

### 3. Mokeli-keli Oa Mononts'a

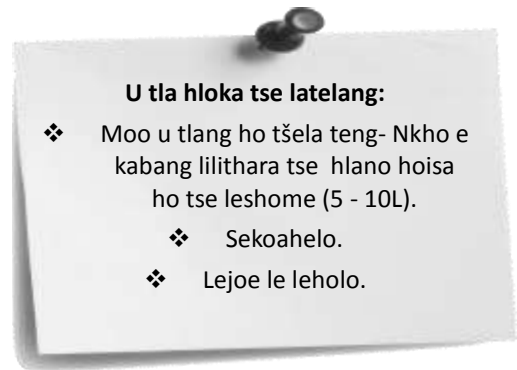
Tšebeliso ea mokeli-keli ke tsela e bobebe ea ho fa lijalo tsa hau matla. Mokeli-keli o ka etsoa ka manyolo a semela kapa a liphoofofo. Sepheo mona ke ho fa lijalo tsa hau lijo tsa thlaho ka pele nakong eo lintseng li hola. Mokeli-keli ona le bohlokoa haholo ho lijalo tse hlokanang lijo tse ngata joalo ka k'habeche.

#### Mokhoa oa ho etsa mokeli-keli ka semela

Semela se setle bakeng sa ho etsa mokeli-keli ke se bitsoang comfrey. Hape u ka sebelisa mahaba/makhasi a matala, lehola le lehlaka. Qoba ho sebelisa limela tsenang le menkho e bohale. Ka ha limela ka ho fapana li entsoe ka likaroloana tse sa lekaneng tsa matsoai, hape le tsona linka matsoai a sa lekaneng mobung, khothaletso ke hore u sebelise mefuta e sa tšoaneng ea limela, hoetsa mokeli-keli.

- ❖ Hlatsoa nkho ea hau pele u e sebelisa.
- ❖ Bokelletsa limela ebe u li tšela ka nkhang. U tšoanela ho lula u ntse u eketsa limela tsena beke le beke.
- ❖ Beha lejoe holima limela ebe u kaohela nkho ea hau. Se ke oa tšela metsi. Limela tsena li tla iketsetsa metsi ka bo tsona.
- ❖ Beha nkho ea hau letsatsing ebe u e hloela kamorao ho libeke tse peli ho bona hore na limela ha li eso fetole 'mala li be ntšo. Ha u ka oa sekamisa nkho u tla bona metsi a matšo. Metsi a matšo a no ke oona mokeli-keli o etsoang ke limela, feela o loile haholo o batla ho kopangoa le metsi.
- ❖ Kopanya mokeli-keli le metsi ka tsela ena:
  - Sethopo:** Lekolokoti le le leng la mokeli-keli ho a mane a metsi
  - Lijalo tse kholo:** Lekolokoti le leng la mokeli-keli ho a mabeli a metsi

Ha mokeli-keli o loile haholo, o tla chesa lijalo tsa hau. Beke tse ling le tse ling tse peli, tšela lekolokoti le le leng la mokeli-keli sejalong ha u qeta ho se tšella. Sebelisa lekolokoti le lekanang le botlolo e kholo ea jeme.

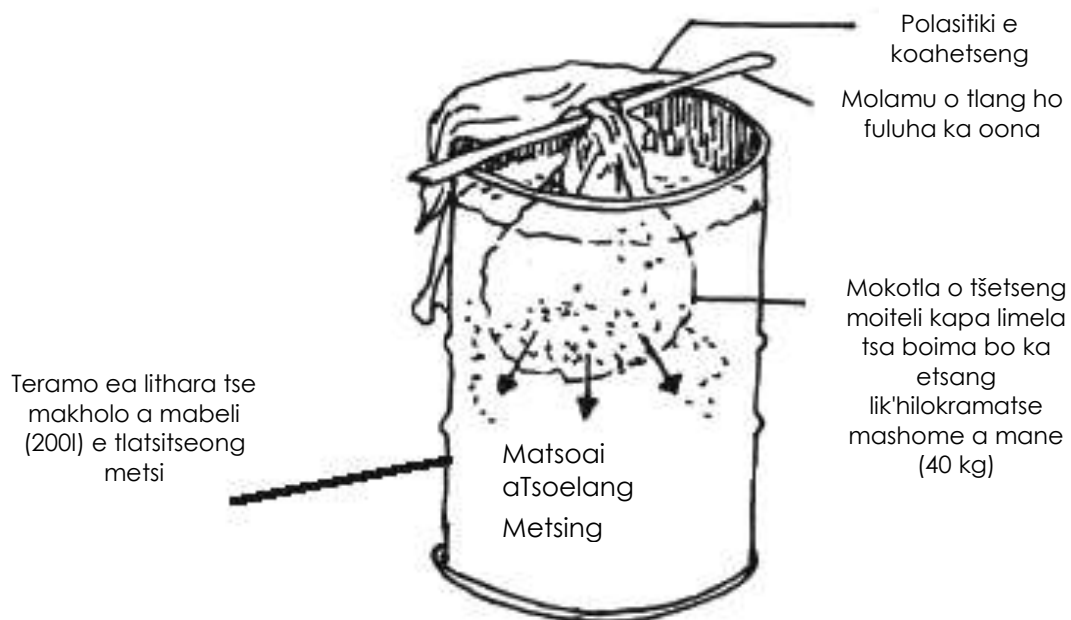


## Mokhoa oa ho etsa mokeli-keli ka moiteli

Moiteli oka sebelisoang ke oa likhomo, likhooho, meutlanyana, linku le lipoli. U khothaletsoa ho sebelisa moiteli o kopantsoeng le e meng.

- ❖ Tšela motsoako oa moiteli ka mokotleng ebe u oa fasa.
- ❖ Tšela mokotla oo ka nkhong kapa ka teramong, ebe u fasselletsa molamung kapa lerapong. Tlatsa nkho/ teramo ka metsi. Ho k'hilokrama e le ngoe ea moiteli, tšela li lithara tse leshome tsa metsi. Ka tsela e na re qoba ho kopanya metsi le moiteli kaha moiteli o metsi ha o oa lokela lijalo.
- ❖ Koahela nkho/teramo. Lula u ntse u fuluha ka mora matsatsinyana.
- ❖ Kamorao ho beke tse peli, mokeli-keli o tla be o lokile hore o ka sebelisoa. O tlameha ho shebahala joalo ka tee e sa loeang. Pele o u sebelisa, u fuluhe haholo.
- ❖ Ka ha mokeli-keli o tlabe o loile haholo, u kopanye le metsi tjena:  
**Sethopo:** Lekolokoti le le leng la mokeli-keli ho a robeli a metsi  
**Lijalo tse kholo:** Lekolokoti le le leng la mokeli-keli ho a mane a metsi.

Ha mokeli-keli o loile haholo, o tla chesa lijalo tsa hau. Beke tse ling le tseling tse peli tšela mokeli-keli sejalong ha u se u qeta ho se tšella. Sebelisa bonyane lekolokoti le le leng / botlolo e kholo ea jeme bakeng sa ho tšela mokeli-keli sejalong se le seng. Qoba ho tšela mokeli-keli motšea kapa ha ho chesa haholo.



## 4. Thlahiso ea sethopo



*Setšoantšo sena se bontšamokhoa oa ho koahela leifo la sethopo ka matlakala a roketletsoeng 'moho. Sethopo se sirelelitsoe khahlanong le lebatama la letsatsi le moea o phallang ka matla.*

### Sethathong

- ❖ Etsa bonnete ba hore u na le peo e ntle e sa bolang
- ❖ Etsa bonnete ba hore u na le mokhoa oa ho fumana metsi a hloekileng haufinyane, (metsi a seretse ha a hlokahale ho hang!)
- ❖ Etsa bonnete ba hore u na le mobu o nonneng o senang lehlabathe. U khotlaletsoa ho bala sehloho "Ntlafatso ea mobu".
- ❖ Etsa bonnete ba hore ho na le moriti moo u ka sireletsang sethopo sa hau.

#### Melaonana ea bohlokoa ka metsi

- ❖ U tlameha hoba le metsi haufinyane
- ❖ Metsi a lokela hore a be a hloekileng. Metsi a litšila, ana le seretse se sengata a tla sitisa sethopo ho hlaha.

#### Melaoana ea bohlokoa ka peo

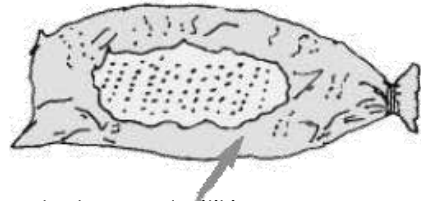
- ❖ Sebelisa peo e ncha. Peo e lokela ho bolokoa selemo ho isa ho tse peli (1-2) feela. Ha u reka peo, sheba pakete eo ea peo hore na e na le nako e kae. Le uena u ka iketsetsa tlhathlobo ea ho bona hore na peo eo u nang le eona e ka hlaha na pele u jala serapa kaofela (Talima qetello ea leqhephe)
- ❖ Peo e lokela ho behoa moo ho pholileng, moo e sa chabeloeng ke letsatsi e bile ho se mongobo. Haeba u reka peo, e tsa bonnete ba hore peo eo e lutes moo ho pholileng, ha e ea chabeloa ke letsatsi, hape ha ho mongobo. Ha eba lipakete tsa peo li lutse moo li chabetsoeng ke letsatsi, ho hang u seke oa lireka
- ❖ Haeba u ipehetse peo lilemong tse feteling, etsa bonnete ba hore ha ena hlobo, mengoapo, likoti le ho peperana.
- ❖ Haeba u rekile peo, kamorao ho pakete, ngola selemo le khoeli tseo u e rekileng ka tsona, u tle u tsebe ho ikhopotsa matsatsing a tlang.
- ❖ Netefatsa hore peo eo u ikotuletseng eona serapeng u e jala kamo'a nako e itseng. Ha u ka e jala hang kamor'a kotulo, moroho o tla thunya le ho etsa peo kapele.



## Liteko

Thlathlobo/teko ea ho bona hore na peo e tla mela. Etsa teko ena haeba u belaela peo ea hau o bona e ka e ke ke ea mela

Pele u jala, uka e tsa teko ea ho bona hore e feela peo eo u nang le eona e tla mela, 'me hona ho tla u bontša hore na ke peo e kae e tlang ho mela.



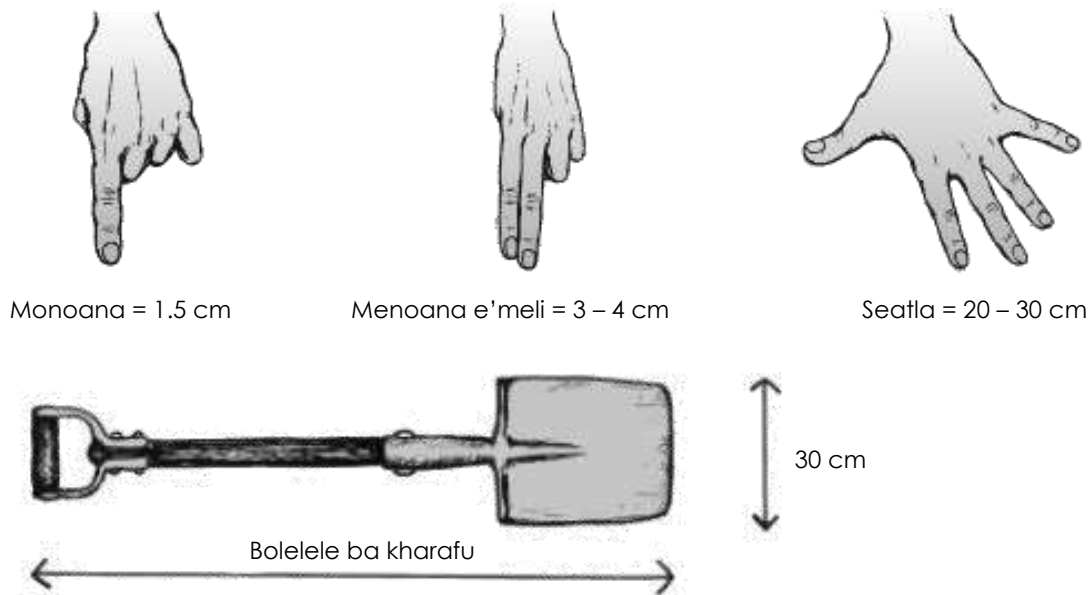
Mocheso ka hara polasetiki o bakiloeng ke lesela le mongobo

- ❖ Nka peo tse mashome a mahlano (50), li behe holima pampiri kapa lesela le mongobo. Se ke ua flohela peo ka metsing kapa ua e omisa haholo.
- ❖ Beha pampiri kapa lesela le phuthetseng peo ka hara polasetiki, e butsoele u ntano e koala.
- ❖ Hlahloba peo khafetsa ho bona hore na ke tse kae tse metseng. Peo ena e polasetiking e kanna ea nka matsatsi a mararo hoisa ho a leshome (3-10 days) hore e mele.
- ❖ Kamora'o ho moo, bala lipeo tse metseng.

Mohlaleng o ka holimo, lipeo tse mashome a mane ho tse mashome a mahlano li eli tsa mela. Hona ho bolela hore ke mashome a robeli lekholong (80%) a peo e metseng.



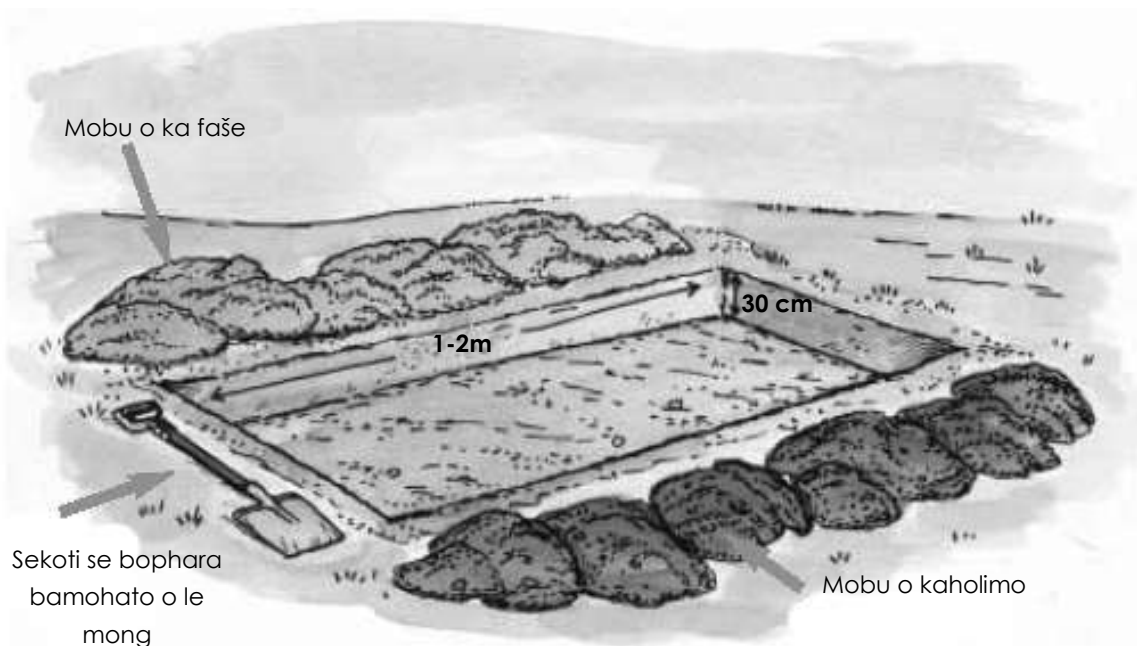
## Mokhoa oa ho metha



## Tokiso ea leifo

Leifo ke sebaka serapeng se nang le mobu o manoni, ho bile hona le mokhoa oa ho sireletsa sethopo seo letsatsing, le hore sethopo se se ke sa fumana serame.

Cheka sekoti 'me u lekanye ka kharafu, bophara le bolelele ba eona. Sekoti se be bolelele ba mohato kapa mehato e 'meli (1-2m).



Ha u ntse u cheka sekoti, etsa bonnete ba hore u arola mobu o ka holimo (hangata

o tla fumana o le motsonyana tjee) ho o mong. Lema kahare ho sekoti e le ho qhalakanya mobu o se ke oa eba le makoete.



Kopanya mobu o neng o le kaholimo ha u ne u cheka sekoti ka likarolo tse lekanang le manyolo, motsoako oa molora kapa mosuela. Tlasa sehloho sena "Ntlafatso ea mobu", u tla bala ka mekhoea ea ho lokisa manyolo le mosuela.



