune niuntu nibioraga na bikathuthurukanga. O uria maiga jamaingi jakuunikanga nou imera bibi biori bikwongereka, nikenda ruuji rurwingi nkuruki rumba gwikwa ndene ya muthetu, na kwou rumba gwitithia na mbele gukuria imera.

Niki into bibi biori birina bata?

Into bibi biori (mono kuumania na kwora kwa imera) nibiritaga irio bibingi, biria biithagira birio niuntu bwa imera bibieru. Kinya nibiikaga tunyomoo turia turi baita ndene ya muthetu, bigatethia ruuji gutonya muthetune na kinya bigatethia muthetu kugwatana amwe bwega.

Nimbi yugaga muthetu juria jurio ni jwa muthemba juriku?

- *Rera*: Murutira na ruuji ruria rurio niruugaga mpwi ya iiga ya kuunikanga.
- *Tunyomoo*: Tunyomoo tumwe nituritaga ngugi ya bata ya kuungania muthetu ja mang'ionyo jaria jetagwa earthworms. Tunyomoo twa muthetu nitutethagia kworia imera na nyomoo na tungi nitutethagia gwikira nitrogen ndene ya muthetu (ja Rhizobium bacteria).
- *Uria muunda jukari*: Mung'uanano, muthetu kibarine ni jumuceke na jukamatangagwa nkuruki ya muthetu juria jwithagirwa juri miurone.
- *Iiga riria juumenie nario*: muthemba jwa iiga riria muthetu juumite.
- *Mathithio ja antu*: uria tutumagira na kumenyeera muthetu jwetu gukauga unoru bwaju.

The texture of the soil you have depends on how much sand, silt and clay it is made from. The diagram on the following page shows you the main categories of soil texture. The texture of the soil and structure influence how easily roots can penetrate the soil, and how much water can be retained.

Niki pH ya muthetu irina bata?

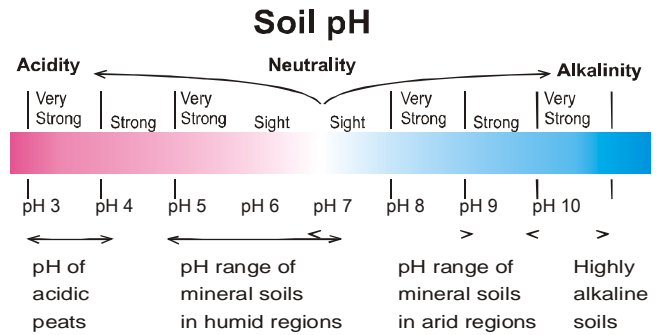
Acidi kana alkali iria iri kiri muthetu (PH yaju) niugaga kethira irio birio niuntu bwa imera nani tunyomoo turiku muthetune tukoomba gutuura. Jaria maingi irio bia muthetu nibitonyaga ruujine (na kwou imera nobibijukie bikijukia ruuji) riria muthetu jurina acidi nkuruki ya riria jukiri kii kana juri alkaline.

Indi, kethira muthetu jurina acidi inyingi mono bakteria inyingi itiumba gukura, na bubu bukanyia kwora kwa imera na nyomoo. Mithetu imiega ya iguru imingi iri PH ya 5.5 gwita 7.5 na nimiiru (rangi).

Muthetu jumunoru ni juriku?

- Muthetu jumunoru ni juria jurina irio bionthe biria bikwendeka niuntu bwa imera gutuura bing'ani

- *Primary nutrients*: nitrogen, phosphorus, potassium
- *Secondary nutrients*: sulphur, magnesium, calcium
- *Micronutrients*: iron, manganese, boron, chlorine, zinc, copper, molybdenum, nickel.



Kuongera unoru bwa muthetu.

- Thugania kwongera nitrogen (mboleo itiumi kuumania na imera biria biikagira nitrogen muthetune) na Phosphorus (rock phosphate).
- Uthurania na utumire ntaka ya ndithia na maumago. Ni injega nkuruki yathithirua kirinyene. Mboleo itiumi no ithirwe irina ammonia inyingi mono (iria iumba kugitaria imera) na noithirwe iri tunyomoo turia turetaga mirimo tutwingi. Watumira ntaka itiumi, tunmira inkai na ukare mieri nkuruki ya iiri mbele e wikira yo kairi.
- Ongera mati gukurukira gwika kirinyene (ja uria ukwirwa aja nthi).
- Tumira mitire iria miega bubu ya urimi bubwega ja uria wathiri jamaingi kanyuma au:
 - o Kugarurania imera.
 - o Kuanda imera biungenue.
 - o Kuungania miti na imera.
 - o Anda imera biria bicokagia nitrogen muthetune biri bia gukunikira nthi
 - o Tiga muunda jutiandi.
 - o Use of mulch.
 - o Tumira marinya ja kilimo hai.
 - o Nyiyia ukamati bwa muthetu gukurukira kuanda miti, kwinja mitaro.
- Thugania kuandaniria Pigeon pea (Cajanus cajan), Dolichos lablab, Mucuna pruriens, Crotalaria, Canavalia.
- Thugania kwongera muju, juria jurina calcium na potassium carbonate na wingi.
- Ongera lime kethira nwiiji muthetu jwaku jurina acidi inyingi.
- Ni bwega nkuruki kurega kwongera mineral ingi (nkuruki ya iria ciithagirwa ciri mboleone) utithimite muthetu jwaku kwona ni irio na mineral iriku cikwendeka.
- Magitene jamwe no witie gwikira fertilizer ya nduka. Ikira kulingana na uria muthithia aandikite na urie afisa ba urimi ni iriku ciri injega kiri ntuura yaku.



Kuthithia mboleo

Mboleo ya kuthithia na imera ni fertilizer ya kuumania na into bitina ugwati ya gutethia imera biaku bikura bwega. Ni injega nkuruki ya fertilizer cia nduka niuntu

icithithie yongwa na itina ugwati kiri imera na kiri naria kuthiurukite. Kuthithia mboleo iji ni njira imwe ya iria mbuthu, itina goro na injega ya kwongera unoru bwa muthetu.

Nitrogen	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)
<ul style="list-style-type: none"> Leguminous crops that are used as green manures or as mulch provide between 20 to 80 kg N / acre which can be used by subsequent crops. Blood meal/ leather meal 12-15% N. They are applied directly to the crops. Urines from all species contain pure urea (up to 1% N)- It is not a stupid idea to urinate on the compost heap! Poultry manure 8-20 kg N/t Pig manure 3-5 kg N/t Goat / sheep manure 2-4 kg N/t Cattle manures 2-3 kg N/t Compost * 1 kg N/t Manure teas and plant teas provide easily available nitrogen and can be used as top dressing or foliar feeds. 	<ul style="list-style-type: none"> Rock Phosphate 20-33% Bone meals 12-25% Poultry manure 10-25 kg/t Pig manure 3-6 kg/t Goat/sheep 2.5-4 kg/t Cattle manure 2-3 kg/t Compost * 4kg/t 	<ul style="list-style-type: none"> Wood ash 3-7% Goat / sheep manure 12 kg/t Cattle manure 5-12 kg/t Poultry manure 5-12 kg/t Compost * 6 kg/t Pig manure 3-7 kg/t Urines: 1-3 kg/t
<p>Content of purely vegetative compost. If compost is prepared with livestock manures, rock phosphate and wood ash, the product will have higher nutrient contents.</p> <p>Nutrient contents of manures and composts are highly dependent on handling and storage and on feed quality!</p>		

Nimbi yumba kuthithia mboleo?

- Matigari ja imera, iria, mathangu jamoomu, imera biria bigiti, mboleo na maumago ja ndithia, mati jaria ndithia imamagira, matigari ja irio kuuma riiko na manyani, muju, maratati jagitangi na kandibodi
- Ugatumira nyama, into kinya biriku kuumania na ndithia, maguta jamomu kana ja ruuji, sikerebu kana mikebe ya mibira.

igatethia igitene ria kuanda.

- Mboleo iji ibati kwithirwa iria ya rangi ya muthetu na ikiunikang'aga riria iri tayari. No ucunke mboleo iji nikenda wona iria iunikangi bwega, na wongere jau manene kirinyene nikenda ija gutumirwa riu ringi.

Bimwe bia ikundi bia TIST nibitumagira njira imwe iria boonaga igitaga ngugi. Nibaejene matagaria jaja:

Mitire iria miega buru ya kuthithia mboleo ya imera:

- Taara antu kurina kirundu gwa gwika int bibi biri au iguru.
- Kunikira na mabura kana kiratasi kia nailoni
- Ikiira ruuji igitene ria uumo.
- Karia kuumania na ngai (iria yumba gukamata irio biria bikwendeka).
- Ja mutaratara tegera ati:
 - Gicunci kimwe kiri bithatu ni imera bitinyaari (manyaki, matunda, nyani, makonyo ja nkara, makonyo ja nkandi, mboleo kuumania na ndithia, maria, imera).
 - Gicunci kimwe kiri bithatu ni "imera binyaari (mathangu joomi, nyaki injumu, sondasti, makandibondi na matigari ja imera warikia guketha).
 - Gicunci kimwe kiri bithatu ni into bibirito ja biang'i bigitangi na matigari jamanene ja imera.
 - Menyeera ati uritumira imera biria bitirathithia mbeu na ugatumira imera biria biajitue.
 - Rikanira into bibi amwe kana kirinyene. Ruugo nirwendekaga kuthithia mboleo iji, kwou urugania into bibi amwe bwega na ukamamiria into bibi mono.
- Ikiira ruuji, ukunikire na urekane nabio mieri imikai nikenda into bibi bikoora. No uruganie into bibi o igita nyuma ya igita.
- Mboleo iji yeja gutendera kana kununka no ithirwe irina ruuji rurwingi mono kana ithirwe irina into bitiumi bibingi mono. Ongera imera bibiumu gwakarika ou na uruganie.
- Geria into biaku biithirwe biri tayari kuunganua, gwikirwa ruuji, gukunikirwa na gwikwa mieri iiri kana ithatu mbele ya mbura yambiria nikenda

Kuthuranira mboleo ya mati na njira iria ikundi bimwe bia TIST bitumagira:

- Taara antu aria ukeenja kirinya giaku kia warie bwa mita inya na uraja bwa mita inya.
- Theria antu au.
- Inja kirinya kirina warie bwa mita ithatu gwita inya na mita imwe na nusu kwinama.
- Uthurania matigari ja imera biaku jaria urinajo na ugitange tue tunini. (mung'uanano mathangu na mati ja mpempe, miere na ming'au).
- Ikira matigari jaja kirinyene mwanka gitigare nusu mita.
- Ongera lita ithano cia muju.
- Riu wongere centimita mirongo ithatu (kana o iria ikwoneka) cia mburi kana nguku).
- Ongera matigari ja imera nusu mita.
- Ikira lita ingi ithano cia muju.
- Ongera matigari ja imera kairi mwanka kirinya kiende kuujura.
- Mutia, ikira muthetu mwanka kirinya kiujure
- Ukiujuria kirinya na muthetu, tonyithia muti jumuraja gatigati ga kirinya mwanka jukinye nthiguru buru.
- Tigana na kirinya giki ntuku mirongo kenda (mieri ithatu).
- Igitene riri tumira ruuji rwaku rwa ruko gwikira bole. Mung'uanano, warikia kuthambia nyomba kana nguo ciaku, ituura ruuji ruru ugutumagira kirinyene. Kethira urina ndithia ituura maumago jacio iguru ria kirinya.
- Geria wikagire kirinya kiu ruuji na njira iji ntuku cionthe kana oriria ruuji rurio.
- Ntuku mirongo kenda ciathira, mboleo ikethira iri tayari. Tumira muti kuthima mwanki – mboleo yayia no mwanka ithirwe irina mwanki mwanka toi yoneke ikiumaga mutine wajurita ku.