Ha u qeta ho etsa motsoako ona, u sefe pele u o buetsa. Ha u sena sefe, e tsa bonnete ba hore motsoako ha o na lintho tse kang mahlokoana, makhasi a lifate, majoe, makoete joalojoalo tse ka sitisang sethopo ho hola se atlehile. Qoba ho tsamaea holim'a seratsoana ha u qetile mosebetsi oa hau.



Leifo le lokela hoba bophara ba bolelele ba kharafu. Lebaka ke hore u tle u tsebe ho fihlela bohareng ba leifo u sa le hate. Ho hata ho lima leifo haholo ha mobu o le metsi, ho senya mobu, obe thata ebe o sitisa sethopo hore se hole.

Mokhoa o senang litsenyehelo tse ngata oa ho etsetsa sethopo sa hao moriti ke oa ho sebelisa lipalo, mahlakana kapa mohlomo.



## Ho jala

Lipeo tse fapakaneng li lokela ho jaloa ka mekhoe e fapakaneng.

### 1. Ho jala o sa etse sethopo/ Ho sunya peo mobung

Mefuta e meng ea lipeo e batla ho jaloa serapeng eo li tlang ho holela teng li sa etsoe sethopo, hobane li ka utloa bohloko ha lintse li hlongoa li hlongolloa.

Peo jaloa ha sesame ka makhetha hore e felle hantle ka forong

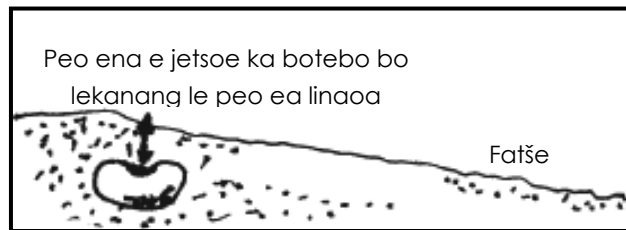


Mefuta e joalo ea lipeo ke ea linaoa, bete,  
lihoete, cucumbers, garlic, poone, lierekisi,  
litapole, mokopu, rapa le meroho e meng.

Foro kapa mola otlameha ho ba  
botebo ba monoana (1.5 – 2 cm)

**Lipeo tse sesanyane** tse kang tsa lihoete, rapa le meroho e meng lia tebisoa ha li joloa. Etsa foro e kabang botebo ba monoana (1.5cm deep/1 finger width). Tsoara peo pakeng tsa monoana oa bosupa le o motona ebe u e jala ka hlokolosi, u entse bonnete ba hore ha e tebe haholo. Jala peo u ntse u siea sebaka sa botenya ba monoana lipakaeng. Etsa bonnete ba hore e anetse mola hantle kaofela. Koahela peo ka mobu, mosuela kapa manyolo, e be u hatella hantle ka monoana.

**Lipeo tse tenya** tse kang tsa linaoa, li jaloa ka botebo bo nkang botenya ba tsona. Ha ngoe ho isa bobeling. Ha li ka tsa tebisoa ho feta mona li ke ke tsa mela. Le teng ha li ka phaphamala ka holimo, e tlare sethopo ha se qala se hlaha e be se a robeha.



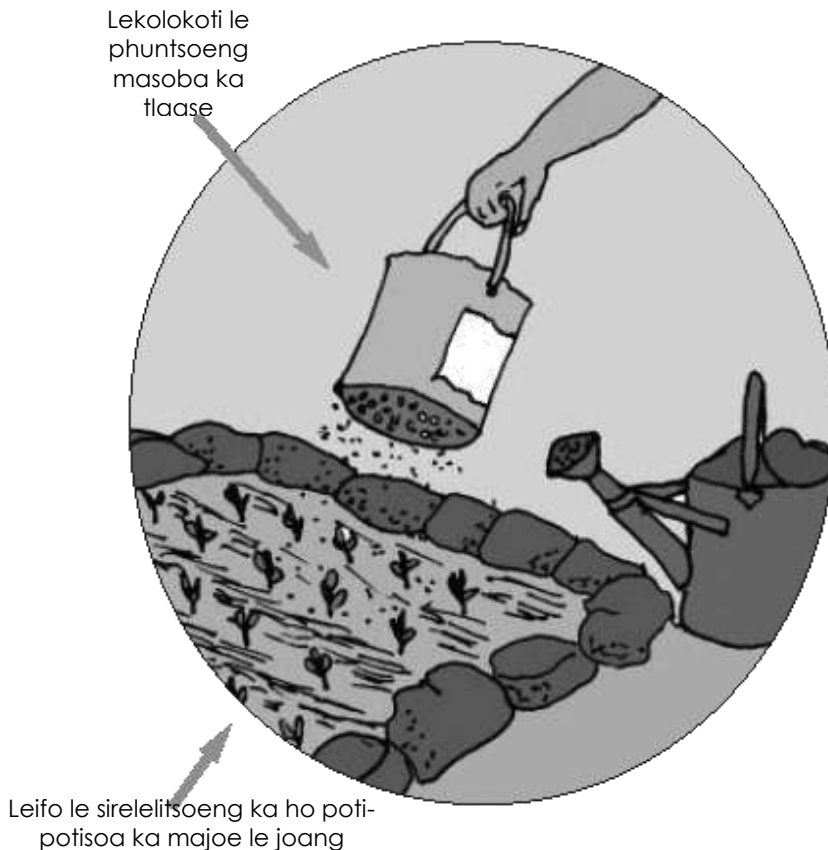
## 2. Ho etsa sethopo

Lijalo tse ling li hola le ho atleha ha li entsoe sethopo pele li ntano hlomoala li isoe serapeng. Lijalo tse joalo e kaba broccoli, k'habeche, cauliflower, chilisi, eggplant, lipepere, leeks, selae, anyanese, sepinichi le tamati.

Tse ling tsa lijalo tse kaholimo li ka jaloa li le joalo kapa tsa etsoa sethopo, khetho ke ea motho ka mong hore na eena u thabelang. Lijalo tse joalo ke sepinichi, anyanese, garlic le litapole.

## 3. Tlhokomelo ea sethopo leifong

Lipeo sesanyane joalo ka tsa k'habeche, tamati, anyanese joalo-joalo, ha li jaloe li teteantsoe, hobane sethopo sa teng se tla hlaha se le sesesane, se sa atleha hantle, e bile sena le mafu. Ka tsela ena sethopo se iphumana se tlameha ho tsekisana sebaka sa ho hola hammoho le khanya. Joale, jala peo ha sesane feela e anele leifo lohle. Lipakeng tsa peo, sia sebaka se lekanang le botenya ba monoana. Hang ha u qeta ho kenya peo mobung, ho bohlokoa hore u boloke mobu u le mongobo ka linako tsohle.



Tšella habeli ka letsatsi ha mocheso o le mongata. Nakong ea lehlabula, khothaletso ke hore u tšelle mantsiboea, mariha teng, tšella hoseng ha letsatsi le chabile. Tšella ka hlokolosi.

Qoba ho tšela metsi ka sekahla e sere a hohoba peo kapa a batalatsa mobu 'me oa etsa lek'hoko ka holimo. Ha u sena shitiri e nang le molomo o masoba a masesane, u ka iketsetsa ea hau tjena: nka lekotikoti le kang la pente ebe u le phunya masoba a masesanyane ka fatše u sebelisa sepekere le hamore.

Koahela leifo ka joang. Tlosa joang boo hang ha sethopo se qala ho hlaha, hobane ha usa etse joalo, u sitisa sethopo hore se hole hantle.

- ❖ Hlaola leifo khafetsa ka makhethe.
- ❖ Ho arola sethopo ke ho etsa hore se hole hantle se atlehile. Ha se hlaha, tsetolla se sesesane, ebe u jala feela tse atlehileng. E tsa bonnete ba hore lipakeng tsa sethopo u sia sebaka sa botenya ba menoana e 'meli (3-4 cm) e le hore sethopo sa hau se tle se hole hantle se sa petetsana.
- ❖ U ka sireletsa bo-kathoko ba leifo la hau ka majoe a sephara. Hona ho thibela mongobo ho lahleha o tsoa mabopong a leifo. Matsatsi a mararo ho isa ho a mahlano pele u hloma sethopo, fokotsa makhetlo ao u tšellang ka ona le ho tlosa sesireletsi sa letsatsi, e le hore sethopo se tloale mathata a komello le mocheso oa letsatsi

#### 4. Ho hloma sethopo

Nako e nepahetseng ea ho hloma sethopo ke ha sena le makhasi a mabeli hoisa ho a tseletseng (2-6). Le methapo ese e tiile. Makhasi a mabeli a hlahang pele ha a bontše hore u ka tsoela pele



oa hloma sethopo sa hau, joale emela sethopo hore se tietie pele.

Hloma sethopo mantsiboea kapa ha hole maru. Ka tsela ena, sethopo se tla tseba hore se be se tiele pele ho letsatsi le hlahlamang. Haeba ho bata haholo, sethopo se ka hlongoa hoseng ha letsatsi le se le chabile, mobu le oona ose o futhumetse hanyenyane.

Sethopo se nang le makhasi a mabeli a nnete



Ho tšoara sethopo ka makhasi

- ❖ Lokisa serapa moo u tla jala sethopo teng, u be u se tšelle
- ❖ Etsa bonnete ba hore mobu ha ona makoete, e bile ona le manoni a kang manyolo, molora kapa mosuela.
- ❖ Hlomolla sethopo ka hlokolosi o sebelisa kharafu e nyenyane ea letsoho (SE KE OA HULA SETHOPO KA MATSHOHO!) Leka hore u hlomolle sethopo se ntse se na le mobu o mongata methapong. Tšoara sethopo ka makhasi eseng kae kapa kae.

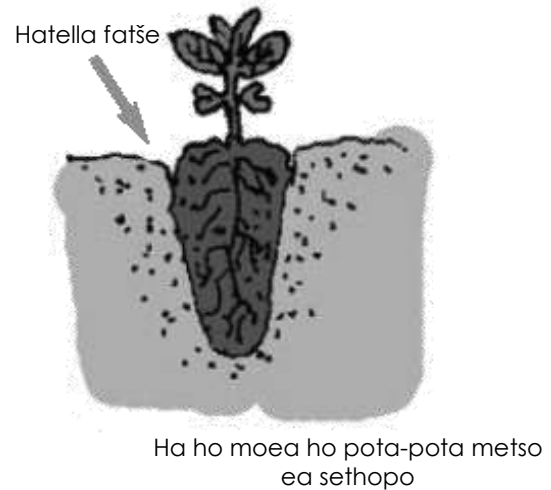


Ho tsumula sethopo ntle le se sebelisoa se kang kharafu joalo-joalo, ha hoa nepahala

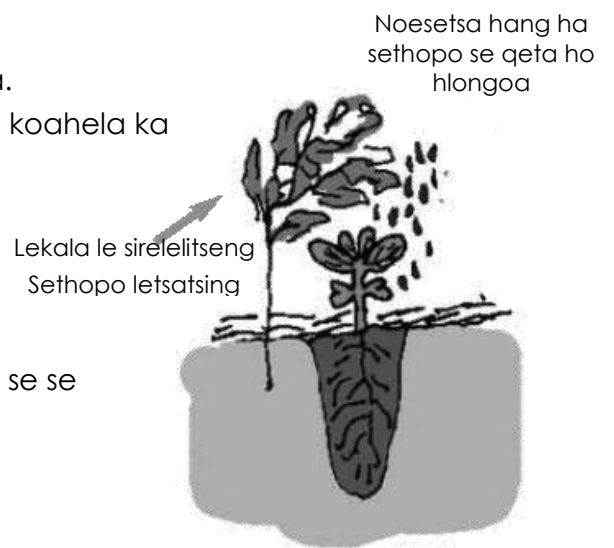
Ha u sebelisa kharafu kapa sesebelisoa sefe kapa sefe, sethopo se tla tsoa metso e sa qhalakana



- ❖ Nakong eo u hlomang sethopo, etsa bonnete bahore methapo ea sona ha e ea kobeha. E tšoanela ho otloloha, e se ke ea sobokelloa ka mokoting. Hang ka morao ho moo, tšela mobu ka sekoting e be u paka ka hlokolosi ho pota-pota methapo ea sethopo ele hore ho sebe le moo moea o ka kenang.



- ❖ Tšella sethopo hang ha se qeta ho hlongoa.
- ❖ Ho qoba hore mongobo o lahlehe ka pele, koahela ka joang.
- ❖ Sireletsa sethopo letsatsing ka ho sebelisa lekala la sefate kapa k'hateboto (cardboard). Setšireletsi sena se tlosoe ka mora matsatsi a mane ho isa ho a mahlano, ha ho bonahala hore sethopo se se se tsitsitse.



Beha joang kapa matlakala ha u qeta ho jala sethopo, hore mongobo o se ke oa lahleha kapele

# *Resource Material for Homestead Food Gardeners*

## Chapter 2: Handouts (seSotho)

Handout 1    Liteko Tse Etsoang Ke Sehoai (Farmer experimentation)



# 1. Liteko Tse Etsoang Ke Sehoai



Tšebetsong ena ea hoba lihoai, re kopana le mathata a mangata ka nako tsohle, 'me re leka maqiti a mangata ho a fenyha. Re ka nna ra batla ho leka mekhoea e mecha. Le ha hole joalo re tšoanela ho leka mekhoea ena e mecha re sa ikenye khathatsong kapa hona ho ipakela mathata a mang hape. Tsena re ka li qoba ka ho etsa liteko.

Ho etsa teko ke ho bona hore na mokhoea o mocha o ka sebetsa na. Hang ha re se re fumane hore na bothata ke bofe le hore na bo bakoa keng, re ka atleha ho batla mekhoea ea ho bofenya. Re etsa liteko tsena e le hore re bone hore na efela mokhoea ona o mocha o tla sebetsa. Teko ena re e etsa re sebelisa moroho o seng mongata hore haeba teko e sa atlehe, ra be re sa lahlehelo ke moroho kaofela.

Ona ke mohlala oa 'Me Ngobese oa KwaHlongwa (Umzumbe, Africa Boroa). O ile a etsa qeto ea ho leka mekhoea e mecha ea ho loantšha hoaba morohong oa hae oa kh'abeche. O ile a utloela ka mekhoea e 'meli eo a neng a batla ho e leka. Oa pele ene e le ho tšela molora holim'a mahaba a kh'abeche ea hae, oa bobeli e ne e le ho fafatsa motsoako oa chilisi le sesepa holim'a mahaba ao a kh'abeche. E ne e le metsoako ea ho loantšha hoaba eo a neng a ka e sebelisa a sa lahleheloe ke chelete e ngata.

'Me Ngobese o ile a seha sekhechana sa serapa sa hae (1/10th) moo a tlang ho etsa liteko tsa hae teng. O ile a arola serapa sa hae likaroloana tse tharo (3), 'me a lišoa ea ka tsela e bonahalang.

Seratsoana se Sebelisoang Bakeng sa liteko	Molora  1	Kh'abeche e seng tekong 2	Chilisi le sesepo 3
Serapa se engoeng kh'abeche			

1. Karolong ea pele o ile a fafatsa molora kh'abecheng.
2. Karolong ea bobeli ha a ka a tšela letho. Ka mantsoe a mang, ha a ka a tšela molora kapa motsoako oa chilisi le sesepa, e le hore a tle a bapise hore na efela molora le motsoako li sebetsa
3. Ho ea boraro a fafatsa motsoako oa chilisi le sesepa.

Joale ea ba o lula a ntse a lekola le hona ho lebella hore na lipatlisiso li ntse li tsamaea joang. O ne a lekola kh'abeche ea hae beke le beke, a bile a ngola fatše hore na ke hoaba e kae e teng moo kh'abecheng ea hae. O ne a etsa sena hore a tle a hopole hantle hore ho ile hoa etsahalang e le hore ha a qetile ka lipatlisiso tsa hae, a tle a tsebe ho khetha hore na ke mokhoa o fe o molemo oa ho laola hoaba.

Tsena e bile liphetho tsa hae:

Beke	(1) Molora Molora	(2) Likh'abe che tse sa kenang tekong	(3) Motsoako oa chilisi lesepa
1, 2 le 3	Hoaba ha eo	Hoaba ha eo	Hoaba ha eo
4	A fafatsa molora ha a bona hoaba eba teng.	Hoaba e qala ho bonahala, tse ka bang leshome (10) kh'abecheng ka ngoe. Ke likh'abeche tse 'maloa feela tse bonahalang li na le hoaba.	A fafatsa motsoako ha hoaba e bonahala.
5	Hoaba e ntse e bonahala tse ka bang hlano (5) kh'abecheng e le ngoe	Hoaba joale e bonahala haholo holim'a mahaba, tse kabang lekholo (100) ka palo.	Hoaba ha e sa bonahala
6	Hoaba joale e atile. Ebile e teng le likh'abecheng tseo e neng e le sio pele. A fafatsa molora hape.	Likh'abeche tse neng li sena hoaba joale li na le eona	Hoaba e bonahala e atile, ebile e teng le li kh'abecheng tse neng li sena eona pele. A fafatsa motsoako hape.
7	Hoaba joale e bonahala e fokotsehile. Likh'abeche tse ling li shebahala li sena eona. Ho ne ho chesa, ebile mahaba a mang a	Hoaba joale e hlasetse li likh'abeche kaofela. Hoa chesa feela mahaba ha a cha.	Hoaba e fokotsehile, ebile tse ling tsa likh'abeche ha lisana eona. Hoa chesa feela mahaba ha a cha.

	bonahala a chele Na ekaba ke molara oo?		
8	Mahaba a cheleng a tlositsoe hape likh'abeche li ntse li hola hantle le hoaba e fokotsehile.	Likh'abeche ha li hole hantle. Hoaba e bonahala e tloha mona e ea lipolo- tong tsela tse sebelitsoeng ka molara le motsoako.	Hoaba e ea fokola feela e bonahala e ntse e eketseha.
9	Hoaba e ile ea eketseha ha nyanyane ka morao ho pula e matla. Ha a ka a sebelisa molara hape.	A etsa qeto ea ho tlosa likh'abeche tsena tse neng li sa kena tekong, kaha joale li ne li sa hole ebile li tšoaetsa liratoana tse ling tse peli.	Hoaba e ile ea eketseha haholo kamorao ho lipula tse matla. A fafatsa motsoako hape.
10	Hoaba e teng lijalong kaofela le ha e se ngata.		Hoaba e ea fokola. Li kh'abeche li qala ho bopa.
11	Hang hoaba e bonahala e atile. Ha ho bonolo ho fafatsa molara hobane joale kh'abeche e se ntse e bopa. Le ha ho le joalo, o ile a fafatsa o seng mokae.		Hoaba e eketsehile. Kh'abeche e qala ho bopa. A fafatsa motsoako hape.
12	Kotulo		Kotulo
LIPHETHO	Palo e tlase ea hoaba e ntse e le teng. Likh'abeche li na le molara e bile ha li shebahale hantle.	Ha ho kotuloa letho ka ha lijalo li ile tsa sengoa ke hoaba.	Hoaba e a fokola lijalong, ebile li kh'abeche e entse lihloho tse shebahalang hantle.

'Me Ngobese o ile a nahana hore tsela engoe eo a ka bonang hore na teko ena e atlehile ke hore a fumane boima ba tse ling tsa likh'abeche ha a qetile ho etsa teko. O ile a bekha likh'abeche tse leshome (10) karolong e 'ngoe le e 'ngoe.

O ile a ngola boima boo tjena:

Nomoro ea Likh'abeche	Molara	Li kh'abeche tse sa kenany tekong	Motsoako os chilisi le sesepa
	Boima (likh'ilokereme; kg) Kh'abecheng ka 'Ngoe	Boima (likh'ilokereme; kg) Kh'abecheng ka 'Ngoe	Boima (likh'ilokereme; kg) Kh'abecheng ka 'Ngoe
1.	0.85kg	-	0.75kg
2.	0.56kg	-	0.82kg
3.	0.55kg	-	0.59kg
4.	0.81kg	-	0.62kg
5.	0.33kg	-	0.86kg
6.	0.76kg	-	0.88kg
7.	0.54kg	-	0.45kg
8.	0.59kg	-	0.73kg
9.	0.62kg	-	0.55kg
10.			

	0.88kg	-	0.65kg
KAKARETISO	6.49kg	0	6.90kg

Ha a qetile, a ngola maikutlo a hae ka mekhoha ena e meraro, hore na ke mokhoa ofe oa ho loantša hoaba o ileng oa mosebeleletsa ho feta emeng. Qeto ea hae ebile hore ka ha o tsebile mokhoa o mosebeleletseng ho feta emeng, nakong e tlang, o tla o sebelisa likh'abecheng tsohle tsa hae e seng tse 'maloa feela

Molara	Kh'abeche e seng tekong	Chilisi le sesepa
<p><b>Seo ke se nahanang:</b></p> <p>Molara o ntse o saletse kh'abecheng, ka ha o mong o ile oa kenella mamenong a mahaba. Ke nahana hore molara ke oona o ileng oa chesa mahaba ana. Hape ha pula ena, molara o oa hlatsoeha, e be ke tlameha ho o tšela hape.</p>	<p><b>Seo ke se nahanang:</b></p> <p>Hoaba ene e haketse hoo ke ileng ka tlameha ho tlosa li likh'abeche tse neng li se tekong kaofela, joale ha lina ho bekhoa. Ha ke kholoe li ne li ka bopa. Ho sebelisa molara kapa chilisi le sesepa ho molemo ho feta ho se etse letho ho hang.</p>	<p><b>Seo ke se nahanang:</b></p> <p>Likh'abeche tse neng li le seratsoaneng sena li ne li phetse hantle li bile li le boima ho feta tse ling. Ke ne ke fafatsa motsoako beke tse ling le tse ling tse peli, haholo ha pula e ile ea na. Motsoako ona o bonahala o bolaea hoaba e leng ntho ea bohlokoa hobane hoaba e ke ke ea fetela lijalong tse ling. Ke tla sebelisa motsoako ona le nakong e tlang.</p>

Ha re nahaneng haholo ka seo 'Me Ngobese a se entseng. Le uena u ka sebelisa mohlala ona oa hae ho etsa liteko tse joalo jareteng ea hau. Re tla sebelisa setšoantšo sena ho u thusa ka liteko tseo u tlang ho li etsa.



Ha u bona setšoantšo sena e tlabe e le nako ea hore u nahane ka hore na u tla etsa liteko joang jareteng ea hau hore u fumane liphetho tse khotsofatsang.

Ha 'Me Ngobese a ntse a etsa teko ena, o ile a ipotsa lipotso tsena tse latelang a ba a ikaraba tsona

1. **Pele, o ile a qala ka ho ipotsa hore na bothata ke bofe.** 'Me karabo ea e ba hore ke likh'abeche tsa hae tse hlasetsoeng ke hoaba, e leng ntho e sa nepahalang.
2. **Bothata boo nka bo fenya joang?** 'Me Ngobese a nahana hore a ka bofenya ka ho fafatsa molara kapa motsoako oa chilisi le sesepa likh'abecheng tsa hae.

3. **A ipotsa hore na mokhoa ona o tla fenya bothata ba hae joang?** 'Me Ngobese a nahana hore tšebeliso ea metsoako ena e tla felisa hoaba
4. **A ipotsa hore na o tla bona joang hore metsoako ena e tla sebetsa na?** O ile a fafatsa likh'abeche tse ling ka molara, tse ling ka motsoako oa chilisi le sesepa, ho tse ling a se ke a tšela letho. Eaba o bala hore na ke hoaba e kae e teng lijalong tseo tsa hae.
5. **Ke tla fumana likarabo joang?** Ke tla be ke shebile eng? 'Me Ngobese one a bala hoaba e teng likh'abecheng tsa hae beke le beke, abile a ngola fatše seo a se fumaneng. O ile a fumana hore likh'abeche tse neng li sa kena tekong li ne li e na le hoaba e ngata haholo, athe ka ho sebelisa molara le motsoako a ka fokotsa ho ata hoa hoaba, ha feela a li sebelisa beke tse ling le tse ling tse peli.
6. **Mokhoa o mong oa ho fumana likarabo ke ofe?** Ke tla sebelisa eng? Ke tla sebelisa eng? 'Me Ngobese a bekha likh'abeche tse leshome (10) serapeng ka seng, ha teko e felile a se a bile a kotutse. A fumana hore likh'abeche tse leshome (10) tse ileng tsa fafatsoa ka molara li bekhile 6.49kg, tse ileng tsa sebetsoa ka motsoako ea eba 6.9kg. Hona ho bolela hore, likh'abeche tse ileng tsa fafatsoa ka motsoako oa chilisi le sesepa li ne li le boima ho feta tse fafalitsoeng ka molara. Ha a kaba a boloka tse neng li sa kena tekong hore a libekhe.
7. **Ke tla sebelisang ho bona hore likarabo tsa ka li nepahetse?** Likh'abeche tse neng li ena le hoaba e fokolang kapa li kh'abeche tse neng li le boima sekaleng ke tsona tse ka nkoang li nepahetse.
8. **Ke tla bapisa joang teko ee le mokhoa oo ke tloaetseng ho o sebelisa tšebetsong ena eaka ke le sehoai?** Tsela eo 'Me Ngobese a tloaetseng ho sebetsa ka eona joalo ka sehoai ene e le ho se etse letho ka hoaba, joalo ka ha a ile a etsa likh'abecheng tse neng li sa kena tekong. Tekong ena 'Me Ngobese o hlokometse hore molara hammoho le motsoako oa chilisi le sesepa li fokotsa hoaba kh'abecheng ea hae. O boetse a hlokomela hore a li sebelise ka bobeli, haholo nakong tsa lipula. Leha ho le joalo, o nahana hore motsoako ke ona oa 'makhontho ho loantša haoba kh'abecheng ea hae.

Kahar'a mabokosana a latelang, u tla fumana lipotso tseo u ka ipotsang tsona ha u se u rerile ho etsa teko. Ho bile hona le sebaka moo u tlang ho ngola likarabo teng.

Moralo o ka sebelisoang tekong ea meroho e fokolang ka palo	
1. Bothata ke bofe?	
2. Bothata boo nka bo fenya joang?	

3. Hobaneng ha ke sebelisa mokhoa oo?	
4. Mokhoa oo ke tla o leka joang?	
5. Ke tla fumana likarabo joang? Ke tlabe ke shebile eng?	
6. Mokhoa o mong oa ho fumana likarabo ke ofe?	
7. Ke tla sebelisang ho bona hore na likarabo tsa ka li nepahetse?	
8. Ke tla bapisa teko ee le mokhoa oo ke tloaetseng ho o sebelisa t'ebetsong e eaka ke le sehoai joang?	

Ha u etsa liteko life kapa life, ho bohlokoa hore u be le mokhoa oo u ka u sebelisang ho bona hore na likarabo tseo u lifumaneng li nepahatse, le ho bona hore na teko eo e atle- hile kappa che. Ha u etsa liteko tsa ntho tse ngata ka nako e le 'ngoe u sa tsebe hore na u tla sebelisang ho bona hore na e fela e le tsona, u keke oa tseba hore na e bile motsoako o fe o sebelitseng. Sena ke se etsahetseng tšoantšisong ena e latelang.

Ho etsahalang ha re leka mekhoha  
e mengata ea ho hlola mathata ka  
nako e le 'ngoe?

Haeba lintho li atleha kapa li hloleha  
re tla tseba joang hore sephetho  
se teng se bakiloe ke eng?



## Seholoholo se bohloko

Ka letsatsi le leng  
nkhono e mong o ne a  
tšoeroe ke seholoholo...

Ah! Seholoholo  
sena se bohloko  
hoo!



Motho e mong le e mong a hlaha ka ea hae keletso.

E ea  
ngakeng

E ea  
ho  
nkhekhe

Noa tee  
ea  
limatlafatsi



Ke ilo bona ngaka



Ha nkhono a tsoa  
bona ngaka a kopana  
le nkhekhe

Ka tla ka  
thabela ho u bona  
Ntate Mkhize,  
ke opeloa ke  
seholoholo!

U batla ke u  
folise?









# BOHLOKO BA MOKOKOTLO

## **Pheletso ya pale ya bohloko ba mokokotlo**

Ntho e tšoanang le e tšoantšisong mona e ka be e etsahetse ho 'Me Ngobese, haeba a ile a fafatsa molara le motsoako oa sesepa le chilisi likh'abecheng tsa hae ka nako e le 'ngoe. A kabe a sa tseba hore na mokhoa o molemo ho loantša hoaba ke ofe.

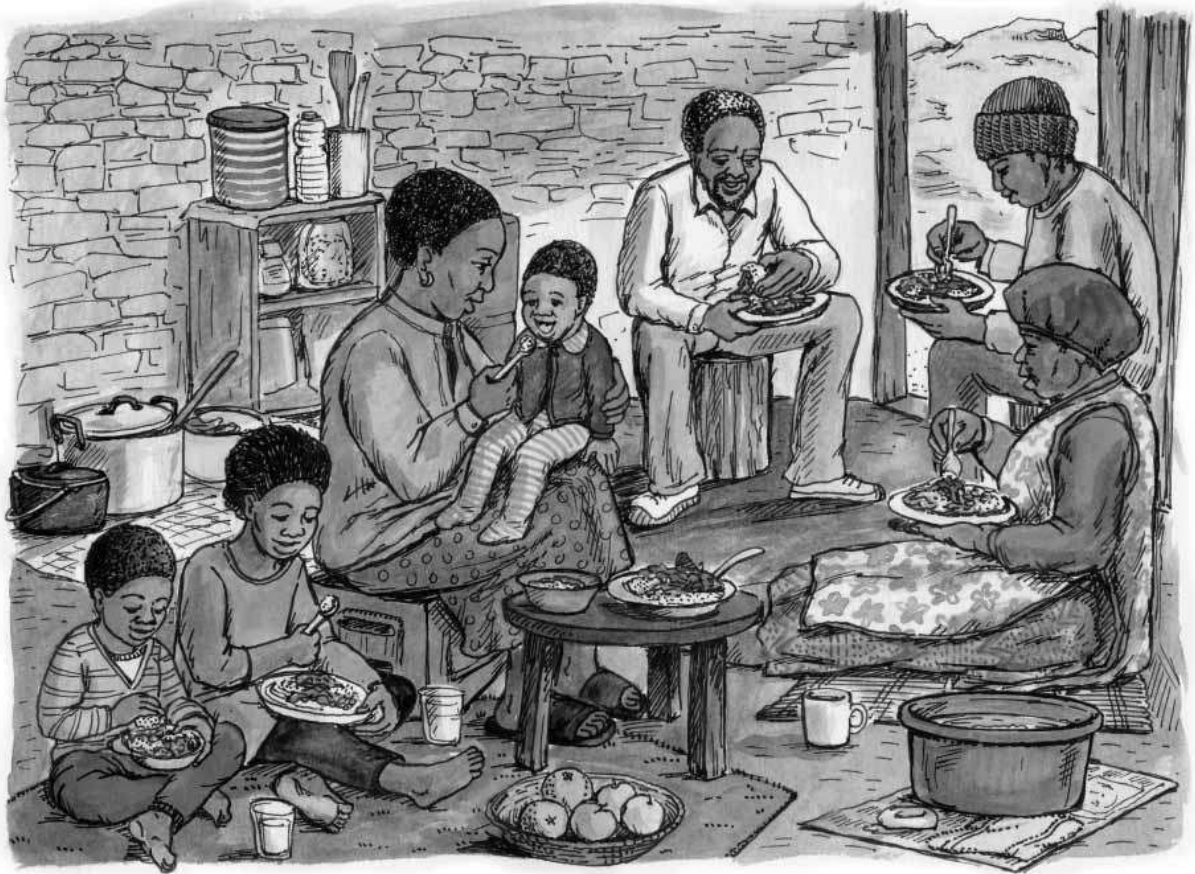
Ntho e ntle ka ho etsa liteko ke hore u ka arolelana tsebo ea hau le metsoalle le bahaisane, e be e ba tsoela molemo. Le bona ha ba etsa liteko, ba tla arolelana tsebo ea bona le uena, e le hore u se hlole u ikhathatsa ka ho etsa teko tseo hape. Ka tsela ena motse oa lona o ka etsa qeto ea hore na mokhoa o ka sebelisoang ke ofe 'me motho e mong le e mong a ka o sebelisa.

# *Resource Material for Homestead Food Gardeners*

## Chapter 3: Handouts (seSotho)

Handout 1    Phepo e Nepahetseng (Living and eating well)

# 1. Phepo e Nepahetseng



## Phepo e nepahetseng ke eng?

Phepo e nepahetseng ke tokiso e nepahetseng ea lijo, ho lipheha ka tsela e nepahetseng le ho lija ka litekanyo tse nepahetseng. Hona ho kenyeletsa nako e nepahetseng ea ho lipheha ka litekanyetso tse nepahetseng ho motho ka mong ho ipapisitsoe le ts'ebetso le lilemo tsa hae.