Mazingira Bora



TIST

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

Kikuyu Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Amemba a TIST Cluster ya Gikumene mucemano-ini wao mweli muthiru.

Thiini wa Ngathiti:

Uria TIST ithiite na mbere icigo njeru cia Machakos na Nyamira Counties. Page 2

TIST: Mitaratara miega ya kugeria kuhanda miti hamwe na irio cia mugunda. Page 4

TIST: Unoru wa tiiri. Page 5



Uria TIST ithiite na mbere icigo njeru cia Machakos na Nyamira Counties.

Ica ikuhi, TIST niikoretwo igitherema counties ngurani na nicio Muranga, Machakos, Nyamira, Trans-nzoia, Nandi, Taita-Taveta na Makeni. Mweri uyu tugukumenyithia uria counties cia Machakos na Nyamira ithiite na mbere.

Machakos County.

Nginyagia riu, nituthondekete Clusters inya (4) na nicio;

Cluster	Namba ya ikundi	Amemba	Miti iria mitare
Kakumini	37	223	4225
Kaluluini	18	109	4281
Mamba	34	199	0
Ndalani	50	312	10633

Aya nioAtongoria a kahinda gaaka Cluster ya Kakimini (Cluster Leaders)

Role	Name	Phone
Leader	David Mutua	+254704433206
Co-Leader	Eunice Mbini	+254710428509
Accountability	Paul Makau Kivuvo	+254718210197
Female Rep.	Eunice Musyoka	+254710428509
Male Rep.	Paul Makau	+254718210197

Aya nioAtongoria a kahinda gaaka Cluster ya Kaluluini (Cluster Leaders)

Role	Name	Phone
Leader	Mukai Peter	+254711351861
Co-Leader	Theresia Karanja	+254724599436
Accountability	Robert Kimaile	+254718719930
Female Rep.	Theresia Karanja	+254724599436
Male Rep.	Robert Kimaile	+254718719930

Aya nioAtongoria a kahinda gaaka Cluster ya Mamba (Cluster Leaders)

Role	Name	Phone
Leader	Joseph Kio Nzioka	+254718217381
Co-Leader	Josphine Kanini	+254715176961
Accountability	Francis Musembi	+254717159951
Female Rep.	Josphine Kanini Nzina	+254715176961
Male Rep.	Joseph Kio Nzioka	+254718217381

Aya nioAtongoria a kahinda gaaka Cluster ya Ndalani (Cluster Leaders)

Role	Name	Phone
Leader	Christine Nthenya	+254714260544
Co-Leader	Catherine Maingi	+2540700710745
Accountability	Simon Kioko	+254700710745
Female Rep.	Catherine Maingi	+254725610569
Male Rep.	Simon Kioko	0700710745

Nyamira County – 4 Clusters

Cluster	Namba ya ikundi	Amemba	Miti iria mitare
Ratera	70	440	24763
Makairo	31	196	7701
Etono	15	99	8942
Ekerenyo	29	184	2686



Kwina Cluster ingi iri mutarata wa guthondekwo na nicio Matorola Cluster ina ikundi 8; Kebirigo ina ikundi 5; Kamwarani Cluster ina ikundi 4 groups; and Gesura Cluster ina ikundi 6
Aya nioAtongoria a kahinda gaaka Cluster ya Ratera (Cluster Leaders)

Role	Name	Phone
Leader	Stephen Okundi	+254701681426
Co-Leader	Valentinah Mumo	+254710397059
Accountability	Richard Okiega	+254712051041
Female Rep.	Valentinah Mumo	+254710397059
Male Rep.	Richard Okiega	+254712051041

Aya nioAtongoria a kahinda gaaka Cluster ya Makairo (Cluster Leaders)

Role	Name	Phone
Leader	Robert Mong'are	+254702976637
Co-Leader	Everlyline Momanyi	+254716340090
Accountability	Peter Makori	+254727707703
Female Rep.	Everlyline Momanyi	+254716340090
Male Rep.	Peter Makori	+254727707703

Aya nioAtongoria a kahinda gaaka Cluster ya Ekerenyo

Role	Name	Phone
Leader	Frolence Onserio	+254705452760
Co-Leader	Shadrack Omenyi	+254737271329
Accountability	Pauline Nyongi	+254700678643
Female Rep.	Pauline Nyongi	+254700678643
Male Rep.	Shadrack Omenyi	+254737271329

Aya nioAtongoria a kahinda gaaka Cluster ya Gesura

Role	Name	Phone
Leader	Benard Magoma	+254712288547
Co-Leader	Isabellah Chenge	+25495018542
Accountability	Chrisantus Rioba	+254715120629
Female Rep.	Isabellah Chenge	+25495018542
Male Rep.	Chrisantus Rioba	+254715120629

Aya nioAtongoria a kahinda gaaka Cluster ya Kamwarani

Role	Name	Phone
Leader	Wilson Ongere	0710970595
Co-Leader	Rose Moraa Momanyi	0717330803
Accountability	Samwel Mang'aria	0728951578
Female Rep.	Rose Moraa Momanyi	0717330803
Male Rep.	Samwel Mang'aria	0728951578



TIST: Mitaratara miega ya kugeria kuhanda miti hamwe na irio cia mugunda.

Agroforestry yuugite kuhanda irio cia mugunda hamwe na miti na kuriithia mahiu. Gitumi kinene kia rimi uyu ni kwongerera maciaro ma mugunda kuhitukira huthiri wa miti. Miti niikoragwo na mawega ta maya kuri murimi:

- indo cia gwaka.
- Ngu.
- Matunda na irio ingi.
- Irio cia mahiu
- kwagirithia tiiri.
- Kunoria tiiri
- kuiga ugunyu wa tiiri.
- Kunyiha ruhuho.
- Kugitira tiiri kumana na gukuuo ni maai.
- Dawa.
- Kiiruru

Mitaratara ya urimi uyu: nikuri njira nyingi na ingi njeru nicirahondekwo mahinda mothe. Njira ingi nicikoragwo cihotekete kundu kumwe na cikarema kundu kungi. Ici ni imwe cia njira iria cihuthikaga makiria kuri agro-forestry:

1. Hedges: njira ino niya guthuura mithemba ya miti iria ingi handwi na muhari na iteithie mugunda. Hedges ibataraga mugunda munini, kugitira tiiri na nourute mahuti ma kurio ni mahiu kana kwara mugunda-ini. Kionereria kiega kia hedging ni kuhanda muhari wa miti muhaka-ini. Utaganu uria witikirikite ni wa 2m-3m. Mubango uria mwega niwa kuhanda utukanitie miti mukuri na miraihu.

2. Alley cropping: ino ni njira ya kuhanda miti thiini wa mugunda na mihari utukanitie na irio. Muhiano mwega ni kuhanda muhari wa mbembe na leucaena kana kahuwa na marigu. Miti ria miga muno niiria yongagirira nitrogen tiiri-ini. Utaganu wa mihari ya miti na irio cia mugunda yagiriirwo gukworwo iri 5m. Mihari ya miti niyagiriirwo ni kurimirwo wega na kwa mahinda. Miti ndingikura wega na iri miraihu tondu niigucindanira unoru wa

tiiri na utheri. Mahuti maria macehwo nomarekio tiiri-ini niguu mongerere unoru.

Miti iria icehetwo ikahana githaka ndingitarwo ni tisT tondu ndiragucia carbongi no niiguteithia mugunda na njira ingi nyingi. Kuria gukoragwo kuri kumu, ino noikorwo itari njira njega ya kurora uhoru uyu kana handu hanene gaagati ka miti na irio nikagiriirwo gukorwo kari kanene niguu citigacindanire unoru na utheri.

3. Windbreaks: nio ni njira ya kuhanda miti mihari-ini niguu inyihie ruhuho na kugitira mimera kumana na ruhuho runene. Wanjagia nakuhanda miti minene gatagati, minini mihari-ini ingi iiri na gathaka kanini, ithaka na nyeki nja. Mawega ma njira ino niati murimi ndabataraga kuuthira mugunda wothe kuhanda miti. Ibataraga o muhari wa mugunda na mawega nomakorwo mongererekete na muigana wa gicunji kia 30% kundu kungi. Ririkana ati ungiaga kubanga wega njira ino nouthukie irio riria ruhuho rwaigirira gatagati-ini.

Caria mudu uri na umenyo muiganu niguu akubangithie.

4. Fallow cropping: ino ni njira iria murimi atigaga kuhanda irio mugunda-ini na akarekereria miti ikure na akanoria mugunda.

5. Inter-cropping: uu ni gutagania miti irio-ini. Miti iria miega ni iria miraihu na irutaga nitrogen.

6. Grazing improvement: noukinyanirie njira ino riria wakuria miti kuria urariithia mahiu niguu guteithiriria kwona ngu na irio cia mahiu.

7. Woodlots: tumiti tunini notukurio kuria gutarimagwo kana kuria kuhinju, muhiano, tumiti tutu nituhandagwo kuria kuri na mahiga kana mitaro ya maai. Tumiti tutu notuhandwo ona mugunda turi twa kunyihia ruhuho. Ririkana ati miti ya TIST nomuhaka itaganio wega niguu ikure na iikare gwa kahinda kanene, no ti miti yothe itikirikaga hari marihi ma TIST.



TIST: Unoru wa tiiri.

Tiiri ni kii?

Tiiri ni mwen wan a-iguru wa thi. Ukoragwo na riera, maai na unoru hamwe na minerals.

Tiiri uthondekagwo atia?

Gwatumkanga na kumumuthuka kwa mahiga nikuo guthondekaga tiiri uria uhotithagia mimera gukura. Mimera ningi niyongagirirwo tiiri-ini. Riria mahiga makiria mamumuthuka, noguo tiiri muingi uthondekagwo kwa uguo maai maingi nimakuigwo tiiri-ini na kwongerera gukura kwa mimera.

Nikii organic matter iri ya bata?

Organic matter (Iria ithondekagwo muno kumana na kubutha kwa mimera) niurutaga unoru muingi uria woyagwo ni mimera na ikanyitirira miturire ya indo cia tiiri-ini iria cikoragwo na umithio muingi kuri tiiri na ukauteithia kugia na hinya na kuhotithia maai gutonya thiini.

Nikii kimenyithanagia muthemba wa tiiri?

- *Riera*: Urugari na maai riria cioneka nicikoragwo na effect kuri kumumuthuka kwa mahiga.
- *Organisms*: Bacteria, fungi na minyongoro ni imwe cia iria ciikaraga tiiri-ini. Imwe nicinnyitaga itemi hari gutukania tiiri ta earthworms. Organisms cia tiiri niciteithagia kubutha na gueithia mimera.
- *Topography*: Uria mugunda uikare. Kwa muhiano, tiiri uri kundu kuinamu niukoragwo uri muceke na ugakuuo ni maai na-ihanya gukira tiiri ungi uri kundu kuigananu.
- *Parent material*: Muthemba wa mahiga maria mathondekete tiiri.
- *Human Behaviour*: Uria tuhuthagira na kumenyerera tiiri witu niutumaga unoru ukorwo uria uri.

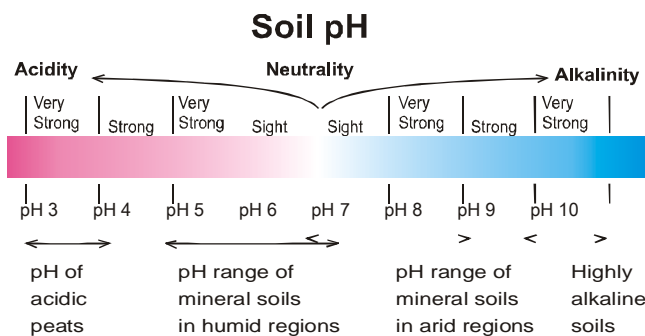
Bata wa soil pH nikii?

Uria tiiri uri na acini na alkali niyo pH na niyugaga nutrients iria iri tiiri-ini na muthemba wa tiiri uria ungi korwo mwena ucio na unyitirirwo wega. Nutrients nyingi cia tiiri nicikoragwo na uhoti wa kumumuthuka na kwa uguo cigateithia kuiyukio ni mimera riria tiiri uri na acid gukira riria uri na alkali. Ona kuri o uguo, angikorwo tiiri uri na acid nyingi noguo bacteria nyingi citangikura na organic matter cikaremwo ni kubutha. Tiiri muingi uria wa iguru ukoragwo na pH ya 5.5-7.5 na ukoragwo na rangi muiru.

Tiiri munoru ni uriku?

Tiiri uria munoru ni uria ukoragwo na nutrients iria cibataranagia hari gukura kwa mimera.

- *Primary nutrients*: nitrogen, phosphorus, potassium.
- *Secondary nutrients*: sulphur, magnesium, calcium.
- *Micronutrients*: iron, manganese, boron, chlorine, zinc, copper, molybdenum, nickel Maundu ma kwongerera tiiri unoru.
- Ongerera nitrogen (na njira ya thumu muigu) ohamwe na phosphorus (na njira ya mahiga).
- Ungania na uhuthire thumu wa mahiu na mathugumo. Uyu ukoragwo uri mwega riria wabutha. Uria utar mubuthu noukorwo na ammonia nyingi (iria ingithukia mimera). Thumu uyu niukoragwo na pathogens nini. Ungihuthira utari mubuthu, huthira utari muingi na uutige gwa kahinda ka mieri 2 .
- Ongerera organic matter kuhitukira composting.
- Huthira njira iria njega na hitukie.
 - o Kuhanda mithemba miingi ya irio hamwe na gucjenania imera.
 - o Kuhanda miti mugunda-ini wa irio.
 - o Gutiga mahuti mabuthire mugunda.
 - o Kuhuthira marima ma Kilimo Hai.
 - o Nyihia erosion na kuhanda miti, kwenja terraces kana fanya juu.
- Huthira intercropping na Pigeon pea (*Cajanus cajan*), *Dolichos lablab*, *Mucuna pruriens*, *Crotalaria*, *Canavalia*.
- Ongerera muhu, uria I ukoragwo na calcium na potassium carbonate.
- Ongerera lime anbatarikgikorwo tiiri waku niukoragwo na acid nyingi.
- Niwega kwaga kwongerera minerals (tiga iria cikoragwo thumuini) utarorete tiiri wega niguo wone kana nicirabatarikana.



Uria tiiri uhana kuringanaga na muigaa wa muthanga, silt na clay uthondekete. Diagram ino ironania mithemba ngurani ya tiiri. Muthemba wa tiiri niwonanagia uria miri ingiingira tiiri-ini na muigana wa maai uria ungiingira thi.



- Nikuri hiingo wagiriirwo nikuongerera inorganic chemicals fertilizers. Huthira kuringana na mawatho ma athondeki na ataalamu a maundu egii tiiri.

Nitrogen	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)
<ul style="list-style-type: none"> Leguminous crops that are used as green manures or as mulch provide between 20 to 80 kg N / acre which can be used by subsequent crops. Blood meal/ leather meal 12-15% N. They are applied directly to the crops. Urines from all species contain pure urea (up to 1% N)- It is not a stupid idea to urinate on the compost heap! Poultry manure 8-20 kg N/t Pig manure 3-5 kg N/t Goat / sheep manure 2-4 kg N/t Cattle manures 2-3 kg N/t Compost * 1 kg N/t Manure teas and plant teas provide easily available nitrogen and can be used as top dressing or foliar feeds. 	<ul style="list-style-type: none"> Rock Phosphate 20-33% Bone meals 12-25% Poultry manure 10-25 kg/t Pig manure 3-6 kg/t Goat/sheep 2.5-4 kg/t Cattle manure 2-3 kg/t Compost * 4kg/t 	<ul style="list-style-type: none"> Wood ash 3-7% Goat / sheep manure 12 kg/t Cattle manure 5-12 kg/t Poultry manure 5-12 kg/t Compost * 6 kg/t Pig manure 3-7 kg/t Urines: 1-3 kg/t
<p>Content of purely vegetative compost. If compost is prepared with livestock manures, rock phosphate and wood ash, the product will have higher nutrient contents.</p> <p>Nutrient contents of manures and composts are highly dependent on handling and storage and on feed quality!</p>		

Composting

Compost manure ni thumu utari wa fertilizer uria uteothagia mimera gukura. Niukoragwo urimwega gukira wa chemical tondu ni wa ki-nduire na nduthukagia mimera na maria maturigiciirie. Composting ni nnjira imwe ya iria huthu makiria na citari na mahuthiro maingi cia kwongerera unoru wa tiiri.

Nikii kingihuthika hari guthondeka compost?

- Matigari ma irio, riia, mahuti na mahuti ma miti, main a mathugumo ma mahiu, irio cia nyumba matunda, muhu na maratahi .
- Ndukahuthire nyama, daily products, fats, oil Cuma kana plastic.

Maundu maria wagiriirwo nikurumirira riria urathondeka compost.

- Huthira handu hari na kiiruru.
- Humbira na marigu kana plastic.
- Itiriria maai riria kuri na riua.
- Gitira kumana na mbura(iria ingithambia unoru wothe).
- Ta njira ici, tigririra;
 - 1/3 “green vegetation” (nyeki, matunda, mboga, makorogoca, makoni, thumu, riia na mimera).
 - 1/3 ‘brown vegetation’ mahuti momu, straw, nuura, cardboard na matigari ma irio)
 - 1/3 indo nene ta miti.
 - Tigririra niwahuthira indo citari nambegu na ndukahuthire kindu kiri na murimu.
 - Iganirira indo ici hamwe na ndugakindire.
- Itiriria indo icio maai,humbira na utige niguo cibuthe gwa kahnda ka mieri ta iiri. Nouikare ugitukanagia indo icio.
- Indo icio cingiambiriria kununga, nikuga ati ciri na maai maingi kana green vegetation ni nyingi, ongerera brown vegetation na utukanie.

- Geria gukorwo na indo ici ciothe niguo utukanie, uitiririe maai na uhumbire na utigie 2-3 months mbere ya mbura niguo ukorwo uri mwega ukihanda.
- Thumu uyu wagiriirwo gukorwo uri wa brown na unyitanite. No ucunge thumu niguo wehutie giko na ukoro na mutukanio mwega.

Ikundi imwe cia TIST nichihuthagira njira ngurani na makona ciri njega na magataariria haha.

Kuhariria compost manure na TIST groups

- 1) Hariria handu ha 4mx4m ha kwenja irima.
- 2) Theria handu hau.
- 3) Enja irima ria 3-4m na 1.5 uriku.
- 4) Ungania matigari mothe ma irio na umatinangie tunini tunini(muhiano mahuti ma mabebe, muhia na mboco)
- 5) Itirira mahuti macio irima-ini na utigie 0.5m.
- 6) Ikira 5l cia muhu.
- 7) Ongerera 30cm mai ma mahiu.
- 8) Ikira mahuti mangi.
- 9) Ikira 5l cia muhu ingi.
- 10) Ikira mahuti nginya uihurie mahuti nginya uihurie irima.
- 11) Muthia, ikira tiiri nginya iguru.
- 12) Riria uraihuria tiiri, ikira muti miraihu gatagati niguo ukinye thi.
- 13) Eterera thumu waku matuku 90 kannaa (3months).
- 14) Gwa kahinda gaka, huthira maai mari na giko gwikira irima-ini. Kwa muhiano, thtutha wa guthambia nyumba, nguo huthira maai macio kana mathuguma ma mahiu.
- 15) Itiriria irima maai o muthenya na njira ino kana riria maai monekana.

Thutha wa 90days thumu waku niugukorwo uri mwega. Huthira muti uria uhandite gatagati ta thermometer – riria thumu wagira niwagiriirwo nigukokorwo uri muhiu na waruta muti ucio.

Mazingira Bora



TIST

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

Kiswahili Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Wanachana wa TIST Cluster ya Gikumene katika mkutano wao mwezi uliopita.

Ndani ya Gazetti:

Maendeleo ya TIST katika maeneo mapya ya Machakos na Nyamira. Page 2

TIST: Njia bora zaidi katika kilimo mseto. Page 4

TIST: Rutuba ya udongo. Page 5



Maendeleo ya TIST katika maeneo mapya ya Machakos na Nyamira.

Hivi majuzi, TIST imepanua mipaka hadi kaunti mpya ambazo zinajumuisha Muranga, Machakos, Nyamira, Trans-Nzoia, Nandi, Taita Taveta na Makeni. Mwezi huu, tuwajumuisha kwa maendeleo ya Kaunti ya Machakos na Nyamira.

Kaunti ya Machakos:

Hadi sasa, tumueanzisha cluster nne ambazo zinajulikana kama:

Cluster	Nambari ya vikundi vilivyoundwa	Wanachama	Nambari ya miti mipya iliyohesabiwa
Kakumini	37	223	4225
Kaluluini	18	109	4281
Mamba	34	199	0
Ndalani	50	312	10633

Wafuatao ndio viongozi wa sasa wa Cluster ya Kakumini:

Jukumu	Jina	Nambari ya simu
Kiongozi	David Mutua	+254704433206
Kiongozi Mwenza	Eunice Mbini	+254710428509
Uwajibikaji	Paul Makau Kivuvo	+254718210197
Mwakilishi wa kike	Eunice Musyoka	+254710428509
Mwakilishi wa kiume	Paul Makau	+254718210197

Wafuatao ndio Viongozi wa sasa wa Cluster ya Kaluluini

Jukumu	Jina	Nambari ya simu
Kiongozi	Mukai Peter	+254711351861
Kiongozi Mwenza	Theresia Karanja	+254724599436
Uwajibikaji	Robert Kimaile	+254718719930
Mwakilishi wa kike	Theresia Karanja	+254724599436
Mwakilishi wa kiume	Robert Kimaile	+254718719930

Wafuatao ndio viongozi wa sasa wa Cluster ya Mamba

Jukumu	Jina	Nambari ya simu
Kiongozi	Joseph Kiio Nzioka	+254718217381
Kiongozi Mwenza	Josphine Kanini	+254715176961
Uwajibikaji	Francis Musembi	+254717159951
Mwakilishi wa kike	Josphine Kanini Nzina	+254715176961
Mwakilishi wa kiume	Joseph Kiio Nzioka	+254718217381

Wafuatao ni Viongozi wa sasa wa Cluster ya Ndalani

Jukumu	Jina	Nambari ya simu
Kiongozi	Christine Nthenya	+254714260544
Kiongozi mwenza	Catherine Maingi	+2540700710745
Uwajibikaji	Simon Kioko	+254700710745
Mwakilishi wa kike	Catherine Maingi	+254725610569
Mwakilishi wa kiume	Simon Kioko	0700710745

Kaunti Ya Nyamira - Cluster nne

Cluster	Nambari ya vikundi vilivyoundwa	Wanachama	Nambari ya miti mipya iliyohesabiwa
Ratera	70	440	24763
Makairo	31	196	7701
Etono	15	99	8942
Ekerenyo	29	184	2686



Cluster zingine ambazo ziko kwenye mfumo wa kuundwa ni pamoja na Cluster ya Matorola yenye vikundi nane, Cluster ya Kebirigo yenye vikundi vitano, Cluster ya Kamwarani yenye vikundi vinne na Cluster ya Gesura yenye vikundi sita.