## Phepo ea mokhachane

O lokela ho ja lijo tse nang le matsoai le matsoaeana ohle a hlokoang ke 'mele joalo ka; lithibela mafu (meroho le litholoana); liaha 'mele

Lesea le fumana litlhoko tsa lona ho tsoa lebeseng la 'ma lona. Haele ba seng ba holile bona ba lokela ho fumantšoa litholoana le meroho hore ba lule ba sireletsehile mafung. Ntle le mono ba lokela ho fuoa liaha-'mele tse kang mahe, chisi, botoro, linaoa, 'lensisi' le linaoa tsa 'soya'. U lokela ho fepa bathonyana bana makhetlonyana a maloa ka letsatsi, bonyane makhetlo a mahlano. Le uena 'moho le thaka tsa hau le tlamehile ho fumana lijo tse nang le lihlopha tsohle hore le tsebe ho pheta mesebetsi ea letsatsi le letsatsi. Ntle le mono Bakuli 'moho le Baimane ba lokela ho ja ka mokhoa o khotalletsoang.

(mahe, tlhapi, linooa le nama) le limatlafatsi (papa, setampo, bohobe). Matsoaieana ke; ts'epe e fumanoang sebeteng, spiniching, nameng e khubelu joalo-joalo); calcium e fumanoa ho 'moko, lebese le chisi; iodine e fumanoa letsoaing le ntlafalitsoeng le tlhapi; folic acid e fumanoa merohong e metala 'me le thusa hore mokhachane a seke a senyeheloa nakong ea bokhachane.

### **Phepo ea lesea**

Lesea ha le hlaha ho fihlela likhoeling tsa pele tse ts'eletseng le fumana lijo (lebese) ho tsoa ho 'ma feela. Le se fuoe le ha e se ele metsi feela. Ho tloha likhoeling tse ts'eletseng le fuoa lijo tlatsetso ebile le ntse le tsoela-pele ho anya. Lijo tsena ekaba litapole tse khotliloeng, lesheleshele le ntlafalitsoeng, mokopu o khotliloeng, kholu ea linooa kapa ea meroho esita le lero la litholoana.



### **Phepo ea bana (Lilemo tse 1-5)**

Bana le bona ho tloha lilemong tse peli ho isa tse 18 ba hloka phepo e nepahetseng.



### **Phepo ea batho ba baholo**

Batho ba baholo le bona ba lokela hoja lihlopha tsohle tsa lijo, ho ipapisitsoe le mosebetsi oa motho ka mong. Mohlala Seahi le mosebeletsi oa sechaba kantorong ba keke ba ja ka ho lekana, ka hona batla boeletsi ho 'Maphepo motseng.



### **Phepo ea maqheku le maqhekoana**

Maqheku le maqhekoana le ona ka mokhoa o ts'oanang ba lokela hoja lihlopha tsa lijo empa le ha ho le joalo ba lokeloa ke matsoaieana akang calcium bakeng sa ho matlafatsa masapo le letsoai la vitamin A ho matlafatsa pono.

### **Phepo ea mokuli**

Mokuli le eena o ts'oanela ho hlokomeloa haholo ka phepo e nepahetseng hore a tsebe ho hlaphoheloa ka pele. Hona ho thusa lithhare ho sebetsa hantle 'meleng.

# Eja mefuta e fapakaneng ea lijo molemong oa bophelo bo botle

Re lokela ho ja mefuta e fapakaneng ea lijo e fanang ke **litlhoko** tsohle tsa 'mele. Ho phethahatsa hona ha u hloke hore u reke lijo tse theko e holimo haholo. Ka khetho e nepahetseng uena le ba lelapa la hau le ka phela bophelo bo botle bo amohelang bo senang litšenyehelo tse holimo.

Lijo li arotsoe lihlopha tse tharo tsa mantlha, 'me tsona ke: **limatlafatsi, lihaha-'mele le lithibela mafu**. U khothaletsoa hore khetlo le leng le le leng ha u ja sejaneng sa hau ho be le mofuta o mong le o mong o boletsoeng kaholimo. U lokela ho noa metsi a mangata, onyane mabekere a robeli letsatsi le leng le le leng.

## Limatlafatsi:

'Lipatata'  
Litapole (ho sa tsotellehe hore li pheuo joang)  
'Rice' e tšoeu kapa e sootho.  
Mabele  
'Macaroni'  
Bohobe  
'Oats'  
Lijo thollo  
Libanana



## Limatlafa

Sehlopha sena sa lijo se fana ka matla. U lula u le mahlahlaha ha u phela ka tsona



## Lihaha-'mele

Ke mofuta oa lijo kholong ea mele bakeng la kholo e ntle ea mesifa le likarolo tse ling. Li bohlokoa ho batho bohle, ho akareletsa bakhachane le bakuli, ba lokelang ho li fumana nako eohle eo ba jaang.

## Lihaha-'mele

Kaofela ha tsona lijo tsena li fana ka matla. Leha ho joalo u ntse u lokela ho li ja 'moho le tsa lihlopha tse ling.



***Lethathamo le latelang ke la lijo tseo u ka li sebelisang ele mehloli ea liaha-'mele:***

linaoa  
lierekisi  
linaoa tsa 'soya'  
makotomane  
nama ea khoho  
le mefuta e meng ea nama  
tlhapi  
mahe  
chisi  
mafi  
botoro  
makotomane  
peo ea moora-tsatsi  
(sonoblomo)



Mahe a bohlokwa hoholo-holo bakeng la bana le bomme ba mmeleng jwalo kaha ana le proteins, vitamins, fats and calcium.

Bana ba loketse hape hoja dinawa kappa dierekisi kamehla. Ho bohlokwa hore bana baje dijo tse nepahetseng tse lekaneng kaafetsa

Reisi e sootho le dinawa di nonne ho feta nama. Reisi e sootho e tshwana feela le e tshweu, ntle fela hobane e sootho ha eya tloswa makgapetla. Hona ho bolela hore reisi e sootho ena le protein, minerals and vitamins tse ngata, ho feta ena e tshweu.

**Lithibela mafu**

Sehlopha sena sa lijo se fana ka lithibela mafu. Ke sehlopha se nang le makhabane a mangata ka hona u kothaletsoa ho ja mefuta eohle e oelang tlas'a sehlopha sena.

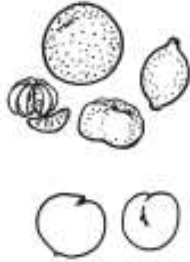
***Lithebela Mafu***

Mefuta ea lijo e oelang tlas'a sehlopha sena e sireletsa 'mele khahlanong le amfu ka mefuta e fapakaneng. E fana ka matsoai le li "vitamin"



***Lethathamo lena ke la meroho le litholoana tse fanang ka lithibela mafu:***

lamuni  
morara  
peneapole  
granadilla'  
liperekisi tse tšehla  
liperekisi tse tšehla  
mabolilane  
apole  
pere  
'lemons'  
libanana  
sepinache  
tamati  
litapole  
'broccoli"  
lihaba  
lihoete  
linaoa tsa lehoetla  
lirekisi tsa lehoetla  
betiruti



Hlatsoa litholoana le meroho hantle ka metsi a hloekileng pele u ka li sebelisa.



Meroho e metala le litholoana ka mebala e fapakaneng li bohlokoa 'meleng.

Ka hona bana le bakhachane ba lokela ho li fumantšoa kamehla.

Leka hore u je moroho kapa litholoana nako eohle ha u ja lijo tsa letsatsi. Ntle le tsona u ntse u ka ja tlhapi,, linaoa, le nama ka mefuta ea eona.



## Mefuta ea lijo-tse ka fumanehang lapeng

### Malebela a ho hlokomela lijo

Tlama leqeba kapa seso pele u tšoara lijo. Kamehla hlapa matsoho ka metsi a sesepa le pele u tšoara lijo. U khothaletsoa hobala ho tloha ho 'ngoe ho ea ho leshome le metso e mehlano nakong eo u ntseng u hlapa matsoho. Ona ke mokhoa oa ho netefatsa hore u ipha nako e lekaneng ea ho hlapa matsoho.



### Malebela

U khothaletsoa ho sebelisa nama hang ha u qeta ho e reka kapa u e boloke ka sehatsetsing. Haeba u ka e boloka nako e telele ho feta matsatsi a mabeli u lokela ho e boloka ka moo ho batang haholo. E phehe nako e telele ka mocheso o sa phahamang ho fihlela e lokile. Qoba ho ja nama e sa butsoang hantle kapa ho pheha mahe ao likhaketlana li peperaneng.



## Litekanyo tsa lijo tsa letsatsi le letsatsi'

### ❖ **Limatlafatsi – E le 'ngoe kapa kaofela hoa tse latelang:**

Bohobe; Halofo ea lebekere le tšetseng 'macaroni', 'rice' e sootho, litapole, poone, kapa; Lebekere le tletseng 'oats', lesheleshele kapa phofo ea poone.

### ❖ **Liaha-'mele – Khetha tse tharo lethathamong lena:**

Lebekere la linooa kapa lierekisi, 'moho le oli ea moora-tsatsi e bongata bo lekanang le halofo ea khabana ea tee; Mahe a mabeli; Lega le leholo la tlhapi, khoho kapa mefuta e meng ea nama; Khaba e tletseng ea oli ea moora-tsatsi, makotomane; Lebekere le tletseng lebeso le motsilili kapa mafi; selae sa chisi.

### ❖ **Lithibela mafu**

Litholoana tse tharo tse feletseng; Lebekere le halofo tsa meroho. Eketsa bongata ba mooratsatsi haeba u sa atlehe ho hoja litholoana.



## Lijo tsa sesotho

<b>nyekoe</b>	mokopu, linaoa le mabele tse phehuoeng 'moho
<b>likhetso</b>	mokopu o sa eboloang oa phehelloa' moho le lithotse
<b>lepu</b>	mabolotsane a kopantsoeng le lihaba
<b>lesheleshele</b>	motsoako o belisitsoeng oa phofo ea poone kapa ea mabele le metsi
<b>leqebekoana</b>	bohobe ba koro bo phehuoeng ka metsi
<b>motoho</b>	motsoako o belisitsoeng oa phofo ea poone kapa mabele, tomoso le metsi
<b>likhobe</b>	e kaba tsa poone, koro kapa motsoako oa poone le linaoa/lierekisi tse phehuoeng
<b>setampo</b>	poone e haitsoeng
<b>lipolokoe</b>	bohobe ba mabele a macha

## Khetho le tokiso ea lijo

### Etsa bonnete ba hore u boloka makhabane a matle a litholoana le meroho

Litholoana le meroho tse sa tsoa khuoa serapeng li na le matsoai a mangata ho lekana. Ho qoba hore matsoai ana a lahlehe ka lebaka la tšoarō e mpe le mokhoa o mobe oa ho pheha u khothaletsoa ho etsa tse latelang:

- ❖ Ja meroho le litholoana li ntse li le tala.
- ❖ Kaha boholo ba matsoai bo fumaneha letlalong u se ke ua li ebola.
- ❖ Khothaletso ke hore meroho le litholoana li lengoe malapeng.
- ❖ Ha u lokisetša ho pheha qoba ho li khabela hasesanyane kaha li lahleheloa ke matsoai ka bongata ho feta tse khabetsoeng ka botenya.
- ❖ Pheha moroho nako e khutsòanyane ka mocheso o seng bohale haholo ho fihlela li lokile. U sebelise oli e tlhotliloeng limeleng ha u pheha lijo tse ling.
- ❖ Ja lijo hang ha u qeta ho li tšola.



## Litlama tse ka sebelisoang e le linoko

- ❖ Limela tse sebelisoang ele linoko joalo ka



'cinnamon' li ka sebelisoa ho eketsa tatso lijong.

- ❖ 'Parsley' e nkhisela lehano hamonate ha u eja haholo kamor'a lijo.
- ❖ 'Ginger' e ntle bakeng la ho phekoa ho nyekeloa ke pelo hape le serame.
- ❖ 'Garlic' e ntle bakeng la ho loantsa mafu. U ka e phehella le lijo tse ling kapa ua e ritela ka metsing a chesang.
- ❖ 'Thyme' e matlafatsa tšilo ea lijo. U kopanya makhasi a eona le lijo tse ling.
- ❖ Tse ling tseo u ka li sebelisang lijong tsa hau ebile u ka itemela tsona ke: 'coriander', 'oregano', 'sweet basil' le 'fennel'.

## Phepo ea mokuli

Hangata ho u ena le maloetse u ka lebala ho ja, empa ele ntho ea bohlokoa aholo nakong ena ea ha u kula. Ho ja hantle ka nepo nakong eona ena ho na le melemo e latelang:

- ❖ 'Mele oa hau o tla matlafala.
- ❖ 'Mele o tla atleha ho loantsa mafu.
- ❖ U tla atleha ho ja matsoai le lithibela mafu.



Ha u hloloa ho fepa 'mele oa hau ha u kula u tla lieha ho fola.

## Ho etsahalang 'meleng ha u kula?

Nakong eo 'mele oa hau o loantšang likokoana hloko o hloka bongata ba mefuta ea lijo e oelang tlas'a lihlopha tse tharo tsa lijo, e leng limatlafatsi, liaha-'mele le lithibela mafu.

### Nakong eo u kulang ho ka nna hoa etsahala hore:

- ❖ U ikutloe u khathetse hoo u leng botsoa ho lokisa lijo.
- ❖ Moriana oo u o noang o etse hore lijo li latsoehe ka mokhoa o sa tloaelehang, 'me li be bohla.
- ❖ U be le letšollo, lehlatso kapa ho nyekeloa ke pelo ho ka 'nang hoa etsa hore u lahleheloe ke takatso ea lijo.
- ❖ U be liso ka hanong hoo u hloloang ho hlafuna.

Leha ho le thata, u iqobelle ho ja lijo. U ka ntlafatsa mokhoa oa hau oa ho ja ha u kula ka ho:

- ❖ Jaha meroho le litholoana tse phehoang ka bongata.
- ❖ Etsa bonnete ba hore u fumana limatlafatsi.

## Mocheso o holimo le ho fufuleloa ha u robetse

Ho phahama hoa mocheso oa 'mele ke tsela eo 'mele o loantsang likokoana hloko ka teng. Leha ho le joalo u lokela ho ela hloko hore mocheso o seke oa phahama ho feta moeli. Ka hona u flameha ho lula u ntse u noa metsi a mangata le ho ja liaha-'mele 'moho le lithibela mafu.

## Bothata ba ka maleng

Bothata bo ikhethang ke letšollo, e leng tahleho ea metsi le matsoai 'meleng. Letšollo le kotsi haholo ho masea, bana ba ntseng ba hola le bakuli ka kakaretso.

### Letšollo le bakoa ke eng?

- ❖ Ho noa metsi a sa hloekang
- ❖ Ho se hlape matsoho kamor'a tšebeliso ea ntloana, eba u tšoara lijō ka ona a ntse a le joalo
- ❖ Ho sebelisa thepa ea ho pheha e sa hlatsuoa hantle, kapa ho ja litholoana u sa li hlatsoa.
- ❖ Meriana e meng
- ❖ Tšoaetso ka maleng
- ❖ Khatello ea maikutlo
- ❖ Lijō tse bolileng
- ❖ Lijō tseo 'mele u sa li floaelang.



### Hobaneng ho le bohlokoa ho ja hantle ha u tšoeroe ke letšollo?

Ka lebaka la letšollo 'mele o lahlehela ke metsi le matsoai a mangata, 'me o qetelle o fokola. U lokela ho noa metsi a mangata 'moho le lero la litholoana. Kamor'a lekhetlo le leng le le leng la letšollo u lokela ho ja u be u noe metsi. Bana ba tšoeroeng ke letšollo ba lokela ho fuoa motsoako le lijō khafetsa.

**Metsi a bohlokoa**

Ha u tšoeroe ke letšollo u lokela ho noa bonyane li lithara tse tharo ka letsatsi.

Ho bohlokoa ho a noa a kopane le letsoai le tsoekere.

Ho etsa motsoako oa metsi, tsoekere le letsoai. Litekanyetso ke tse latelang: Letsoai: halofo ea khabana ea tee; Tsoekere: likhaba tse robeli tse tletseng; Metsi: lithara e le 'ngoe.

U ka nna ua noa lero la litholoana kaha le na le metsi 'moho le matsoai a mang ao 'mele o a hloekang.