Wafuatao ni Viongozi wa sasa wa Cluster ya Ratera

Jukumu	Jina	Nambari ya simu
Kiongozi	Stephen Okundi	+254701681426
Kiongozi Mwenza	Valentinah Mumo	+254710397059
Uwajibikaji	Richard Okiega	+254712051041
Mwakilishi wa Kike	Valentinah Mumo	+254710397059
Mwakilishi wa kiume	Richard Okiega	+254712051041

Wafuatao ni Viongozi wa sasa wa Cluster ya Makairo

Jukumu	Jina	Nambari ya simu
Kiongozi	Robert Mong'are	+254702976637
Kiongozi Mwenza	Everlyline Momanyi	+254716340090
Uwajibikaji	Peter Makori	+254727707703
Mwakilishi wa kike	Everlyline Momanyi	+254716340090
Mwakilishi wa kiume	Peter Makori	+254727707703

Wafuatao ni Viongozi wa sasa wa Cluster ya Ekerenyo.

Jukumu	Jina	Nambari ya simu
Kiongozi	Frolence Onserio	+254705452760
Kiongozi mwenza	Shadrack Omenyi	+254737271329
Uwajibikaji	Pauline Nyongi	+254700678643
Mwakilishi wa kike	Pauline Nyongi	+254700678643
Mwakilishi wa kiume	Shadrack Omenyi	+254737271329

Wafuatao ni Viongozi wa sasa wa Cluster ya Gesura

Jukumu	Jina	Nambari ya simu
Kiongozi	Benard Magoma	+254712288547
Kiongozi Mwenza	Isabellah Chenge	+25495018542
Uwajibikaji	Chrisantus Rioba	+254715120629
Mwakilishi wa kike	Isabellah Chenge	+25495018542
Mwakilishi wa kiume	Chrisantus Rioba	+254715120629

Wafuatao ni Viongozi wa sasa wa Cluster ya Kamwarani

Jukumu	Jina	Nambari ya simu
Kiongozi	Wilson Ongere	0710970595
Kiongozi mwenza	Rose Moraa Momanyi	0717330803
Uwajibikaji	Samwel Mang'aria	0728951578
Mwakilishi wa kike	Rose Moraa Momanyi	0717330803
Mwakilishi wa kiume	Samwel Mang'aria	0728951578



TIST: Njia bora zaidi katika kilimo mseto.

Kilimo mseto ni kupanda miti mikubwa na mifupi pamoja na mimea na mifugo. Mchanganyiko huu unahitajika ili kuongeza uzalishaji kupitia matumizi ya miti. Miti ina faida nyingi kwa mkulima:

- Vifaa vya ujenzi
- Kuni
- Matunda na chakula kinginecho
- Lishe kwa mifugo
- Kushikilia udongo
- Kurutubisha udongo
- Kuweka maji udongoni kwa muda mrefu
- Kupunguza upepo
- Kupunguza mmomonyoko wa udongo, sana kwa maji
- Dawa
- Kivuli

Mazoezi katika kilimo mseto: Kuna mbinu nyingi tofauti na njia mpya zinazogunduliwa kila wakati. Mbinu zingine zinafanikia mahali pamoja lakini hazitumiki mahali penginepo. Zifuatazo ni baadhi ya njia zinazotumika sanasana katika kilimo mseto :

1. Uzio: Hili linajumuisha kuchagua aina ya mti itakayopandwa kwa mstari na ulio na faida katika shamba hilo. uzio unahitaji nafasi kidogo, unazuia mmomonyoko wa udongo na unatengeneza majani ya lishe ya mifugo au ya kufunika mchanga. Mfano wa uzio ni kupanda miti kwa mstari ikizunguka shamba. nafasi inayohitajika kati ya miti ni mita mbili au tatu. Njia bora ni kupanda miti mirefu pamoja na mifupi.

2. Upanzi wa mseto: Hili linajumuisha kupanda miti kwa nafasi ya mita mbili au zaidi kwa mstari ikipita shambani. kwaweza kuwa na mstari wa miti, halafu mstari miwili au mitatu ya mimea, halafu mstari wa miti, halafu mimea na kadhalika.

Mfano wa ukulima huu ni kupanda mstari ya mahindi ikipakana na ya *Leucaena* ama kahawa na ndizi.

miti inayofaa zaidi ni miti ya kunde (inayoweka naitrojeni kwenye udongo). nafasi kati ya mstari iwe zaidi ya mita tano. mstari ya miti yafaa kupaliliwa na majani kupunguzwa kila baada ya wakati. Miti isiwe mikubwa ili isishindane kupata lishe na mwangaza na mimea. Majani

yaliyopunguzwa yaweza kuongezwa udongoni ili kurutubisha udongo.

Miti iliyopunguzwa majani na kuwa kama miti ya kichaka haitalipwa na TIST kwa sababu haitaweza kuondoa kaboni, lakini itaboresha shamba la kulima na impe mkulima faida zingine nyingi. katika maeneo kame zaidi, njia hii si nzuri ama nafasi zaidi kati ya miti na mimea itatakikana ili isishindane sana kwa sababu ya lishe na maji.

3. Kuzuia upepo: Hii ni kupanda miti mingi kwa mstari ili kupunguza upepo, jambo ambalo linalinda mimea kutokana na upepo unaokuja. unianza kwa kupanda miti mikubwa kati kati, midogo zaidi kwa mstari miwili inayofuata na miti mifupi zaidi, halafu vichaka na nyasi nje. Faida ya miti hii ni kuwa mkulima hatoi shamba lote lipandwe miti. Kunachukua shamba kidogo na faida zaweza kuongeza mazao kwa asilimia thelathini katika maeneo mengine. Jua kuwa miti iliyopangwa vibaya yaweza kuharibu mimea zaidi kwa sababu inaelekeza upepo kupitia katika mapengo.

Find someone experienced in this to help you design your windbreak. Tafuta aliye na ujuzi akusaidie kupanga miti yako ya kuzuia upepo.

4. Kupumzisha shamba: Hapa mkulima anaacha kulima mimea shambani na kuacha miti ikue ili kusaidi kurudisha rutuba ya udongo.

5. Kupanda zaidi ya mmea mmoja: Hili linahusisha kupanda miti iliyo kwa umbali mmoja pamoja na vyakula. miti mizuri ni ile isiyo na matawi mengi na inayoweka naitrojeni udongoni.

6. Kuboresha ulishaji wa mifugo: Unafikia hili kwa kupanda miti katika shamba la kulisha mifugo ili kusaidia kupata mbao na chakula cha mifugo.

7. Kupanda miti mingi: Miti michache ilipandwa pamoja yaweza kukuzwa katika mashamba yasiyotumika kwa mfano katika maeneo yaliyo na mawe juu au mitaroni. miti hii yaweza pia kupandwa katika mashamba yenye mimea kuzuia upepo, ama ipandwe katika mashamba yaliyopumzishwa. Tafadhali jua kuwa miti ya TIST lazima iwe na nafasi iliyoelekezwa ili kukua hadi inavyofaa na kukaa udongoni kwa muda mrefu. Baadhi ya njia zilizo hapo juu za kilimo mseto ni njia bora zaidi katika ukulima, lakini hazitaweza kulipwa na TIST.



TIST: Rutuba ya udongo.

Udongo ni nini?

Udongo ni safu ya juu zaidi ya ardhi. Udongo una hewa, maji, viumbe hai na madini.

Udongo utengenezwa aje?

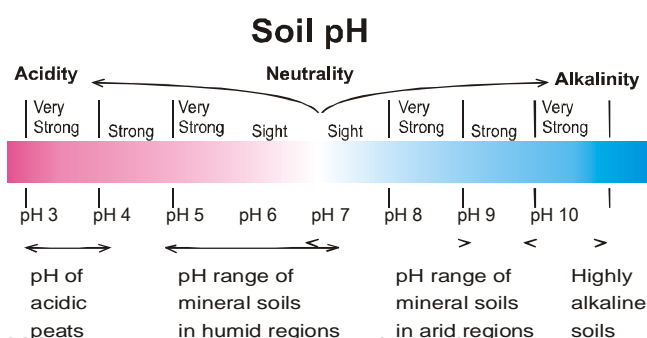
Kuvunjika kwa miamba ya mawe hutoa madini yanayoshikilia maisha ya mimea. Mimea ndipo huongezwa udongoni kama viumbe hai. Jinsi mawe zaidi yanavyovunjwa na mabaki ya viumbe hai zaidi kuongezwa ndivyo maji mengi zaidi yaweza kushikiliwa katika udongo, na kuendelea kuboresha ukuzi wa mimea.

Mbona mabaki ya viumbe hai ni muhimu?

Viumbe hai (sana sana kutokana na kuoza na kutengana kwa mimea) hutoa virutubisho vingi, vinavyopatikana ili kuchukuliwa na mimea mipya. Pia hushikilia maisha ya vijidudu vyenye faida vilivyopo katika udongo, husaidia maji kuingia udongoni na pia husaidia kushikilia udongo pamoja.

Ni nini huamua aina ya udongo unaopatikana?

- *Hali ya hewa:* joto pamoja na uwepo wa maji huathiri wepesi wa kuvunjika kwa mawe.
- *Viumbe hai:* bakteria, kovu na minyoo pamoja na viumbe hai vinginevyo vinavyoishi katika udongo. Baadhi yavyo hufanya kazi muhimu ya kuchanganya udongo kama minyoo. Viumbe hai katika udongo husaidia kuvunja vunjia viumbe hai na vingine husaidia kuingiza naitrojeni udongoni (kwa mfano Rhizobium bacteria).
- *Sura ya ardhi:* Kwa mfano, udongo katika miteremko ni kondefu zaidi kwa ujumla kuliko udongo uliopo katika mabonde.
- *Mawe ulipotoka udongo:* aina ya jiwe udongo ulipotoka.
- *Tabia ya binadamu:* tunavyotumia na kuhudumia udongo wetu huathiri rutuba kwa ukubwa.



Udongo unavyohisika kwa mkono huligana na ni kiwango kipi cha mchanga, silt na clay kilichopo. Picha iliyopo kwa ukurasa unaofuata inaonyesha aina za udongo tukifuatilia unavyohisika kwa mkono. Udongo unavyohisika kwa mkono na ulivyojengwa huathiri wepesi ambao mizizi itaingia kwa udongo na kiwango cha maji kinachowekwa.

Ni kwa nini PH ya udongo ni muhimu?

Jinsi udongo una acidi au chokaa (PH) huathiri virutubisho vilivyopo ili kutumiwa na mimea na vijidudu vipi katika udongo vyaweza kuishi. Kwa kijumla virutubisho vingi katika udongo umumunyika (na hivyo basi huwa tayari kuchukuliwa na mimea) katika udongo wenye acidi ikilinganishwa na usio na chochote au

uliona chokaa.

Hata hivyo, ikiwa udongo una acidi nyingi sana, bakteria hazivezi kuishi na jambo hili litaathiri kutenganishwa kwa viumbe hai. Udongo wa juu mwingi ulio mzuri huwa na PH ya kati ya 5.5 na 7.5 na huwa na rangi ya giza.

Udongo wenye rutuba ni upi?

Udongo wenye rutuba ni uliopo na virutubisho vinavyohitajika ili mimea kuishi kwa wingi.

- *Virutubisho vya kimsingi:* nitrogen, phosphorus, potassium.
- *Virutubisho vya sekondari:* sulphur, magnesium, calcium.
- *Virutubisho vinavyotakikana kwa kiwango kidogo:* iron, manganese, boron, chlorine, zinc, copper, molybdenum, nickel.