8 level teaspoons of sugar

1/2 teaspoon salt

1 litre of water

## Lijo tse khothaletsoang bakeng sa ho loantša letšollo

- ❖ Lijo tse bonolo joalok'a lesheleshele, sechu sa meroho le litholoana.
- ❖ Meroho le litholoana tse phehiloeng li ebotsoe.
- ❖ Lijo tse futhumetseng.
- ❖ Lijo tse fokolang ka bongata khafetsa ka letsatsi.
- ❖ Lero la litholoana le hlapollotsoe ka metsi
- ❖ Sopho
- ❖ Libanana tse sa butsoang hantle
- ❖ Litapole, mokopu, tamati, lihoete
- ❖ 'Rice' e tsoeu
- ❖ Papa
- ❖ Bohobe bo bosoeu
- ❖ Mak'haroni



Mefuta e meng ea lijo e ka mpefatsa boeme ba letšollo, ka hona u olkela ho qoba ho li sebelisa. Tsona ke: moroho o tala, litholoana le meroho e meng tse sa ebolang, poone, lijo tse nang le linoko, mangangajane, tee kapa kofi, 'berries'. U ka fokotsa bongata ba lebese (le le mokeli-keli kapa phofo) leo u le jang.



## Lehlatso le ho nyekeloa ke pelo

- ❖ Haeba u nyekeloa ke pelo kamor'a ho noa moriana u khothaletsoa ho o noa ka nako e ke keng ea ama ho ja lijo tsa hau.
- ❖ Itloaetse ho ja hangata ka letsatsi, feela u ja lijo tse fokolang lekhetlo le leng le leng.
- ❖ Ja lijo tse batang.
- ❖ Haeba u belaela lijo tse mafura joalo ka chisi kapa tse halikiloeng, u ka leka ho li tlohella ka bo'ngoe ho fihlela u beha boemo tlas'a taolo.
- ❖ U se ke ua ja linooa. U je meroho ekang 'broccoli', 'pepper', 'cauliflower', le hanyanese.
- ❖ Sebelisa mafura a fokolang ka bongata.
- ❖ U ka sebelisa lijo tse ommeng joalo ka li 'biscuits', bohobe bo besitsoeng kapa lijo thollo.
- ❖ Qoba ho ja lijo tse nang le monko o ka 'nang oa mpefatsa maemo.

## Lijo tseo u ka loantšang ho nyekeloa le lehlatso ka tsona

**Ho nyekeloa ke pelo:**

Metsing a chesang kapa 'soda water'  
 tse tsoakuoeng le lero la 'lemon'  
 Tee ea maotoana e kopantsoe  
 le tsoekere 'moho le lero la 'lemon'  
 'Pudding' le 'custard'  
 'Rice' kapa 'macaroni'  
 Mahe a belisitsoeng  
 Lero la litholoana le  
 tsoakantsoeng le metsi  
 Libanana  
 Nama ea khoho e pheuoeng ka metsi  
 Litapole tse besitsoeng kapa tse khotliloeng  
 Bohobe bo besitsoeng  
 Meroho e pheuoeng nako e lekaneng hantle

**Lehlatso:**

Metsi  
 Sopho  
 Litholoana tse bonolo joalo ka  
 libanana, mokopu

**Bothata ba lehano**

U ka hloloa ho khotsofatsa lithoko tsa 'mele ka lebaka la liso ka hanong kapa u sa thabele mofuta oa lijo o teng. Ka hona 'mele o tla fokolloa ke matla le mokhoa oa ho u sireletsa khahlanong le mafu ka mofuta-futa.

**Seo u lokelang ho se etsa ha?*****U lahleheloa ke tatso***

- ❖ Tsukunya lehano ka motsoako oa 'bicarbonate of soda' le metsi a fofa pele u ja lijo. Tšela halofo ea khabana ea tee e tšetseng 'bicarbonate' ka metsing. U ka sebelisa metsi a kopaneng le lero la 'lemon'.
- ❖ Qoba ho ja lijo tse chesang haholo kapa tse batang haholo.
- ❖ U ka ithuta mofuta e meng ea lijo ho fihlela u ka etsa khetho ea tseo u li thabelang.
- ❖ Ha u hloloa ke tatso ea mofuta o itseng oa nama, mohlala khomo kapa nku, leka mofuta e meng joalo ka khoho, kolobe, tlhapi le ona mahe.

***Lehano le omellang***

- ❖ Itsukunye ka metsi a letsoai kapa a kopaneng le lero la 'lemon'.
- ❖ Noa metsi a mangata kamor'a lijo. Lehano le tla lula le le mongobo.
- ❖ Qoba ho ja lijo tse ommeng, tse nang le lithheferetsi li bile li hoasha ka hanong. Bonyane u ka ja tse bonolo, tse khotluloeng kapa litholoana tse bonolo joalo ka, mokopu, banana, sopho, nama e khabetsoeng ha sesanyane kapa u tšele lintho tse nolofatsang lijo joalo ka tamati 'sauce' le sopho.

- ❖ Qoba ho ja tsoekere hoba e tla mpefatsa maemo.

### ***Lehano le liso***

- ❖ Ja lijo tse bonojoana joalo ka mokopu, banana, sopho, nama e khabetsoeng ha sesanyane kapa u tšele sopho lijong.
- ❖ Noaha lesheleshele kapa sopho ka lebekere haele bakeng sa linoamapholi u sebelisa lelana (straw).
- ❖ Noaha sopho, lero la litholoana le la meroho.



### **Lijo tseo u lokelang ho li ja ha u le liso ka hanong**

- ❖ Lijo tse bonolo tse kang litapole tse khotliloeng kapa sopho.
- ❖ Nama e khabetsoeng ha sesanyane
- ❖ 'Macaroni' le chisi
- ❖ Sopho
- ❖ 'Custard'



### ***Tseo u lokelang ho li qoba***

- ❖ Lijo tse linoko li bohale joalo ka chilisi le 'curries'.
- ❖ Lijo tse bolila joalo ka tamati, peniapole le mefuta ea lilamune.
- ❖ Lijo tse batang kapa tse chesang haholo.
- ❖ Lijo tse khoramelang joalok'a ka botoro kapa tseo u tlamehang ho li hlafuna nako e telele pele u li koenya joalo ka moroho o tala.
- ❖ Fokotsa bongata ba lijo tse tsoekere haholo 'moho le bohobe haeba u ena le makhopo.

### **Tee ea 'cinnamon'**

Tšela phofshoana ea 'cinnamon' ka ntlha (1/4) ea khabana ea tee ka metsing a chesang a tletseng lebekere la tee.

### **Tee ea 'garlic'**

Tšela likotoloana tse peli tsa 'garlic' ka lebekereng le tletseng metsi a chesang. U ka itsukunya ka eona.



### **Tee ea 'lemon'**

Tšela lero la 'lemon' ka lebekereng la tee le tšetseng halofo ea metsi a chesang. U ka tšela tsoekere e be u enoa e ntse e chesa.

## **Ja hantle u tsebe ho atleha 'meleng**

### **Hobaneng u ka theoha 'meleng?**

U ka fokotseha 'meleng tlas'a mabaka a maloa a kenyeletsang ho seje hantle hobane u sena takatso ea

lijo, u nyekeloa ke pelo kapa u ena le liso ka hanong.



Tlhokahalo ea takatso ea lijo e ka bakoa ke mokhathala o mongata, khatello ea maikutlo kapa ho ferekana.

Lebaka le leng e kaba hore ua kula, ua hlatsa kapa u na le letšollo. Tlas'a boemong bona 'mele ha u thabele lijo tseo o hlileng o li hlokanang hore o tsebe ho fola.

### Malebela a ho ntlafatsa 'mele le takatso ea lijo

- ❖ Ja lijo makhetlo a 'maloa, makhetlo a mahlano ho isa ho a tšeletseng, ka letsatsi. Etsa joalo le ha u sa lapa.
- ❖ Leka ho fumana mefuta ea lijo eo u ka e thabelang ka ho latsoa mefuta e fapakaneng.
- ❖ Boikoetliso pele ho lijo bo eketsa takatso ea lijo.
- ❖ U se ke ua ja lijo tse halikiloeng le nama e mafura haholo.
- ❖ U ka sebelisa mefuta e mengata ea litlama tse eketsang tatso ea lijo. Tsona ke 'cinnamon', 'parsley', 'thyme', 'oregano' le 'sweet basil'. Ntle le mono u ka sebelisa lero la 'lemon'.
- ❖ Itsukunye ka metsi a kopantsoeng le lero la 'lemon' kapa 'bicarbonate of soda'.



Methati ea bohlokoa eo u ka ikatlehlang 'mele ka eona ke ena:

- ❖ Qoba tahlehelo ea metsi le matsoai ho tsoa 'meleng ka mokhoa oa letšollo.
- ❖ Phekola mafu ohle
- ❖ Ja tsohle tseo u lokelang ho li ja ka bongata bo khothaletsoang.

### Mehlala ea lijo tseo u ka lijang hore u eketse 'mele

- ❖ U je setampo, 'rice', bohobe bo bosootho, 'oats', litapole le libanana ka bongata.
- ❖ U je lijo tse latelang khafetsa: nama ea khoho, tlhapi, mahe, mefuta e meng ea nama, linaoa ka mefuta ea tsona.
- ❖ Lipakeng tsa linako tsa lijo tse tloelehileng u je litholoana, lihoete, 'peanut butter' le lilae tsa bohobe tse tloetsitsoeng ka jeme kapa u noe mafi.

### Mekhoa ea ho matlafatsa seo u sejang lapeng

- ❖ Tšela tsoekere kapa jeme leshelesheleng
- ❖ Fuluhele mafura leshelesheleng la hau.
- ❖ Jaha motsoako oa linaoa, 'rice' le mafura.
- ❖ Tšela mafura kapa oli litapoleng ha u li pheha.
- ❖ E ba le maqa a nama ka sophong ea hau.
- ❖ Ja papa (ea poone kapa mabele) kapa setampo ka linaoa.
- ❖ Tšela lebeso le phofo leshelesheleng, sechung kapa sophong.

## Natefelo a ke bophelo ka ho itlhahisetsa lijalo tsa hau

Mokhoa o bobebe oo u ka netefatsang hore u na le mefuta e fapakaneng ea meroho le litholoana ke ho itlhahisetsa tsona serapeng sa hau, 'me ho bobebe ho etsa joalo.

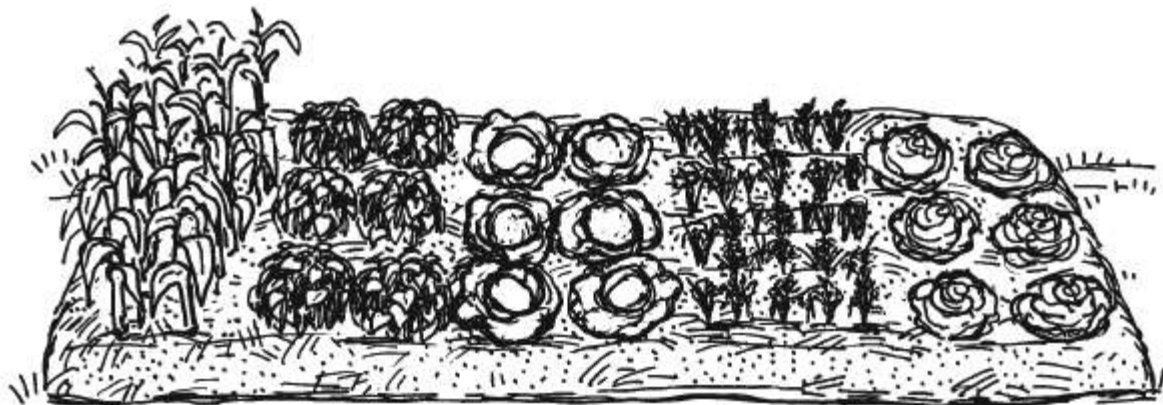
Tse ka hlahisoang:

lihoete	'thyme'
k'habeche	'sweet basil'
sepinache	'fennel'
anyanese	'coriander'
'garlic'	betiruti
litapole	'cauliflower'
tamati	'kale'
'broccoli'	rapa
mokopu	sepaile
poone	rapa e putsoa
linaoa	'leek'
'parsley'	lierekisi



Hlokomela bohlokoa ba ho ja meroho le litholoana tse ntseng li le boemong bo botle nako eohle. U ka atleha ho etsa joalo ha feela u ena le serapa moo u itlhahisetsang tsona e seng u li reke.

Haeba serapa sa hau se le seholo ho lekana u ka itemela lifate tsa litholoana.



Ho tlaaba le sehloho se seng seo u tlang ho ithuta ho itlhahisetsa lijalo.



# *Resource Material for Homestead Food Gardeners*

## Chapter 4: Handouts (seSotho)

Handout 1	Temo ea machobane (Mixed cropping)
Handout 2	Phapanyetsano ea lijalo sebakeng se le seng (Crop rotation)
Handout 3	Taolo ea likokoanyana le mafu lijalong (Pest and disease management)
Handout 4	Tšireletso ea lijalo moeeng le serameng (Wind and frost protection)
Handout 5	Tlhahiso le poloko ea peo ea meroho (Seed saving)
Handout 6	Temo ea lifate tsa litholoana (Growing fruit trees)
Handout 7	Mokgwa wa ho jala sefate sa ditholwana se seng (Grafting)
Handout 8	Tlhophiso la ditholwana le meroho

# 1. Temo ea machobane (Mixed cropping)

Ona ke mokhoa oo u jalang mefuta e fapakaneng ea lijalo seratsoaneng se le seng ka nako e le 'ngoe selemong. Mefuta ea lijalo eo u ka e lemanang 'moho ka mokhoa ona ke eo ho leng bobebe hore e phelisane moho kapa e thusane. Sena se ka etsahala ka hore ebe sejalo se seng se atleha ho bokelletsa letsoai le itseng la bohlokoa ha se seng se sena mokhoa oa ho etsa joalo. Mohlala oo u o tsebang ke ha u jala linaoa le poone seratsoaneng se le seng ka nako e le 'ngoe. Linaoa li tseba ho bokelletsa letsoai le bitsoang "nitrogen" ka mobung ho tsoa moeeng. Linaoa li imona monoana pele ketsong ena ha poone e fumana masokotso (masalla) mobung. Molemo oo linaoa li o fumanang pooneng ke ho itšoarelletsa ka mokhoa oa ho ithatela ka eona.

Mehlala e ea latela:

- ❖ Temo ea lierekisi kapa linaoa 'moho le lijalo tse ling,
- ❖ Temo ea lijalo tse holang kapele 'moho le tse holang butle,
- ❖ Temo ea lijalo tse holang haholo li bile li le tšesanyane 'moho le tse sa holing haholo kapa tse pharallang.

Temo ea machobane e ka phethahatsoa ka mekhoe e mengata e fapakaneng, 'me ke ena e latelang:

- ❖ **MOTSOAKO:** Ka mokhoa ona u jala mefuta e mengata ea lijalo tse kopantsong 'moho. Mohlala ke ha u kopanya 'moho peo ea sepaile (mustard), rapa, anyanese le lierekisi ebe u li jala seratsoaneng se le seng. Li tla hlaha li be li hole 'moho.
- ❖ **TLHATLHAMISO:** U jala mefuta e maloa ea lijalo seratsoaneng se le seng ka nako e le 'ngoe ea temo empa u li hlahlamanya ka matsatsi ao u jalang peo ea tsona mobung. U ka qala ka ho jala 'garlic' meleng e arohaneng ka lisenthimethara tse leshome le metso e mehlano ho isa ho mashome a mabeli (15-20 cm). Ka mor'a hore 'garlic' e mele u jala sepaile le lihoete lipakeng ka ho latela hore na u rata ha li hlahlamana joang. Hona ke mohlala feela u ka hlahlamisa mefuta e ratoang ke uena.
- ❖ **HLAKANTSUTSU:** Mokhoa ona o u lumella ho jala mefuta e mengata e fapakaneng ka nako ea temo kapa ho hlahisa mefuta e mengata ea lijalo serapeng sa hau ka ho li hlahlamisa ka har'a nako ea temo, 'me e le e butsoang ka linako tse fapakaneng. U ka jala selae (lettuce) ka nako ea selemo hoba se hola hantle tlas'a maemo a pholileng ebe u se hlahlamisa ka sepinache kapa lihoete. Haele lierekisi tsona u ka li jala ho ea mafelong a hoetla e le hore u tle u li kotule ha selemo sa temo se thoasa.



Hona ke mohlala uena u ka etsa khetho ea hau. Leha ho le joalo u ka iketsetsa liteko sebakeng seo u leng ho sona hore u tle u tsebe

hantle hore na ke li fe lijalo tse lumellanang le maemo a sebaka sa heno. Haeba u etsa liphuputso tse joalo u hlokomelisoa hore u ele lintlha tse latelang hloko:

- ❖ Lijalo li hola bophahamo bo bokae?
- ❖ Lijalo li hola hantle leka potlako e kae?
- ❖ Lijalo li khathatsoa ke likokoanyana li fe le mafu a fe?
- ❖ Lijalo li beha litholoana tse ntle ka bongata le boholo bo lebeletsoeng?

Hore u tsebe ho etsa papiso e ntle u lokela hore u be le seo u tlang ho li bapisa le sona. Ho ka ba bohlokoa ha u ka li bapisa le lijalo tseo u li hlahisitseng sebakeng se le seng li sa kopangoa le tse ling.

### Lijalo tse ka lengoang 'moho 'me tsa ntle le mathata:

Betiruti	–	Anyanese
Lihoete	–	Lierekisi, selae, anyanese,
Hanyanese	–	Betiruti, monokotšoai, tamati, selae
'Eggplant'	–	Linaoa
K'habeche	–	Litapole, betiruti, anyanese
'Peppers'	–	Meroho ea lirapeng kaofela
Selae	–	Lihoete, rapa ea likhomo, 'strawberries', 'cucumbers'
Mokopu	–	Poone
Sepinache	–	Monokotšoai
Tamati	–	Anyanese, lihoete
Poone	–	Makotomane, linaoa, 'cucumber', mokopu, litapole
Moora-tsatsi	–	'Cucumbers'
Linaoa	–	Litapole, lihoete, k'habeche, mefuta e meng ea meroho



### hola hantle

tamati



### Motsoako oa lijalo o sa kothaletsoeng ho lengoa 'moho:

Leha u sa kothaletsoe ho hlahisa sejalo se ka letsohong le letšehali le se bapileng le sona ka ho le letona moleng o le mong u bolokolohing ba ho iketsetsa liphuputso molemong oa ho ithuta hantle hore na ho etsahala joang.

Betiruti	–	Linaoa tse itšoarellang
Anyanese	–	Lierekisi, linaoa
K'habeche	–	Monokotšoai
Mokopu	–	Litapole
Tamati	–	Litapole, k'habeche
Linaoa	–	Anyanese
Moora-tsatsi	–	Litapole

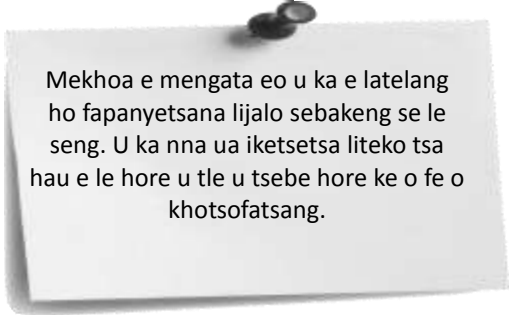


## 2. Phapanyetsano ea lijalo sebakeng se le seng (Crop Rotation)

Leano la mokhoa ona ke hore u se ke ua hlahisa sejalo se le seng habeli kapa ho feta sebakeng se le seng ka ho latellana. U lokela hore u li feto-fetole selemo le selemo kapa ho ea ka linako tsa temo.

Mokhoa ona o na le makhabane a latelang:

- ❖ O thusa ho laola ho ngatafala hoa lira tsa lijalo tse kang likokoanyana le mafu.
- ❖ Limela li atleha ho sielana matsoai ka mobung kaha lia fapakana ka litlhoko, moho le bongata bo hlokoang ke mofuta ka mong.
- ❖ Mobu o lula o ntse o apere selemo kaofela.
- ❖ Lijalo tse ling li atleha ho bokelletsa letsoai le bitsoang “nitrogen” joalo ka lierekisi, linooa ka mofuta ea tsona le ha u li phetholella ka mobung nakong eo li ntseng li le tala.
- ❖ Ho thusa hore manyoa (nematodes) a mobung a se ke a fumana mokhoa oa ho ngatafala ka lebaka la khora ha a fumana lijo tseo a li ratang nako eohle.
- ❖ Mahola a holang ha bobebe ha lijalo tse itseng li lengoe seratsoaneng ha a fumane monyetla oa ho hola ha u lemme mofuta e meng.

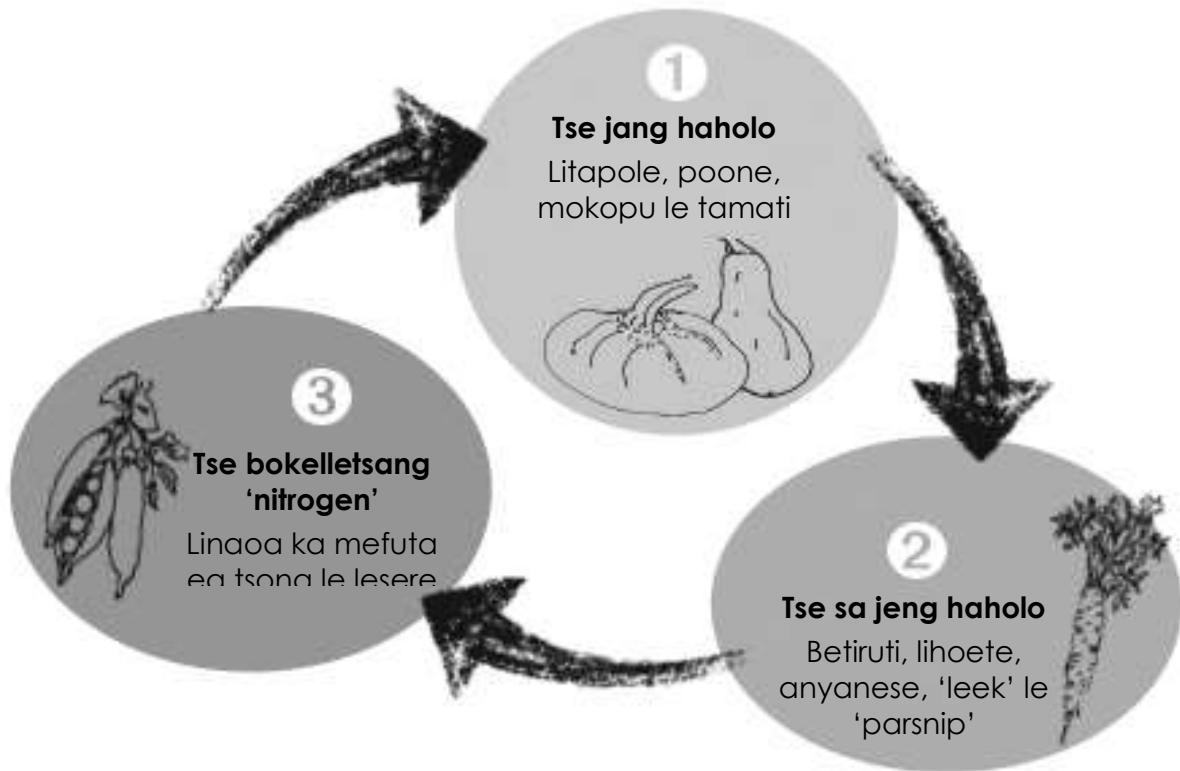


Mekhoa e mengata eo u ka e latelang ho fapanyetsana lijalo sebakeng se le seng. U ka nna ua iketsetsa liteko tsa hau e le hore u tle u tsebe hore ke o fe o khotsofatsang.

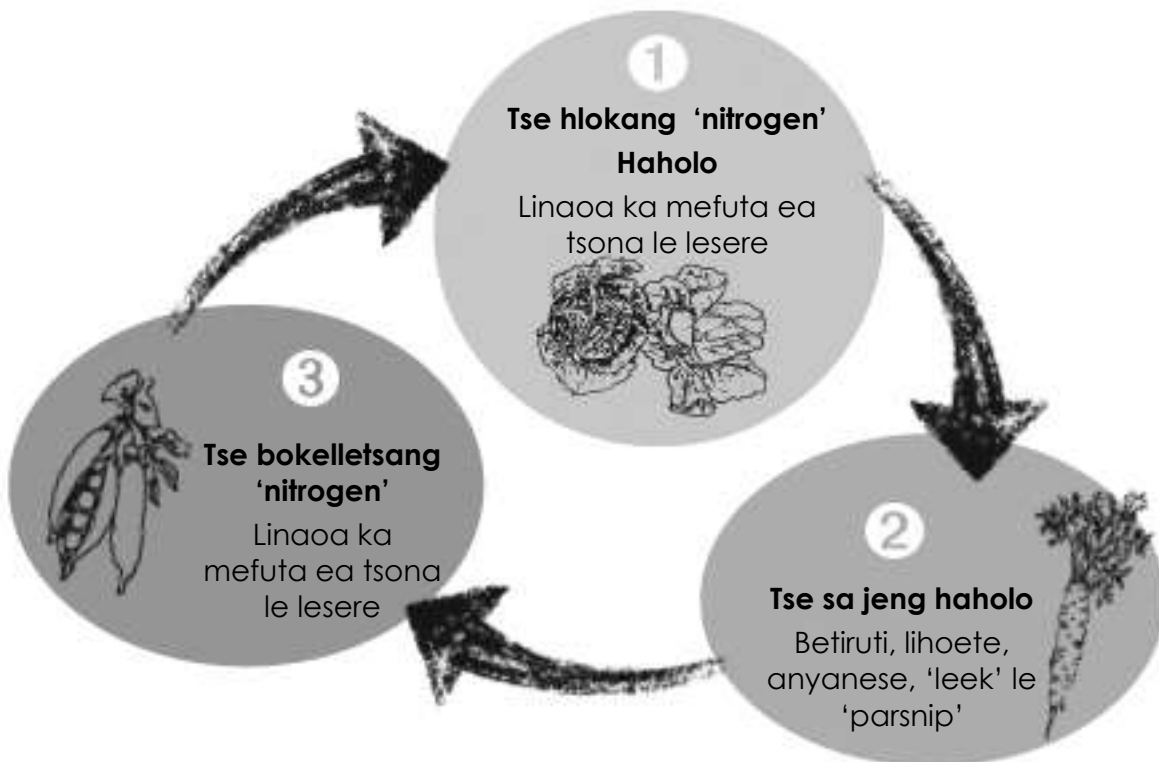
U mothating oa ho ithuta mekhoe e ‘meli ea ho hlahlamisa lijalo seratsoaneng sa hau. Ka bobeli ba eona u ka hlahisa litholoana tse hlabosang. A k’u e leke e le ‘meli u ntano khetha o le mong o u khotsofatsang haholo.

### Mokhoa oa pele:

U ka hlahlamisa lijalo tsa hau ka mokhoa o latelang:



Hoseng joalo u ka li hlahlamisa ka mokhoa o latelang:



Bakeng sa mekhoe e 'meli e bontšitsoeng ka holimo u ka tšela manyolo ka forong ka litekanyetso tse latelang ho latela lijalo tse fapakaneng:

**Manyolo a tletseng kharafu (a entse mohlohlo), a boima ba 'kilogram' e le 'ngoe.  
Bolelele ba mohato o le mong bo lekana le bolelele ba kharafu**

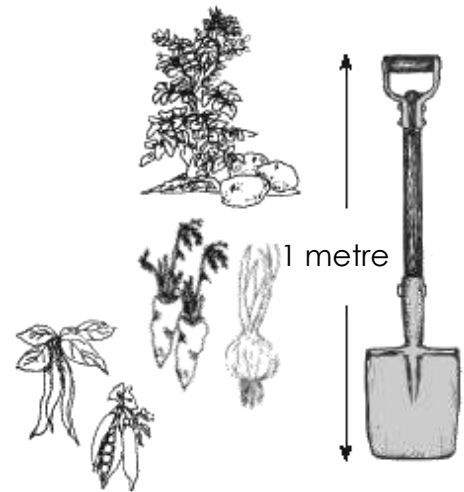
*Litapole:* Kharafu e tletseng manyolo forong e bolelele ba kharafu

*Poone:* Manyolo a bongata bo etsang halofo ea kharafu forong ea bolelele ba kharafu.

*Lihoete le anyanese:* Manyolo a bongata ba 0.4 kg sebakeng sa bolelele ba kharafu

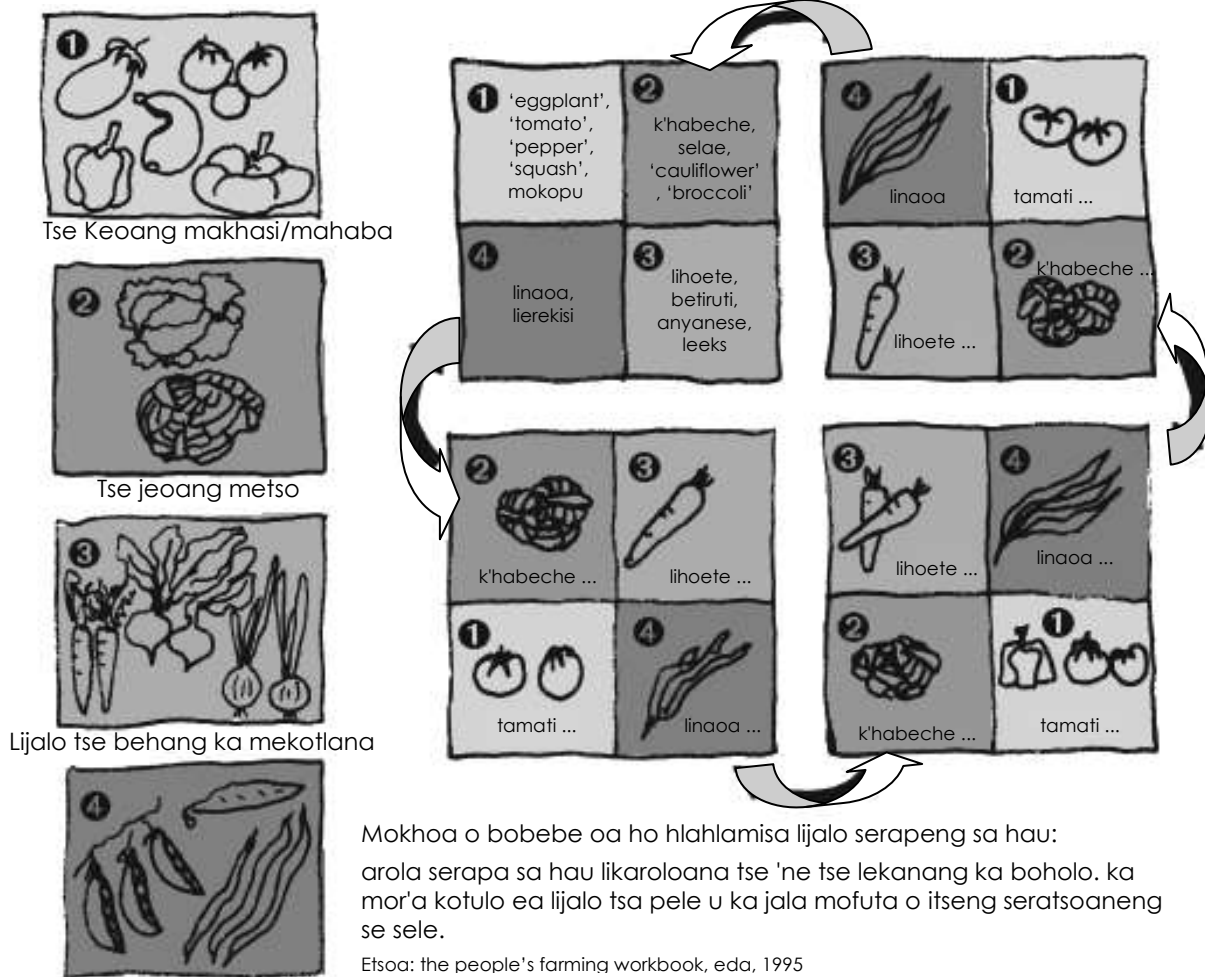
*Linaoa:* Manyolo a bongata ba 0.3 kg sebakeng sa bolelele ba kharafu

*Lierekisi:* Manyolo a bongata ba 0.2 kg sebakeng sa bolelele ba kharafu



**Mokhoa oa bobeli:**

Tse behang litholoana



Lokisa mobu oa lirapa tsa hau hantle pele u jala. Hase moiteli oa bongata ba likharafu tse 'ne tse tletseng sebakeng seo bolelele le bophara li lekanang le bolelele ba kharafo. U ka qala ka ho jala tse behang litholoana joalo ka tamati, mokopu le tse ling. Li hlahlamise ka tse kotuloang makhasi joalo ka sepinache kapa sepaile. Ke tsona tse khothaletsoang hobane lithoko tsa tsona tsa matsoai a mobung lia fokola ha li bapisoa le tseo u qalileng ka tsona. Tsona u ka li hlahlamisa ka tse jeoang metso (methapo) joalo ka lihoete le betiruti. Haele tsona u ka li hlahlamisa ka lierekisi kapa linooa ka mofuta ea tsona.