Mikakati ya kuboresha rutuba ya udongo

- Fikiria kuongeza naitrojeni (iliyopo katika mbolea ya kijani iliyotokana na mimea inayoweka naitrojeni udongoni) na Phosphorus (iliyopo kama Rock phosphate).
- Kusanya na utumie kinyesi na mikojo ya mifugo yako. Hii ni bora zaidi ikiwa katika mbolea iliyotengenezwa katika shimo. Vyanzo safi huwa na ammonia nyingi zaidi (ambayo hudhuru mimea) na vyaweza kuwa na vijidudu vingi zaidi (vijidudu vinavyoleta magonjwa). Mbolea iliyotengenezwa katika shimo huwa na wadudu wachache. Ikiwa utatumia mbolea isiyokauka, tumia kidogo na ukae kwa muda wa miezi miwili kabla ya kuweka tena.
- Ongeza viumbe hai kupitia kutengeneza mbolea kama ilivyoelezwa hapa chini
- Tumia njia bora zaidi za kilimo hai kama ilivyoelezwa katika makala ya hapo nyuma:
 - o Mzunguko wa mimea.
 - o kulima mimea tofauti pamoja.
 - o Kilimo mseto.
 - o Planting leguminous cover crops Kupanda mimea ya kufunika ardhi inayoongeza naitrojeni udongoni.
 - o Kuacha mashamba yakiwa hayajapandwa misimu mingine.
 - o Kufunika ardhi kwa mimea.
 - o Kutumia mashimo ya kilimo hai.
 - o Kupunguza mmomonyoko wa udongo unaosababishwa na maji kwa kupanda miti, kuchimba mitaro.
- Fikiria kupanda pamoja Pigeon pea (*Cajanus cajan*), *Dolichos lablab*, *Mucuna pruriens*, *Crotalaria*, *Canavalia*.
- Fikiria kuongeza jivu kwani lina madini ya calcium na potassium carbonate kwa wingi.
- Ongeza chokaa (lime) iwapo wajua udongo wako una acidi kali.
- Ni bora zaidi usiongeze virutubisho vingine (isipokuwa vilivyopo katika mbolea) kabla ya kupima udongo kwanza ili kuona ni virutubisho na madini vinahitajika.
- Kuna wakati mwingine unahitajika kuongeza mbolea ya viwandani. Tumia kama ilivyoelekezwa na ulizie nizi ni ni nzuri kwa mazingira ya eneo lako kupitia kupata ushauri kutokana na wasimamizi wa kilimo wako.

**Kutengeneza mbolea ya majani.**

Mboleo ya majani ni mbolea ya kiasilia ya kusaidia mimea yako kukua. Ni bora zaidi ya mbolea za viwanda kwani ni ya kiasili na haina athari za kuumiza mimea na

mazingira. Kuandaa mbolea hii ni moja ya njia zilizo nyepesi, zenye gharama ndogo na bora zaidi za kuboresha rutuba ya udongo.

Nitrogen	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)
<ul style="list-style-type: none"> Leguminous crops that are used as green manures or as mulch provide between 20 to 80 kg N / acre which can be used by subsequent crops. Blood meal/ leather meal 12-15% N. They are applied directly to the crops. Urines from all species contain pure urea (up to 1% N)- It is not a stupid idea to urinate on the compost heap! Poultry manure 8-20 kg N/t Pig manure 3-5 kg N/t Goat / sheep manure 2-4 kg N/t Cattle manures 2-3 kg N/t Compost * 1 kg N/t Manure teas and plant teas provide easily available nitrogen and can be used as top dressing or foliar feeds. 	<ul style="list-style-type: none"> Rock Phosphate 20-33% Bone meals 12-25% Poultry manure 10-25 kg/t Pig manure 3-6 kg/t Goat/sheep 2.5-4 kg/t Cattle manure 2-3 kg/t Compost * 4kg/t 	<ul style="list-style-type: none"> Wood ash 3-7% Goat / sheep manure 12 kg/t Cattle manure 5-12 kg/t Poultry manure 5-12 kg/t Compost * 6 kg/t Pig manure 3-7 kg/t Urines: 1-3 kg/t
<p>Content of purely vegetative compost. If compost is prepared with livestock manures, rock phosphate and wood ash, the product will have higher nutrient contents.</p> <p>Nutrient contents of manures and composts are highly dependent on handling and storage and on feed quality!</p>		

Ni nini hutumika kutengeneza mbolea hii?

- Masali ya mimea, magugu, majani yaliyokauka, mimea iliyokatwa, kinyezi na mikojo ya mifugo, matandiko ya mifugo, chakula kilichobaki jikoni kutokana na matunda na mboga, jivu, makaratasi yaliyokatwa na mbaao nyepesi.
- Usitumie nyama, vitu vinavyotokana na mifugo, mafuta, chuma au plastiki.

Mazoezi ya kijumla yaliyo bora zaidi katika maandalizi ya mbolea hii:

- Chagua eneo lenye kivuli la kuchimba shimo lako
- Funikia kwa majani ya ndizi au kwa karatasi ya plastiki.
- Nyunyizia maji wakati wa kiangazi.
- Linda dhidi ya mvua (ambao hubeba virutubisho)
- Kama mwongozo wa kijumla, lenga:
 - Sehemu moja kwa tatu 'mimea ya kijani' (nyasi iliyokatwa, matunda, mboga, mabaki ya mayai, mabaki ya mbegu za mafuta, magugu, mimea)
 - Sehemu moja kwa tatu mimea iliyokauka (majani makavu, nyasi iliyokauka, mabaki ya mbaao, mbaao nyepesi na masalamadogo madogo ya mimea).
 - Sehemu moja kwa tatu vitu vizito kama matawi yaliyokatwa na mabaki makubwa ya mimea.
 - Hakikisha unatumia mimea ambayo haina mbegu, na usitumie mimea iliyo na ugonjwa.
 - Weka vitu hivi kwa safu au katika shimo. Hewa huhitajika kutengeneza mbolea, kwa hivyo changanya vitu hivi pamoja na usifinyilie chini
- Nyunyizia maji, funika na uache ili vitengane kwa muda na miezi michache inayofuata. Waweza kukuchanganya tena kila baada ya wakati.
- Ikiwa mbolea itakuwa yenye kuteleza au inayonuka jinsi inavyoendelea, yaweza kuwa na maji mengi sana au kuwa na mimea ya kijani mingi sana. Ongeza mimea iliyokauka ili likionekana na uchanganye.
- Jaribu kuhakikisha masala yako yapo tayari kuchanganywa, kuwekewa maji, kufunikwa na kuachwa kwa miezi miwili au mitatu kabla ya msimu wa mvua kuanza ili mbolea iwe tayari wakati wa kupanda.
- Mbolea yafaa kuwa ya rangi ya kahawia na yenye kuvunjika kwa urahisi inapokuwa tayari. Waweza

kutenganisha mboleo iliyo na vipande vidogo vidogo na ile yenye vikubwa vikubwa, na kurudisha yenye vipande vikubwa shimoni ili iwe tayari wakati utakaofuata.

Baadhi ya vikundi vya TIST hutumia njia maalum zaidi ambayo waliiona kuwa yenye ufanisi. Wameeleza mchakato huo hapa chini:

Hatua za Maandalizi ya mboleo zinazotumika na baadhi ya vikundi katika TIST:

- Chagua eneo lenye upana wa mita nne na urefu wa mita nne la kuchimba shimo lako la taka
- Fagia sehemu hiyo.
- Chimba shimo la mduara lenye upana wa mita tatu au nne na mita moja na nusu kina.
- Kusanya masala yote ya mimea uliyo nayo na uyakate kuwa sehemu ndogo ndogo (kwa mfano majani na mashina ya mahindi, mtama, maharagwe)
- Weka masala haya ya mimea katika shimo ilo hadi kina cha nusu mita.
- Halafu ongeza lita tano za jivu.
- Halafu uongeze centimita thelathini (ama kiwango kiliopo) za kinyesi cha mifugo (kwa mfano kinyesi cha nguruwe, ng'ombe, mbuzi au kuku).
- Ongeza safu nyingine ya majani ya mimea na mashina (nusu mita).
- Ongeza lita zingine tano za jivu.
- Ongeza majani na mashina tena hadi shimo likaribie kujaa.
- Hatimaye, ongeza safu ya udongo hadi shimo lijae.
- Unapokuwa ukiweka udongo shimoni, ingiza fimbo ndefu katikati mwa shimo hadi ifike chini ya shimo.
- Liache shimo la taka kwa miezi mitatu (siku tisini).
- Katika kipindi hiki tumia maji yako machafu kuweka katika shimo hili. Kwa mfano, baada ya kuosha nguo au nyumba, yamwage maji uliyotumia juu ya shimo. Ikiwa una mifugo waweza pia kumwaga mikojo ya mifugo juu ya shimo.
- Jaribu kuweka maji kila siku kwa njia hii, ama wakati maji yapo.
- Baada ya siku tisini mbolea itakuwa tayari. Tumia fimbo kama kipima joto – mbolea inapokuwa tayari lazima iwe na joto na waweza kuona mvuke ukitoka kwa fimbo hiyo baada ya kuitoa.

Mazingira Bora



TIST

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

Kikamba Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Memba ma gwatanio ya TIST Gikumene thini wa umbano woo wa mwai muthelu.

Nthini:

Undu TIST iendee nthini wa iso nzau sya county sya Masaku Na Nyamira. Page 2

Uthukumi museo wa tist kwa kuendeesya uvandi wa miti vamwe na liu na kuithya indo. Page 4

TIST: Unou wa muthanga. Page 5



Undu TIST iendee nthini wa iso nzau sya county sya Masaku Na Nyamira.

Ivindani yiteyiasa, TIST niyathathaie na kuvikia isi nzau sya county ta Muranga, Machakos (Masaku), Nyamira, Tranzoia, Nandi, Taita-Taveta na Makeni. Mwai uu twikunikila undu TIST iendee nthini wa county sya masaku (Machakos) na Nyamira.

Kautii ya Machakos (Masaku)

Kwayu, Twina ngwatanio inya ila ni

Ngwatanio	Namba ya Ikundi ila imiseuvitye	Memba(Ene)	Miti myeu mitale
Kakumiini	37	223	4225
Kaluluini	18	109	4281
Mamba	34	199	0
Ndalani	50	312	10633

Vaa nthi vena masyitwa ma atongoi ma Ngwatanio ya kakuumini

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	David Mutua	+254704433206
Munini wa muungamii	Eunice Mbini	+254710428509
Mwiki wa masavu (mwii wa kinandu)	Paul Makau Kivuvo	+254718210197
Mutongoi wa aka	Eunice Musyoka	+254710428509
Mutongoi wa aume	Paul Makau	+254718210197

Kuatiia vaanthi navo vena masyitwa ma atongoi ma ngwatanio ya Kaluluini

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Mukai Peter	+254711351861
Munini wa muungamii	Theresia Karanja	+254724599436
Mwiki wa masavu (mwii wa kinandu)	Robert Kimaile	+254718719930
Mutongoi wa aka	Theresia Karanja	+254724599436
Mutongoi wa aume	Robert Kimaile	+254718719930

Kuatiia vaa nthi navo vena masyitwa ma atongoi ma ngwatanio ya Mamba

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Joseph Kiio Nzioka	+254718217381
Munini wa muungamii	Josphine Kanini	+254715176961
Mwiki wa masavu (mwii wa kinandu)	Francis Musembi	+254717159951
Mutongoi wa aka	Josephine Kanini Nzina	+254715176961
Mutongoi wa aume	Joseph Kiio Nzioka	+254718217381

Vaa nthi vena masyitwa ma atongoi ma ngwatanio ya Ndalani

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Christine Nthenya	+254714260544
Munini wa muungamii	Catherine Maingi	+254725610569
Mwiki wa masavu (mwii wa kinandu)	Simon Kioko	+254700710745
Mutongoi wa aka	Catherine Maingi	+254725610569
Mutongoi wa aume	Simon Kioko	+254700710745

Nthini wa Nyamira kaunti vena ngwatanio inya ila ni

Ngwatanio	Namba ya Ikundi ila imiseuvitye	Memba (Ene)	Miti myeu mitale
Ratera	70	440	24763
Makairo	31	196	7701
Etono	15	99	8942
Ekereyoi	29	184	2686



Ngwatanio ingi ila iendee na useuvw' ni vamw na Ngwatanio ya Matorola yina ikundi 8, Kebiringo yina kundi 5, Kamwarani mena ikundi 4 na ngwatanio ya Gesura yina ikundi 6.