Hopola hore tsona li atleha ho ipokella letsoai le bitsoang 'nitrogen' ho tsoa moeeng.

Ka hona u se ke ua le kenyeletsa matsoaing ao u a eketsang mobung. U lokela ho ela hloko hore lihoete ha li lokele ho jaloa mobung oo u sa tsoa hasa moiteli kapa mosuela o mocha. Lebaka ke hore li tla hlahisa matsoele e leng se sa hloka haleng bakeng la 'maraka. U ka mpa oa sebelisa monontša oa sekhooba bakeng la ho nontša mobu.

Kamorao hore u hlahise lihlopha tsena tse 'ne seratsoaneng se le seng u ka boela ua lokisa mobu hape joalo ka ha u ile ua etsa sethathong. Boela u li hlahlamise joalo hape.

## Tlhatlhamiso ea lijalo

Ka mokhoa ona u ka lema meroho ka mefuta ea eona selemo kaofela. U ka fihlela hona ka ho jala mofuta o itseng oa moroho ka li nako tse fapakaneng empa li hlalhamana. Ka mantsoe a mang linako tsa ho jala li siane ka libeke tse seng kae. Mohlala ke oa tlhatlhamiso ea tamati. Ha e hlongoa e le ngata ka nako e le 'ngoe e tla butsoa kaofela ka nako e le 'ngoe. Ha u etsa hore sethopo se siane ka libeke nakong eo u jalang peo u tla se hloma ka nako tse fapakaneng ka hona u kotule naka e telele.

### Tokiso ea seratsoana:

U ka etsa joalo ka ho phetholella mosuoela kapa moiteli ka mobung botebo bo sa feteng lisenthimithara tse mashome a mararo.

Khothaletso ke hore u hase moiteli kapa mosuoela oa bongata ba lithane tse mashome a mararo (30 tones) boholong ba ekere ea sekhoaa. Haele seratsoaneng teng u ka sebilisa keribae e tletseng kapa likharafu tse tletseng tse 'ne sebakeng sa bophara le bolelele bo lekanang le bolelele ba kharafu.

Haeba re hlalisa sethopo ka likhaohano re ka sebelisa thepa e botšitsoeng mona. Hlokomela hore li na le masoba ka tlase molemong oa hore metsi a tsebe ho tsoa le teng.

- ❖ Lehlabathe: karolo e le 'ngoe.
- ❖ Mosuoela: karolo e le 'ngoe.
- ❖ Mobu: karolo tse peli. Ha u qetetile li kopanye 'moho.



Lebekere  
le leholo



Moritsoana



Manki



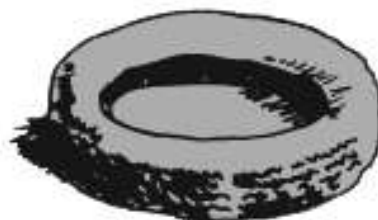
Lipolasitiki



Lehlaka



Lebokose la mapolanka kapa lithupa



Lebili la koloi le sa sebelisoeng

Etsoa: the people's farming workbook, eda, 1995



### 3. Taolo ea likokoanyana le mafu lijalong

Taolo ea  
likokoanyana  
na le mafu  
lijalong

Seroalankhoana  
Li ja mefuta  
eohle ea  
likokoanyana

Bobile  
liboko tsa  
bona  
li ja hoaba



Linonyana,  
linqanqane,  
mekholutsoane le  
lempetje

Tsona li ja  
likokoanyana

Bobi  
Bo behela  
mahe a bona  
holima liboko

Mesikaphalla  
Li ja khofu le mahe a  
likokoanyana tse  
senyang, 'me ka tsela  
ena li nkoa e le  
metsoalle ea molemi  
hobane li mo thusa  
ka ho ja lintho tseo  
molemi a sa lihlokeng  
serapeng sa hae

*Setšoantšo se bontsang e meng ea melemo eo likokoanyana, lihahabi le linonyana li e etsang serapeng sa hau. kaofela ha tsona li nkoa e le metsoalle eamolemi ka ha li mothusa ho laola likokoanyana*

### Phapano ke ntho e ntle hobane

- ❖ E sebetša mmoho le tšlaho ka ho kopitsa tsela eo limela li holang ka teng. Likokoanyana le lehola ke karolo ea tšlaho. Re lokela ho ithuta ho khotša letsa likokoanyana le limela tsena tse kang bo maleshoane, seroalankhoana, 'lace wings', bobi, linqanqane, mekholutsoane le linonyana e le hore li tle li je likokoanyana tsena tse re senyetsang ka lirapeng. Likokoanyana tsena li bitsoa 'predators', 'me ha u ka oa li tlohela ka serapeng sa hau li tla u tsoela molemo.
- ❖ Lipampiring tse fetileng joalo ka ea 'tlhahiso ea lijalo', re buile ka ho jala mefuta e fapakaneng ea lijalo le ho jala lijalo tse sa tšoaneng selemo le selemo. Hape, ho a lumeleha hore meroho e ka kopangoa le limela tse ling tse nang le menkho e bohale hore e tebele likokoanyana tse senyang lijalo empa e le limela tse tlang ho hohela li 'predators'.

Setšoantšong se ka holimo, 'nasturtiums' le kuena li jetsoe 'moho le meroho.

## Lethathamo le latelang ke la limela tse menkho e bohale tsoe u ka li jalang 'moho le meroho ea hau:

### 'Pyrethrum' le 'Feverfew'

Limela tsena ke tsa lelapa le le leng le *chrysanthemum*. Li na le lipalesa tse nyenyane tse bileng li khabisitseng ka serapeng, feela li na le chefo e ka bolaeang likokoanyana tse bakang tšenyō ka serapeng. U ka li lema mathuleng a lirapa tsa hau kapa mona le mane ka hare ho serapa sohle sa hau.



Peo ea limela tsena u ka e reka. Ngolla atereseng e latelang:

**Mahlathini Organics, PO Box 807, Richmond, 3780, KZN, South Africa.**



### Marigolds (*Tagetes spp*)

Le tsona li sebelisoa ka mokhoa o tšoanang le tse ka holimo. Li boetse li na le makhabane a hore li atleha ho tebela li 'nematodes' e leng manyooa a masesanyane a jang metso ea lijalo ka mobung.



Mefuta e papakanen g ea li "nematodes"



### 'Fennel'

Sena ke semela se setle bakeng sa ho hohela bobi. Bobi bo behela mahe a bona kahare ho seboko 'me ka tsela ena bo atlehe ho bolaea seboko sena ka bongata.



Bobi

### Wormwood (*Artemisia affra*) – Lengana

Limela tsena li hola hore li be li etse morunyana, kahoo, li hloka ho lengoa qetellong ea serapa kapa li fuoe sebaka sa tsona moo li tlang ho holela teng. Tee e entsoeng ka makhasi a tsona e ntle bakeng sa ho phekola sefuba.

### 'Khakibos' – Monkthane

Ke lehola le thusang ho thibela likokoanyana tse bakang tšenyō lijalong. Etsa bonnete ba hore li teng serapeng sa hau.



Ho jala lijalo tse kang 'cauliflowers', 'lettuce', 'fennel' le anyanese 'moho ke mokhoa o motle oa ho loantša hoaba le 'diamond back moth'.

Serurubele le liboko sa sona

# Lema lijalo tse matlafatseng tse phetseng hantle

## Lijalo tse phetseng hantle ha li futuheloe ke likokoanyana le mafu.

- ❖ Ha mobu o le manoni o bile o tšelo a mosuela le moiteli selemo le selemo, o tla hlahisa lijalo tse phetseng hantle. Etsa bonnete ba hore lijalo tsa hau li lula li ena le metsi ha ho hlokeha.
- ❖ Nakong eo u kotulang, khetha lijalo tse phetseng hantle ho feta tse ling, moo ho tsona u tla iphumanela peo.
- ❖ Pele u jala, khetha peo kapa sethopo se phetseng hantle, hobane ha u sa etse joalo, ha lina ho atleha ha li ntse li hola.
- ❖ Jala meroho ea hau ka nako e nepahetseng ea selemo sa temo (u khothaletsoa ho bala sehloho sena 'Thlahiso ea lijalo'. Lijalo tse ling li hloka ho jaloa e sa le nako e le ho li sireletsa hore li se ke tsa futuheloa ke likokoanyana le mafu. Mehlala ke seboko sa lehlaka pooneng le 'blight' litapoleng.
- ❖ Tšireletso ea mobu letsatsing (u khothaletsoa ho bala sehloho se buang ka 'Ho koahela mobu hore u se lahleheloe ke mongobo').
- ❖ Ha u qeta ho hlaola, se sie lehola le tletse-tletse le serapa sa hau hobane menkho ea lona e hohela likokoanyana tse senyang lijalo. Hona le hore li tlaletle joalo, u ka li sebelisa ho etsa mokeli-keli (u khothaletsoa ho bala sehloho se buang ka 'Ntlafatso ea mobu'). Ntle ho moo, lehola lena u ka le kopanya le litlama-tlama tse ling ho etsa totoma ea mosuoela.

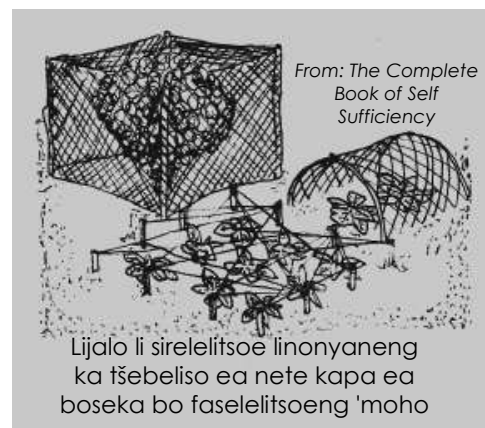
Haeba u bona hore mekhoe e ka holimo ea ho thibela likokoanyana le mafu lijalong tsa hau e sa sebetse, ho ntse ho ena le mekhoe e meng eo u ka e sebelisang ho phema mathata ana.

## Thibelo ka tšebeliso ea lintho tseo u ka li bonang oa ba oa li tšoara

### Linonyana:

U ka qobisa lijalo tsa hau hore li se ke tsa jeoa ke linonyana ka mekhoe e latelang:

- ❖ Sebelisa lithupa tse 'ne (4) le nete ho etsa hoko (cage) ea linonyana
- ❖ Koahela sethopo sa hau ka nete kapa boseka bo faseletsoeng terateng e kobehileng halofo



- ❖ Faseletsa terata tse ngata 'moho e be u li tlamella ka li phek'se (pegs).
- ❖ Litšosetsi le tsona lia khothaletsoa, feela li lokela hore li se ke tsa lula ng'a e le ngoe nako e telele hobane linonyana li tla qetalletse li se li litloaetse, ebe ha li sa tšoha.

### Seseli:

Mofuta ona oa seboko o motenya, o 'mala o mosoothoana. O phela ka tlase ho mobu hanyane, moo teng o senyang ka hoja mahlakana (stems) a lijalo tse nyenyane.

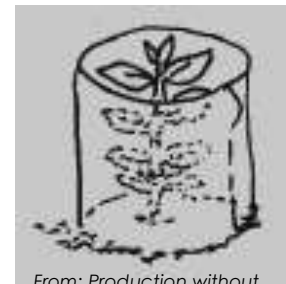
- ❖ Mokhoa oa ho tlosa seseli ke hore, hoseng u no cheke ka monoana pela lijalo tse pongoeng, ebe u nka seseli seo u fepe likhoho tsa hau kapa u se bolae.

- ❖ Litšireletsi li teng tse ka sebelisoang ho sireletsa sethopo sa hau ho seseli. Tsona li pota potisoa sethopo hang ha se qetoa ho hlongoa. Mohlala, u ka sebelisa lebokose la lebese le rekoang la motsilili, lona ebe u le bula ka holimo le ka fatše, u ntano hloma sethopo sa hau ka hare ho lona. U ka boetse oa sebelisa botlolo ea polasitiki, le eona u e khaole joalo ka lebokose la lebese. Khothaletso ke hore litšireletsi tsona li tebisoe ha li kengoa mobung, bonyane botebo ba menoana e 'meli (3cm) ho seng joalo seseli sena se tla phunyeletsa ka tlase ho tsona.

Seseli



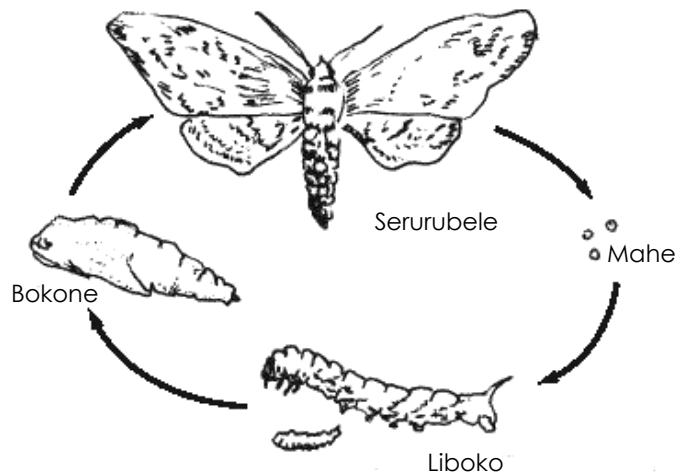
Setšireletsi se sirelelitseng sethopo ho seseli



From: Production without Destruction, 1995

Bongata ba liboko bona le thlathlamano (life cycle) e latelang ea bophelo ba tsona:

Ho qala ka serurubele se tla behela mahe, ao oona a tlang ho qhotsoa, ebe ho hlaha liboko. Seboko sena ke sona se jang lijalo. Kamor'a nako seboko sena sea fetoha ebe bokone, boo bona ka lehlohonolo bo sa senyang lijalo tsa hau. Le ha hole joalo, bokone bona le bona bo tsoala serurubele se tlang ho behela mahe a tla qetelletse a qhotsitsoe, liboko li hlasele lijalo, ebe li ntse li iphetha joalo-joalo.



### Tlha-thlamano ea bophelo ba tse ling tsa likokoanyana

Leraba la khanya bakeng sa ho tsoasa lirurubele

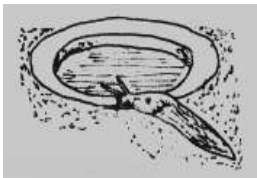


From: *Production without Destruction*, 1995

Ho bonolo hore u hohle mefuta e fapakaneng ea lirurubele u sebelisa leraba le nang le lebone. Lona le behoa kantle bosiu. Leraba lena la khanya le tla fokotsa sekahla seo mahe a beheloang ka teng ke mefuta e fapakaneng ea lirurubele.

### Likhofu:

From: *The Complete Book of Self Sufficiency*



Sekotlolo se tsetetsoeng ka serapeng se tšetse joala ho hohela likhofu

- ❖ Li ka flosa hantle feela ka matsoho. Li tšele ka nkhong e tšetseng metsi kapa li fepe likhoho.



Khofu

- ❖ Mokhoa o mong hape ke hore u nke sekotlolo se tšetseng joaloa e be u se beha serapeng sa hau. Etsa bonnete bahore se lutse hantle hoo khofu e tlang ho hohleha ha bobebe e be e qetelletse e kolumetse ka sekotlolong. Ha ese e oetse, e fepe likhoho kapa u e bolae.

### Tee ea limatlafatsi

Toantšo ea likokoanyana le mafu

Likokoanyana le mafu a lijalo li ka behoa tlas'a taolo ka tšebeliso ea mefuta e fapakaneng ea metsoako ea lijalo. Tšebeliso ea tsona e etsoe feela haeba mekhoe eohle e se e hlotsoe. Makhabane a ho sebelisa mokhoa ona ke hore ha o theko e phehameng hape o ka etsetsoa lapeng.