Vaa nthi vana Atongoi ala mevo ma ngwatanio ya Ratera

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Stephen Okundi	+254701681426
Munini wa muungamii	Valentinah Mumo	+254710397059
Mwiki wa masavu (mwii wa kinandu)	Richard Okiega	+254712051041
Mutongoi wa aka	Valemtina Mumo	+254710397059
Mutongoi wa aume	Richard Okiega	+254712051041

Vaa nthi vana Atongoi ala mevo ma ngwatanio ya Makairo

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Robert Mong'are	+254702976637
Munini wa muungamii	Everlyne Momanyi	+254716340090
Mwiki wa masavu (mwii wa kinandu)	Peter Makori	+254727707703
Mutongoi wa aka	Everlyne Momanyi	+254716340090
Mutongoi wa aume	Peter Makori	+254727707703

Vaa nthi vana Atongoi ala mevo ma ngwatanio ya Ekereyo

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Florence Onserioi	+254705452760
Munini wa muungamii	Shadrack Omenyi	+254737271329
Mwiki wa masavu (mwii wa kinandu)	Pauline Nyongi	+254700678643
Mutongoi wa aka	Pauline Nyongi	+254700678643
Mutongoi wa aume	Shadrack Omenyi	+254737271329

Vaa nthi vana Atongoi ala mevo ma ngwatanio ya Gesura

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Benard Magoma	+254712288547
Munini wa muungamii	Isabellah Chenge	+254795018542
Mwiki wa masavu (mwii wa kinandu)	Chrisantus Rioba	+254715120629
Mutongoi wa aka	Isabella Chenge	+254795018542
Mutongoi wa aume	Chrisantus Rioba	+254715120629

Vaa nthi vana Atongoi ala mevo ma ngwatanio ya Kamwara

Kiwango kya mutongoi	Isyitwa	Simu
Mutongoesya (muungamii)	Wilson Ongere	+254710970595
Munini wa muungamii	Rose Moraa Momanyi	+254717330803
Mwiki wa masavu (mwii wa kinandu)	Samwel Mang'aria	+254728951578
Mutongoi wa aka	Rose Moraa Momanyi	+254717330803
Mutongoi wa aume	Samwel Mang'aria	+254728951578



Uthukumi museo wa tist kwa kuendeesya uvandi wa miti vamwe na liu na kuithya indo.

Uimi uyu wa kuvanda miti, ikuthu, kuithya na kuvanda liu in uetae wongeleku wa w'umi wa kisio kya muunda kwisila kutumia miti.

Miti yi vaita mwingi kwa muimi:

- Miti ya kwaka
- Ngu
- Matunda na liu
- Uithyo/Liu wa indo
- Kulumya muthanga
- Kuete unou wa muthanga
- Kusii kimeu kukuwa
- Kusii nzeve
- Kusii kukuwa kwa muthanga nguumoni sya mbusi
- Ndawa
- Muunyi

Nzia sya kuvanda miti vamwe na liu na ndithya Kwi nzia mbingi sya kuvanda miti vamwe na liu na ndithya, vala nzia imwe ni nzeo kwa isio imwe indi ti kwa ingi. Vaa ve imwe kati wa nzia sya uimi uyu.

1. Nima ya Wiio.

Ino ni nzia imwe ila mundu usakuaa muthemba wa miti ila ukuvanda ta wiio iatianie lainini umwe na ila yithiawa na vaita kwa muthanga. Wiio wendaa mwanya muni na nusii kukuwa kwa muthanga, matu ma wiio niutumwiwa ta liu wa indo kana kwikia muunyi ungu wa liu. Kwa ng'elekany'o mundu ni uvanda muti muthemba muna ta wiio muvakani. Utaaniu ula waile kwa miti ya wiio ni matambya eli kana atatu. Wanake museo niula uvulanitye miti imwe minene na ingi minini.

2 Nima ya kuvokany'a.

Ino Ni nzia imwe vala miti ivandawa iatianie lainini indi iyikiwa liu katikati . kwa ngelekany'o wavanda laini umwe wa miti uyikia laini itatu kana inya sya liu (mimea ta mbemba). Ngelekany'o nzeo ni leucaena na mbemba, Kaawa na Maiu. Miti miseo kaingi ya uvandaniw'a na liu ni ila inengae muthanga nzeve kana unou wa nitrogen. Utaaniu wa miti yi katikati wa liu waile ithiwa unyiva matambya atano (5m). Myanya ila yi katikati wa miti ino nikwaile ikala kwi kuime na kukathea kila ivinda na miti ino kusewa. Miti ta ino ndyaile kuekwa ikaasava muno nundu ya neneva muno niyambiia kuminia mimea/liu unou wa muthanga na kumivwika kyeni kya sua.

Matu ala masewa kuma mitini ino nomatumike kwa kuete unou kisioni kiiu.

Kaingi miti ya uvandaniw'a na liu ndithiawa na vaita kwa uimi wa TIST nundu ndiekawa ikaasava muno yithiawa ta ikuthu na kwoou nditonya utalika ivinda ya kuta nzeve itavisaa onakau nimiseo kwa muimi nundu ninoasya muthanga na kutuma ethiwa na usyao mwingi. Ingi isioni ila nyumu miti ino niyendaa utaaniw'a munango nikana ndi kathaane kiw'u na liu kuma muthangani na mimea/liu.

3. Kusii Nzeve.

Miti ino ivandawa uteeni ngaliko ila nzeve yisilaa na ivandawa mbee miti ila minene yi katikati , ikakaatiwa ni miti mininangi laini ili ila iatiie, ikuthu na indi nyeki. Vaita wa kusii nzeve ni kana mundu ndendaa kisio kinene indi no kasio kanini ka kitheka na nitonya kuete wongeleku wa ngetha wa kilungu kya 30% isioni imwe. Manya kana miti ya kusii nzeve yavandwa nai nietae wasyo ethiwa nzeve yeekw'angali imwe. Mantha mundu wina utuika wa kuvanda miti ino ya kusii nzeve.

4 Kueka kuima kisio na kukivanda miti.

Vaa ni vala muimi uekaa kuvanda liu kisioni kina na kueka miti imee nikana atunge unou wa muthanga.

5. Nima ya Kuvulanya maliu na miti.

lino yithiawa na myanya yianene ya miti na liu. Miti miseo ni ila yithiawa itena muunyi munene na yongelaa muthanga nitrogen.

6. Nima ya miti na ndithya vamwe.

Nzia ino ivikiawa kwa kusuvia na kuvanda mitii kisioni kila indo iuya kutethya kukwata ngu na liu wa indo.

7. Miti ya kuvandwa vamwe ta kamutitu.

Kamutitu kanini nikatonya uvandwa kundu kula itheka itena w'umi nesa kwa ngelekany'o kula kwi mavia na matw'iku. Tumititu no tuvandwe ta miti ya kusii nzeve kana kuvandwa kithekani kithiitwe kiteutumika. Kwandaia lilikana miti ya Tist nonginya ivandwe na utaaniu ula waile na kwikala vo kwa ivinda iasa nikana iete unzeo ula uvaniiwe.

Lilikana nzia imwe sya umi wa miti ninzeo kwa nima indi ititonya kuvitukithwa ivindani ya ndivi kwa TIST.



TIST: Unou wa muthanga.

Muthanga nikyau?

Muthanga nikaseemu ka yiulu ka nthi. Kethiawa na kiw'u, nzeve, unou, na uthwii wa nthi.

Muthanga useuvaw'a ata?

Mavia mathiana nimo masevvasya muthanga ula wendekaa ni miti kumea na kwikala. Ingi miti/mimea nisyokaa ikongeleelwa muthangani kuseuvya unouc wa muthanga. Oundu ivia yiendee na kuthiwa now'o mitiyongeleketete na unou wa muthanga kwaila nukana kiw'u kingi kithiwe kitonya ukwatwa ni muthanga na kuendeesya miti/mimea kumea na kwiana.

Niki unou wa muthanga wa vata?

Unou wa muthanga (kaingi useuvitw'e kaingi kuma kwoani kwa miti/matu) ila yumasya unou mwingi naw'o uyo swa ni miti ingi nikana yiane. Ingi unou uyu nutetheesya tusamu tula twikalaa muthangani ta yiumbi, mithowe, ngongoo, ing'au, kukwata liu nayo iitetheesya muthanga kukwata nzeve nakiw'u kwikala muthangani.

Nikyau kiamuaa muthemba wa muthanga?

- Nzeve: uvyuvu na uthithu wa vandu na kiw'u nisyo itetheesya ivia kuthiwa yila yisevvasya muthanga.
- Organisms: tusamu ta bacteria na fungi vamwe na mithowe, syingolondo na tusamu tula tungi twikalaa muthangani nitetheesya muno kuvulany'a muthanga na ingi kutuma matialyo ma mimea na matu moa na kusevvasya nzeve ya nitrogen ila yikiawa muthangani ni bacteria yitawa rhizobium.
- Utheeu wa vandu: (topograpohy) ethiwa vandu ni vatheeu niw'o muthanga wavo ukuawa na mituki na kutheew'a syandani.
- Muthemba we via: Undu ivia yila yithiikite yiilye.
- Mwikalo wa mundu: undu twatumia muthanga na kuusuvia nikuutumuma unou wa muthanga ueleeka.

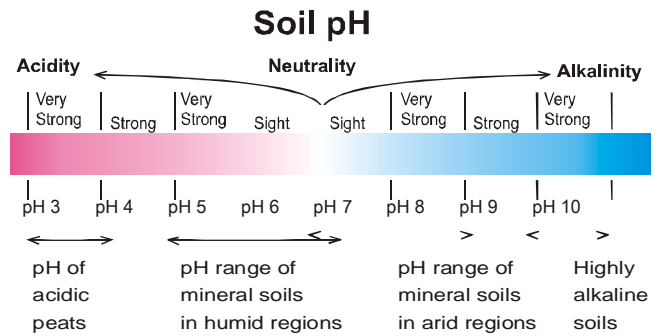
Ingi muthanga ula winaw'o uamuawa ni kithangathi, mututu na yumba yila yiusevivitye. Ve ivisa yi ithangu yila yiatiie yiukwony'a uaaniku wa muthanga. Uvinyu wa muthanga na undu uaanikite nuamuua undu mii ya muti ikulika muthangani na undu kiw'u kitonya kwikala muthangani.

Niki asiti kana PH ya vata?

Muthanga kwithiwa wina asiti mbingi kana wi alkali kii niamuaa undu miti ukumya unou muthangani na ni tusamu twau kana bacteria itonya kwikala muthangani usu. Kaingi monou maingi ma muthanga nimethiawa matonya uvikia mimea/miti malika kiw'uni yila memuthangani wina asiti mbingi kwi

ula wikatikati kana muthithu ute asiti.

Onakau muthanga wina aciti mbingi bacteria na mithowe mingi nditonya kwikala muthangani usu kwoou kwoa kwa matu/mavuti kutwika vuu uyithia kwi nthi na kwoou kusisiia kwiana kwa miti. Kaingi muthanga museo waile ithiwa na PH ya 5.5 kana 7.5 na wimwiu kwa langi.



Muthanga munou niwiva?

Muthanga munou nula wina nutrients syonthe ilasyikwendeka kwa muti kumea na kwikala.

- Nutrients sya mbee: Nitrogen, Phosphorus na Potassium.
- Nutrients ya keli: Sulphur, magnesium, calcium
- Ila syendekaa niini: Iron, manganese, boron, chlorine, zinc, copper, molybdenum na nickel PH ya muthanga Nzia sya kwongela unou wa muthanga.
- Ongele Nitrogen kwanzia ya vuu wa ngilini na phosphorus kwa ivia ya phosphate).
- Kolany'a vuu na maumao ma indo ula withiwa wi museo waindwa kwi wumite indoni na nokwithiwa wina tusamu twingi twa pathogens. vuu uyu usevvasya waindwa vandu va ivinda ya mai ili.
- Ongela vuu kwa nzia ino yivaa nthi.
- Tata utumie nzima ya kusuvia undu uvundiitw'e nii TIST.
- Kukuany'a mimea.
- Kuvandansya.
- Kuvanda mitii na liu.
- Kuvanda osyindu sya uvwika ta nthooko, na mboso.
- Kutia muunda kwa ivinda.
- Kutumia mavuti kuvwika.
- Kutumia maima ma nima ya kusuvia.
- Kuvanda miti kusii muthanga kikuwa kana kwisa mitau, fanya juu Kuvandansya uitumia Nzuu, Dolichos Lablab, Macuna Pruriens, Crotalaria, Canavalia.

Ongela muu ula withiwa na calcium, potassium carbonate Ongela lime ethiwa niwisi muthanga waku wina asiti mbingi

Ti useo kwongela minerals mbiongi eka ila syinthini wa vuu wa yiima utathimite muthanga ukamanya ni mineral yiva itevo na ikwendeka.



Ve ivinda yithiawa ukethia no wongelile vuu wa ndukani yaani vatalisa. Tumia kwiana na uelesyo wa ala maseuvisye kwianana na kisio kyaku na eka

maovisa ma nima ala me kisioni kyaku mautae iulu wa w'o.

Kuseuvya vuu wa yiima Vuu wa yiima

Nitrogen	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)
<ul style="list-style-type: none"> Leguminous crops that are used as green manures or as mulch provide between 20 to 80 kg N / acre which can be used by subsequent crops. Blood meal/ leather meal 12-15% N. They are applied directly to the crops. Urines from all species contain pure urea (up to 1% N)- It is not a stupid idea to urinate on the compost heap! Poultry manure 8-20 kg N/t Pig manure 3-5 kg N/t Goat / sheep manure 2-4 kg N/t Cattle manures 2-3 kg N/t Compost * 1 kg N/t Manure teas and plant teas provide easily available nitrogen and can be used as top dressing or foliar feeds. 	<ul style="list-style-type: none"> Rock Phosphate 20-33% Bone meals 12-25% Poultry manure 10-25 kg/t Pig manure 3-6 kg/t Goat/sheep 2.5-4 kg/t Cattle manure 2-3 kg/t Compost * 4kg/t 	<ul style="list-style-type: none"> Wood ash 3-7% Goat / sheep manure 12 kg/t Cattle manure 5-12 kg/t Poultry manure 5-12 kg/t Compost * 6 kg/t Pig manure 3-7 kg/t Urines: 1-3 kg/t
<p>Content of purely vegetative compost. If compost is prepared with livestock manures, rock phosphate and wood ash, the product will have higher nutrient contents.</p> <p>Nutrient contents of manures and composts are highly dependent on handling and storage and on feed quality!</p>		

niwakuseuvya vate kemikoo na nutetheeasya mimea kwiana. Withiawa wi museo nundu utumiaa syindu sya kwimesya itena kemikoo na ndwanangaa mimea na mawithyululuko. vuu uyu nilaisi kuseuvya na ndwingalama nene ta wakuua na nimuseo mbee kwa kwongela unou wa mithanga.

Nitrogen Phosphorus (P O) Potassium (K O) 2 5 2

Nikya kitonya utumiwa kuseuvya vuu wa yiima?

- Makusa/mavuti ma matialyo ma liu kuma muundani kana matu, usese, kyaa kya ngombe, maumao ma indo, matialyo ma liu wa andu, matunda, muu, mboka, mathngangi matilange na ingi mbingi.
- Ndukatumie nyama, maia, mauta, syuma kana plastic. Nzia nzeo sya kuseuvya vuu wa yiima
- Inza yiima vandu vena muunyi
- Vwika na matu ma maiiu
- Ngithya na kiw'u yila kute kwiu
- Siia mbua ndikakue unou.
- Atiia matambya aya 1/3 ya ngilini ethiwa ni matu, nyeki, matunda, yia kana miti 1/3 Matu momu kana ma langi wa muthanga (brown) ta mavemba, makusa, mutu wa musumeno etc 1/3 syindu ngito ta ngava ndilange lkiithya watumia kiko kya miti/mimea itanamba usyaa Nzeve niyendekaa kuseuvya vuu kwoou ikiithya niwavilany'a nisa na nduvinyiie muno vena nzeve.

Ikala uinginya, uwwikite na kueba vandu va myai kauta nikana yoee na ilikana nesa Woonaa yambiia uyunga muno veonany'a wikiite kiw'u kingi kana matu ma ngilini nimmo maingi kwoou ongela syindumbumu ta matu, mavemba, makusa na uivulany'a. Tata withiwe na syindu sya uvulany'a na kueuvya vuu tayali mwai ta ili kana itatu mbee wa mbua kwambiia

nikana utumie ivindani ya mbanda. Vuu uyu waile ithiwa ulyi muthanga(brown) na ulekanitye wavya. No usunge vuu uyu kumywa ikuli ila itaneevya na uitungia yiimani iendee uvya.

Ikundi imwe sya tist syithitwe iitumia nzia ino yivaa nthi kuseuvya vuu wa yiima nundu kwasyo yithitwe yi nzeo useuvya vuu wa yiima kwa ikundi imwe sya TIST:-

- 1) Kusakua kisio kya matambya 4 x 4m na kwisa yiima
- 2) Enga kisio
- 3) Inza yiima uthathau wa 3-4m na 1.5uliku
- 4) Kolany'a matialyo ma mavemba, muvya, mavoso na uitilanga tulungu tuniini
- 5) Ikia yiimani itumie uliku wa 0.5m
- 6) Ikia muu wa lita itano
- 7) Ongela kyaa kya indo ethiwa kivo kya uliku wa 30cm.
- 8) Ongela matu na makusa uliku ungi wa 0.5m
- 9) Ikia muu ungi wa lita itano.
- 10) Ongela matu na makusa withie yiima notayausua.
- 11) Ususya yiima na muthanga.
- 12) Uyusuya yiima ikia muti muasa kati withie utinite yiimani ungu.
- 13) Eka yiima yiu yiyiue vandu va myai itatu kana mithenya miongo kenda.
- 14) Ivindani yii yonthe osaa kiw'u kila kina kiko uketa vo ngelekany'o kila wavua nakyo kana kuthambya miiio. Ethiswa wina maumao ma indo no wite vo.
- 15) Tata navinya ungithye yima yii kila mithenya kwa nzia ila utonya.
- 16) Itina wa mithenya miongo keenda vuu wiithiwa wi tayali. Tumia muti uyu wikati ta kithimi kya uvyuvu. Vuu wasuva ukeethiwa wimuvyu na nowone muti uuyu waumya uitoo.

Mazingira Bora



TIST

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

Kipsigis Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Gikumene TIST Cluster members during their Cluster meeting last month.

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Tesetai TIST en komosuek chelelachen en Machakos ak Nyamira Counties.

En konegit ko koitich TIST kotoo keberuek chen kitom koit TIST en Counties kou Muranga, Machakos, Nyamira, Tans-nzoia, Nandi, Taita-Taveta ak Makueni. En nguni kotesetai en Machakos ak Nyamira.

Machakos County

En inguni kotesetai kilastaisiek anguanu choton ko chu:

Kilasta	Kurubisiek	Membaek	Ketik
Kakumini	37	223	4225
Kaluluini	18	109	4281
Mamba	34	199	0
Nandi	50	312	10633

Kondo che miten en Kakumini kilasta:

Otebto	Kainet	Simoit
Kondointe	David Mutua	+254704433206
Rubeiwot	Eunice Mbini	+254710428509
Chemotogo	Paul Makau Kivuvo	+254718210197
Ne tononchin kotab korgo	Eunice Musyoka	+254710428509
Ne tononchin kotab murenik	Paul Makau Kivuvo	+254718210197

Kondo che miten en Kaluluini kilasta:

Otebto	Kainet	Simoit
Kondointe	Mukai Peter	+254711351861
Rubeiwot	heresia Karanja	+254724599436
Chemotogo	Robert Kimaile	+254718719930
Ne tononchin kotab korgo	Theresia Karanja	+254724599436
Ne tononchin kotab murenik	Robert Kimaile	+254718719930

Kondo che miten en Mamba kilasta:

Otebto	Kainet	Simoit
Kontointet	Joseph Kiio Nzioka	+254718217381
Rubeiwot	Josephine Kanini	+254715176961
Chemotogo	Francis Musembii	+254717159951
Ne tononchin kotab korgo	Josephine Kanini	+254715176961
Ne tononchin kotab murenik	Joseph Kiio Nzioka	+254718217381

Kondo che miten en Ndalali kilasta:

Otebto	Kainet	Simoit
Kontointet	Christine Nthenya	+254714260544
Rubeiwot	Gatherine Maingi	+254700710745
Chemotogo	Simon Kioko	+254705610569
Ne tononchin kotab korgo	Gatherine Maingi	+254700710745
Ne tononchin kotab murenik	Simon Kioko	+254705610569

En Nyamira County ko miten:

Kilasta	Kurubisiek	Membaek	Ketik
Ratera	70	440	24763
Makairo	31	196	7701
Etono	15	99	8942
Ekerenyo	29	184	2686



Miten anyun che tesetasi koyumigei kou Matorola kotinye kurubisiek 8, Kebirigo5, Kamwaruki 4 ak Gesura 6.

Kondo che miten en Ratera kilasta:

Otebto	Kainet	Simoit
Kontoindet	Stephen Okundi	+254701681426
Rubeiwot	Valentinah Mumo	+254710397059
Chemotogo	Richard Okiega	+254712051041
Ne tononchin kotab korgo	Valentinah Mumo	+254710397059
Ne tononchin kotab murenik	Richard Okiega	+254712051041

Kondo che miten en Makairo kilasta:

Otebto	Kainet	Simoit
Kontoindet	Robert Mongare	+254702796637
Rubeiwot	Evaline Momanyi	+254716340090
Chemotogo	Peter Makori	+254727707703
Ne tononchin kotab korgo	Evaline Momanyi	+254716340090
Ne tononchin kotab murenik	Peter Makori	+254727707703

Kondo che miten en Ekerenyo kilasta:

Otebto	Kainet	Simoit
Kontoindet	Florence Onserio	+254705452760
Rubeiwot	Shadrack Omenyi	+254737271329
Chemotogo	Pauline Nyongi	+254700678643
Ne tononchin kotab korgo	Pauline Nyongi	+254700678643
Ne tononchin kotab murenik	Shadrack Omenyi	+254737271329

Kondo che miten en Gesura kilasta:

Otebto	Kainet	Simoit
Kontoindet	Benard Magoma	+254712288547
Rubeiwot	Isabellah Chenge	+254795018542
Chemotogo	Chrisantus Riobo	+254715120629
Ne tononchin kotab korgo	Isabellah Chenge	+254795018542
Ne tononchin kotab murenik	Chrisantus Riobo	+254715120629

Kondo che miten en Kamwarani kilasta:

Otebto	Kainet	Simoit
Kontoindet	Wilson Ongeru	+254710970595
Rubeiwot	Rose Moraa Momanyi	+254717330803
Chemotogo	Samuel Mangaria	+254728951578
Ne tononchin kotab korgo	Rose Moraa Momanyi	+254717330803
Ne tononchin kotab murenik	Samuel Mangaria	+254728951578

Miten orit kikumeme TIST kilasta en tuiyet nebo arawani konye.



TIST: Practise ne kararannebo Agroforestry.

Agroforestryko mine tab ketik ak osnoshekak minutik alak che kiome anan ko chebo tuga . Maana nebo agroforestry ko ketes ruret ab imbarenik kobune minet 'ab ketik . Ketik kotinye manufaa chechang' en temindet:

- Tuguk 'ab tegset.
- Kwenik
- Logoek ak omitwogik alak
- Omitwogik 'ab tuga
- Toret 'ng'ung'unyek.
- Toldolindab ng'ungunyek.
- Ribe bek chemiten koristo.
- Tre koriswek.
- Ribe ng'ung'unyek komoib bek sanasana oinoshek.
- Kerichek.
- Urwek.

Practices nebo Agroforestry: Kogochang'a oratinwek chekimuche keyaen agroforestry ago teseta kobitu chechang' kila en kila. Oratinwek alak komuche kobore en komoswek alak ago mobore en komoswek alak . Che isubu ko otratinwek che nootin:

1. Hedges: Inoni ko oret ne kimine ketik en lainit asi kotoret imbaret. Hedgeskomoche space ne kiten , tere erosion , ago icheru sogek chekiboishen koig omitwogik 'ab tuga .Koborunet nebo niton ko kemin ketik en tobonwek 'ab imbarenik .Lochindo nekimogching'e ko 2m – 3m. Style nekararan ko kemin nebo circles.

2. Alley cropping: Inoniton komoche kemin ketik en spacing nebo 2m ak en rowishek . imuche komiten rowit 'ab ketik asikosubu minutik en rowishek oeng' anan ko somok ,agityo kosibge kounoton.

Koborunet 'ab niton ko minet 'ab bandek aka leucaena, anan ko coffee ak indizininik.

Ketik che kororonon ko che leguminous(Cho icheru nitrogen koba ng'ungunyek). Spacing en ketik ko yoche ko 5m.Rowshik choton bo ketik koyoche keistechin timdo en kila kenyt. Moyoche korut ketik koyechegitun angamun sindochinge ak minutik omitwogik ak asista. Yon kogibrunen sogek

kimuche kabach en ng'ung'unyek asi koig mbolea.

Ketik che kiiburyo kou timin ko momogotin en TIST payments ang'amun mogonu carbon chematin ,Alakini toreti imbaret agokon manufaa alak chechang'. En komoswek cheyomyotin ,komoimuche kogararan oraniton anan ketese lochindab ketik ak minutik alak asikoma borchin omitwogik chemiten en ng'ung'unyek ak asista.

3. Windbreak: Inoni ko minet 'ab ketik chtinye strips chechang' asikoter koriswek, che tere komowech koriswek minutik koriswek che yach. Inome imine ketik che yechen en kwenet,ketik chemengechen kosubu en rowishek oeng' agityo kosub shrubs, agityo kosub bushes ak suswek.Kororonindab windbreakers ko moyoche komin temeindet ketik en imbaret tugul lakini en komosto ne kiten .Moche imbaret ne kiten , ago manufaa kotese rurutik en 30% en komoswek alak . Ibwat ile windbreakers chemagimin komye koweche minutik ang'amun pune koristo konyik.

Imuche icheng' chi netinye naet en komositon kotoretin .

4. Fallow cropping: En oraniton koyoche kobagach imbaret temindet komagimin asi korut ichegen ketik agowek toltolindab imbaret.

5. Inter-cropping(minet ak minutik alak):En orani koyoche kogochi spacing ketik temindet en kwenititab minutik. Ketik che kororon kochon tinye canopies ago icheru nitrogen.

6. Grazing improvement: Imuche temindet kochomchi tuga koaam ole miten ketik ago koribe komowech ketik.

7. Woodlots: Woodlots che meng'echen kimuche kemin en imbarenik chetomo keboishen , kou. woodlotschekimuche kemin en ole miten koig anan ko olemiten gullies.Woodlots kimuche kora kemin koig windbreak, anan kemin en fallowland. Ibwat ile ketik ab TIST koyoche kigochi space negararn akoyechegitun komye ak en let kong'et en ngweny kogage. Alak en oratinwechubo agroforestryko oratinwek chekororon en minset, lakini imuch komoitchi lipanet neboo TIST.



TIST okwoindab ngungunyek.

Ngungunye ko nee?

Ngu ngunyek ko kebeberta nebo emet netinye koristo, beek nunanikab ketik ana ko tiongik ak kotinye munyuk.

Chebtogei ono ngungunyek?

Bitu murmuranikab koik kotinye munyuk chetoreti sobetab minutik, kotesin minutik en ngungunyek, so ye yoose kouni kotesin beek kotuiyo ak kogochi minutik kobwa.

Amunee asi kobo komonut ngetunonik?

Bo komonut amun yekagonunchi nguwendet kotinye omitwogik che igochin minutik korut toreti kora kutik chemiten ngungunyek ak kotoretich koyomo anan kutuiyo koik agenge.

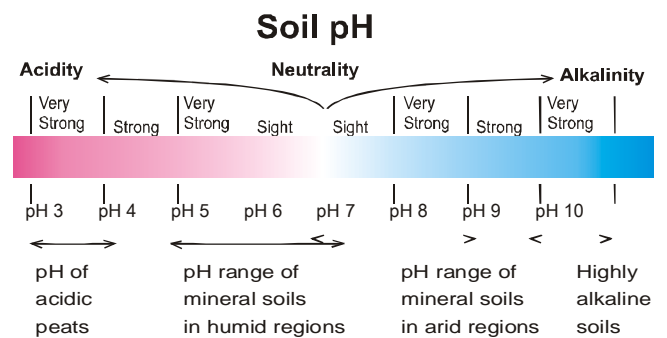
Nee ne ibesto ngungunye yekinyor?

- Burgeyet, burge burgeiyet ak beek kogochin koik kobusbusak.
- Kutik chang kutik che menye ngowindet anak koburucheni ngungunyek anak kogochi nunet asi kobit emitwogikab minutik.
- Ole emet niton anyun kotiyengei ole kiiburto emet, en tunonok konyumnyum ibetab koik kosir ole soet.
- Uketab nhungunyek niton kotiyengei ole kigi tounto koik ngungunyek.
- Otebetab kimulmet otebetab biik ak ole koribto ngungunyek asi moibet okwoindo.

Koyometab ngungunye kotingei chongitab ngainet, menet, ak ole gigitounto, miten anyun koborunet nebo ngungunyek en pichaini koyomoniton bo ngungunyek konyumnyum en tigikab ketit kosib, ak koboru beek chemiten,

Amunee asi kobo komonut PH?

Miten anyun ngungunye che tinye munyuk chechang kot kosir anak niton koweche (PH) ak omitwogikab minutik, kimuchi ketoretito ono kutik che menye ngungunye en munyu chuton ko chechang ko eiyomogei ak beek ko chotos akosigi minutik omitwogik, ole miten munyuk chechang komosigin kutik kochanga niton ko gochin nunet kwo nguwoy, ngungunye chegororon kotinye PH kongeten 5.5 ak 7.5 ago tueen en keret.



Nee okwoindab ngungunyet?

Ngungunyat ne kararan kotinye omitwogik che igochin sobet minutik.

- Omitwogik che tai; nituogen, phosphorus, potassium.
- Chebo oeng; sulphur, magnesium, calcium.
- Ak chechang; iron, manganese, boron, chtonine zinc, copper, molybdenum, nickel.

Koguwoitik che kitisin ngungunyek

- Ketesi omitwogik keboisien kegot rurutik che teche nitrogen.
- Keboisien keture chebo tuga ak sogororek kiruruche asi komumiyo mogiboisien ko morurio.
- Tesin ngetunanikab minutik.
- Kegol imbaret ma kibat.
- Kemin minutik che besiotin.
- Kemin ketik che moweche minutik ak che



ichugei en kwong kou, robuwonik, chebololet ak sotonik.

- Kemin ketik asi koter ngungunyek.
- Miten ketik che tinye ngendek –pigeon.

Nitrogen	Phosphorus (P ₂ O ₅)	Potassium (K ₂ O)
<ul style="list-style-type: none"> • Leguminous crops that are used as green manures or as mulch provide between 20 to 80 kg N / acre which can be used by subsequent crops. • Blood meal/ leather meal 12-15% N. They are applied directly to the crops. • Urines from all species contain pure urea (up to 1% N)- It is not a stupid idea to urinate on the compost heap! • Poultry manure 8-20 kg N/t • Pig manure 3-5 kg N/t • Goat / sheep manure 2-4 kg N/t • Cattle manures 2-3 kg N/t • Compost * 1 kg N/t • Manure teas and plant teas provide easily available nitrogen and can be used as top dressing or foliar feeds. 	<ul style="list-style-type: none"> • Rock Phosphate 20-33% • Bone meals 12-25% • Poultry manure 10-25 kg/t • Pig manure 3-6 kg/t • Goat/sheep 2.5-4 kg/t • Cattle manure 2-3 kg/t • Compost * 4kg/t 	<ul style="list-style-type: none"> • Wood ash 3-7% • Goat / sheep manure 12 kg/t • Cattle manure 5-12 kg/t • Poultry manure 5-12 kg/t • Compost * 6 kg/t • Pig manure 3-7 kg/t • Urines: 1-3 kg/t
<p>• Content of purely vegetative compost. If compost is prepared with livestock manures, rock phosphate and wood ash, the product will have higher nutrient contents.</p> <p>Nutrient contents of manures and composts are highly dependent on handling and storage and on feed quality!</p>		

- Kitesin orek tinye (calcium, potassium carbonate).
- Momeche ketesi komenai anan kotomo ichigil ngungunyek, karara mising itenyoru chitab minutik as kuwororun abo noton.

Keturek

Keturek ko omitwogikab minutik che kitounen kinun en kasrta nenin che mogitesi chemical, motinye weget en minutik, amoweche ngungunyek.

Kitounen nee keturek

- Ngetunonikab minutik, sogek, ak kitage tugul ne yamat ana ko nyali.
- Matiboisien kou bendo, mwanik, chumoinik anan ko plastic.

Ole kimumto

- Lewen ole miten uluwet.
- Tugen sogek kab itisio/chebebe.
- Tumchin beek en kasartab kemeut.
- Tekten en robta.

Kosibet

- Agenge en somok (minutik che nyolilelen, susuwek, ingewek, logoek, sorowekatugal nego ngechinek).
- Agenge en somok sogek che tolilionen.
- Agenge en somok ko sogekab ketik.
- Ker ile neboisien tuguk cheyachen amun weche keturek.
- Tugul anyun ki nto keringet orit amat igony

amun kimogin koristo en orit.

- Igoteb en kasarta nebo orowek asi iburuch tugul koik agenge.
- Ye igas nguunet beo itesi sogek chenyolilen ak iburuchen.
- Ye kainte tuguchuton tugul kou beek igotebi orowet 2-3 asi iib koba imbar.

Miten kosibet ne kigochob temikab tist kou yeisibu

1. Lewen ole itounen keturet 4mx4m.
2. Igot tililit yoton.
3. Tem keringet 3-4m ak 1.5m orit.
4. Iyumchin kayumanik tgugul yoton.
5. Rongik kot koit 0.5m.
6. Tesin orek che keburuch ak orek.
7. Neisibu ites kot goit 30cm ngototokab tuga anan kobo ngororek.
8. Tesin sogek kot korigta konyi.
9. Nebo let anyun ite ngungunye kot konyi.
10. Rutin keti ne tenten kuwenetab keringet kot kotiny kel.
11. Igo munyo en kasarta betusiek 90.
12. Tesin beekab orek 5 litres.
13. Tesin sogek ak mobek (0.5m).
14. En kasariton iyumchi beek chon iboisien imweten ingoroik anan ko keun kot.
15. Tumchin beek en betut angetugul yon kobit beek.
16. Ye ibata betusiek 90 ko gorurio keturek boisien ketit asi koborun mat nemi orit, imuch iger kabusetab karisto nebunu keringat.