## Lintlha tsa bohlokoa tsa ho etsa motsoako oa ho tšella lijalo

- ❖ Sebelisa sesepa se kang 'sunlight' e seng sa phofo kapa se metsi. Se kopanye le motsoako oa hau ho etsa hore motsoako o tle o mamarele lijalo le likokoanyana.
- ❖ Sebelisa lesela ho sefa motsoako. Ha u se u sefile, u ka sebelisa lefielo ho o fafatsa.
- ❖ Ka ha motsoako ona o chefo, etsa bonnete ba hore o anela likokoanyana le matšoao a mafu hantle.
- ❖ Metsoako e meng e chesa lijalo haeba e loile haholo, kahoo, u lokela hore u etse teko ea motsoako oa hau lijalong tse 'maloa pele u ka e tšela serapeng kaofela.
- ❖ Khothaletso ke hore u fafatse likokoanyana tse senyang lijalo motseare oa mantsiboea.
- ❖ Ha pula e ena, se ke oa fafatsa hobane motsoako o tla hlatsoeha o batle hore o u tšele hape.

### NTLHA EA BOHLOKOA:

Kaha motsoako oo e le chefo, etsa bonnete ba hore bana ha ba atamele moo u ntseng u o etsa. Haeba u tlo belisa motsoako, sebelisa pitsa ea khale eo u seng u sa e sebelise ho pheha. Roala liatlana ha u ena le tsona.



## Lethathamo le latelang ke le bontšang tse ling tsa limela, hore na motsoako o riteloa joang le hore na o sebelisoa ho phekola eng:

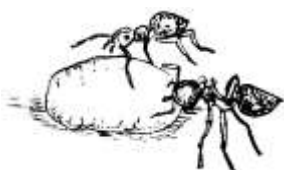
### Lekhala

Mofuta ofe kapa ofe oa lekhala o ka sebelisoa.

- ❖ Sila makhasi a lekhala ebe u oa tšela metsing ka karoloana ea 'ngoe ea phofshoana ea lekhala ho tse hlano tsa metsi (1:5). Hona ho bolela hore metsi a be mangata ha hlano ho feta makhasi. Ha u qeta, sefa motsoako ka lesela ebe u fafatsa lijalo tsa hau.
- ❖ Mokhoa o mong e ka ba oa ho sila makhasi a ommeng ebe u fafatsa lijalo le peo ea hau.

### TOANTŠO:

- ❖ Lekhala le loantša likokoanayana ka mefuta ea tsona kaofela, marutle, hoaba le seboko;
- ❖ Tšupa;



Hoaba



Bohloa



Masetlaoke



Lerutle





### Theepe

Nka makhasi a ntseng a le metsi a ka tlang polasitiki (1Kg) ebe u oa sila. Kopanya lero le tsoang moo makhasing le li lithara tse tharo (3L) tsa metsi a sesepa ebe oa fafatsa.

### TOANTŠO:

Motsoako ona oa theepe o loantša mefuta e fapakaneng ea mafu a kang matheba a fumanoang mokhasing (leaf spot) le lefu la makhasi le bitsoang 'blight'.

### Lengana

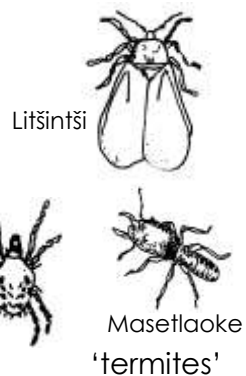
Khabella makhasi ka karoloana e le 'ngoe ho isa ho tse 'ne (1:4) ka metsing, hona ho bolela hore ho seatla se seng le se seng se tletseng makhasi, u tšele li lithara tse 'ne (4) tsa metsi, ebe u li tlohela ka metsing ao matsatsi a mabeli ho isa ho a supileng pele u o sebelisa. Kopanya motsoako oo le sesepa..



**TOANTŠO:** Motsoako ona o loantša likokoanyana ka kakaretso le likhofu.

### Monkhane

Nka peo e ka tlang lebekere e be u e belisa metsotso e leshome, kapa u e tlohele ka metsing bosiu kaofela. Kopanya motsoako oo le lithara e le 'ngoe ea metsi a sesepa e be oa fafatsa.



**TOANTŠO:** Motsoako ona o loantša likokoanyana ka kakaretso, hoaba, bohloa, maleshoane, liboko, seseli, 'mites', le litšintši.

### Chilisi

- ❖ Khabella lichilisi tse ka tlang lebekere (hlokomela u seke oa isa matsoho mahlong, u tla fahloa ke chilisi e saletseng moo).
- ❖ Kopanya chilisi le lithara tse peli tsa metsi.
- ❖ Tlohella chilisi ena ka metsing matsatsi a ka bang mabeli ho isa ho a mararo kapa u li belise metsotso e leshome le metso e mehlano.
- ❖ Kopanya lebekere le tletseng la makumane ho fihlela tsohle li qhibilihile .
- ❖ Sefa motsoako ho flosa masalla a chilisi.
- ❖ Ha ho chesa haholo,



fafatsa motsoako ha 'ngoe ka beke.

**TOANTŠO:** Chilisi e loantša liboko, hoaba le bohloa.

### 'Garlic' le Anyanese

Hlokomela hore motsoako ona o ka chesa makhasi a lijalo tsa hau ha eba o loile haholo

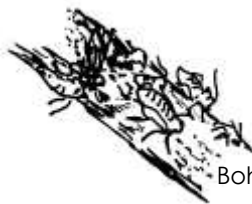


Khabela 'garlic' tse tharo tse kholo (kapa anyanese ho isa ho tse peli), ebe u li inela matsatsi a mabeli ka mafureng kapa ka parafining e ka tlang likhaba tse kholo tse peli. Sefa ebe u kopanya le lithara e le 'ngoe ea metsi a sesepa. Hlapolla motsoako ona ka karoloana e le 'ngoe ho tse leshome tsa metsi ebe oa fafatsa.

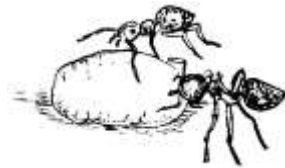
**TOANTŠO:** Li loantša likokoanyana ka kakaretso, hoaba, 'mites', manyoha le masetlaoke. Hape o boetse o phekola mafu a kang matheba a fumanehang makhasing (leaf spot), 'blight' le 'damping off'.



Masetlaoke



Bohloa



Hoaba

### 'Marigolds'



Mona teng re sebelisa sejalo kaofela. Sebelisa limela tse peli ho isa ho tse 'ne (2-4), e be u sila makhasi, methapo le lipalesa tsa tsona 'moho. Li tšele ka metsing a belang a etsang lithara ebe u li inela letsatsi le le leng. Letsatsi le hlahlamang, kopanya

motsoako le lithara ea metsi a batang a sesepa ebe u tšella lijalo tsa hau. Sebelisa masalla a makhasi le methapo ho sireletsa mobu khahlanong le lebatama la letsatsi.

**TOANTŠO:** 'Marigold' e loantša likokoanyana ka kakaretso, bohloa, hoaba, maleshoane, seboko sa lehlaka, hammoho le mefuta e mengata ea mafu joalo ka matheba a fumanoang makhasing (leaf spot) le lefu le bitsoang 'blight'.



## Koae



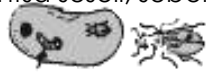
**THLOKOMELISO:** Koae e kotsi haholo kaha e le chefo bathong le likokoanyaneng. Joale, etsa motsoako o latelang ka hlokolosi.

- ❖ Sebelisa liatla tse peli tsa makhasi a omeletseng a koae kapa li tomphi tsa koae.
- ❖ Tšela lithara tse hlano tsa metsi ebe u belisa tsohle metsotso e ka bang mashome a mararo. Sefa motsoako e be u kopanya le sesepa. Emela motsoako o fole. Tšella ka oona ha 'ngoe ka beke.



### TOANTŠO:

E loantša seseli, seboko, hoaba, litšintši le tšupa.



Liboko

Tšupa

Hoaba



## Phekolo u sa sebelise limela

Lethathamo le latelang ke la ho phekola likokoanyana le mafu lijalong u sa sebelise limela.

### Molora oa patsi

Kopanya khaba e kholo e tletseng molora oa patsi le lithara e le 'ngoe ea metsi a sesepa. Tlohela motsoako bosiu kaofela. U sebelise ho fafatsa likokoanyana ka kakaretso.



Kopanya khaba e kholo e tletseng molora oa patsi le lithara e le 'ngoe ea metsi a sesepa, kopanya hape le lebekere le tletseng la mafi ebe u boetse u tšela li lithara tse tharo tsa metsi..

**TOANTŠO:** Molara oa patsi o phekola 'mildew' lijalong le mefuta e mengata ea likokoanyana.



- ❖ Ala molora oa patsi u pota potisa sejalo sa hau, ebe u tšella hanyane ka hanyane.

**TOANTŠO:** Likhofu, seseli

## Phofo

Kopanya khaba e kholo ea phofo metsing a lithara e le 'ngoe. Tlotsa bo ka fatše ba makhasi e leng moo li 'mites' le hoaba li ratang ho ipata teng. E sebelise hoseng mohlang ho chesang.

**TOANTŠO:** 'Spider mites', liboko le hoaba.



## Lebese

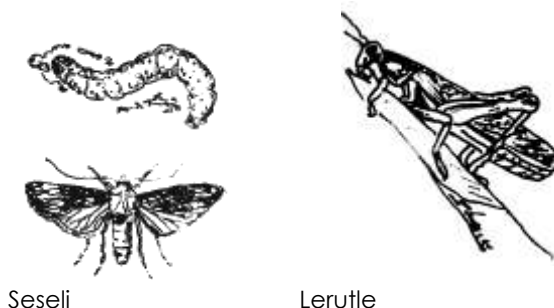
Kopanya lithara ea lesebe le li lithara tse leshome tsa metsi, ebe u tšella lijalo tsa hau e le ho loantša 'spider mites' le ho phekola mafu a kang 'mildew' mokopung, 'blight' tamating le litapoleng le 'mosaic virus' lipepereng. Tšella ka mor'a matsatsi a mang le a mang a leshome.

## Mokeli-keli /Tee ea Mosuoela

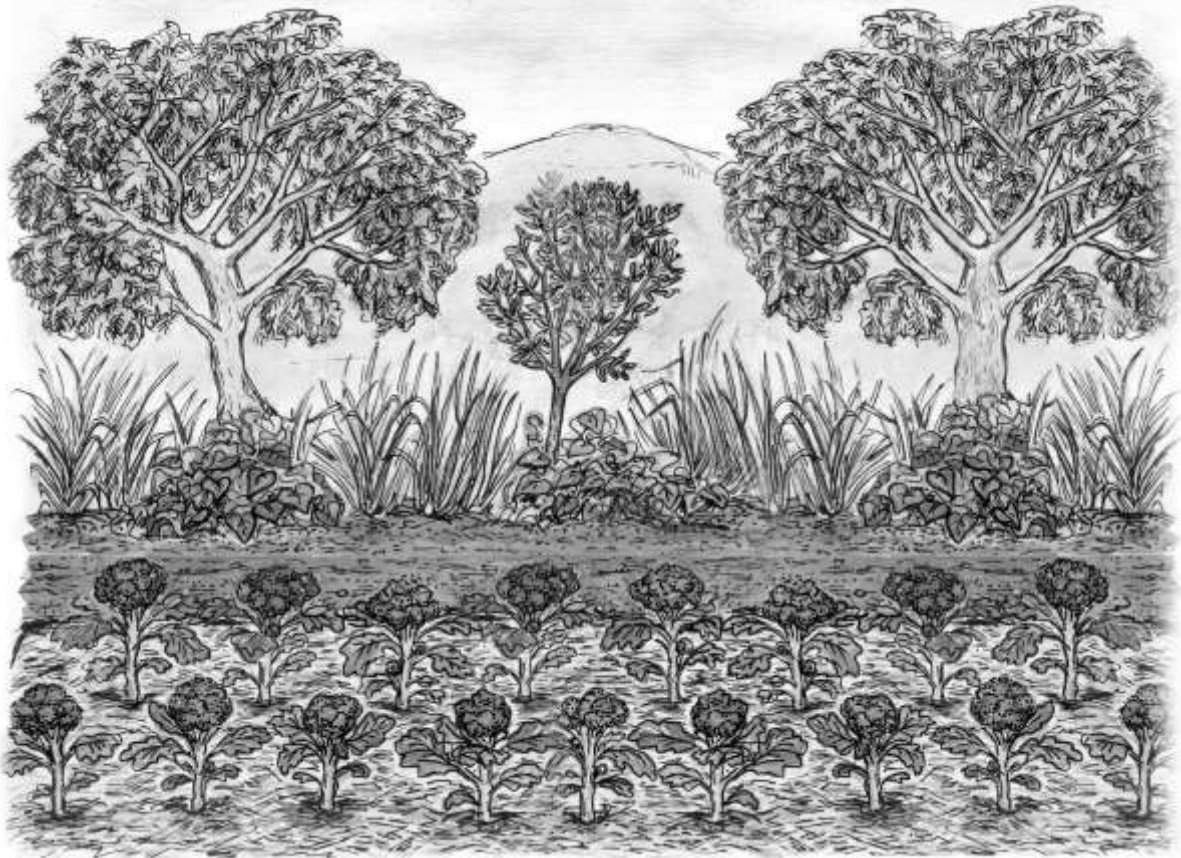
Bala sehloho se buang ka 'Ntlafatso ea mobu' moo teng ho hlalositsoeng ka botebo ho etsa mokeli-keli.

- ❖ Kopanya kharafu e le 'ngoe e tletseng ea mosuoela kapa moiteli kahar'a metsi a li lithara tse leshome.
- ❖ Tlohela motsoako ona matsatsi a leshome ho isa ho a leshome le metso e mene.
- ❖ Moiteli oa liphoofolo o tlameha ho hlapolloa ka karoloana e le 'ngoe ea mokeli-keli ho tse 'ne tsa metsi (1:4). Tee ea mosuoela eona e sebelise e le joalo.
- ❖ Fafatsa motsoako ona lijalong tsa hau hangoe ka mor'a matsatsi a supileng ho isa ho a leshome.

**TOANTŠO:** Ka kakaretso e sireletsa lijalo khahlanong le ho futuheloa ke likokoanyana le mafu. Liboetse li na le matla a ho tebela hoaba, liboko, marutle, maleshoane, 'mites' le seseli.



## 4. Tšireletso ea lijalo moeeng le serameng



Mela ea lijalo le lifate tse fapaneng tse lengoeng 'moho li ka tšireletsa serapa sa hau moeeng le serameng (frost). Se tšireletsi sa moea ke ntho efe kapa efe e ka sebelisoang ho tšireletsa lijalo tsa hau moeeng. E kaba lijalo tse ling kapa lifate. Se behoa moo moea o hlahang teng. Se thusa ka ho fokotsa matla a moea, o fihle lijalong tsa hau o se o fokotsehile. Ka holimo ke mohlala oa tšireletso e joalo e bileng e nang le mefuta ea furu bakeng sa liphoofolo. Lijalo tsena tse sebelisoeng ka holimo li ka boela tsa sebelisoa e le lijo tsa lipoli, likhomo, linku le likhooho!! Setšoantšo sena se ka holimo se bontša 'li cow peas' tse imamaretseng sefateng, hammoho le mefuta e latelang ea limela: 'napier fodder', 'pigeon pea' le cheche. Li mela tsena li ntle bakeng sa ho ntlafatsa mobu, ha makhasi a tsona oona a ka sebelisoa ho tšireletsa mobu ho le batama la letsatsi. Makhasi ana a ka boela a sebelisoa serapeng se bopehileng joalo ka lesoba la senotlolo. (u khothaletsoa ho bala sehloho 'ntlafatso ea mobu').

### Ho tšireletsa moea

Ho foka ha moea ke ntho ea bohlokoa lijalong. Moea o thusa ho qobisa lijalo mafu a bakoang ke mangobo o mongata le a mang a mafu a bakoang ke ho ba sio ha oona moea. Moea o boetse o thusa ho qhalakanya peo e fumanoang lipaleseng tsa sejalo.

**Moea o ka ama lijalo tsa hau ka tsela e mpe tjena:**

- ❖ Meea e matla e ka roba lijalo le ho koqola lifate
- ❖ Meea e omileng enka mongobo e be lijalo li sala li omile.
- ❖ Meea e chesang kapa e batang haholo e ka senya lijalo.
- ❖ Lerole le hoholoang ke moea le ka hohla lijalo tsa hau joalo ka ha eka ke sekiripoto.
- ❖ Moea o boetse o baka khoholeho ea mobu, haholo li kheoling tseo ho omelletseeng. Ha moea o le mongata, o nka mobu o ka holimolimo o nang le matsoai a mangata o sie o seng motle haholo.

**Setšireletsi o ka sebeha kae**

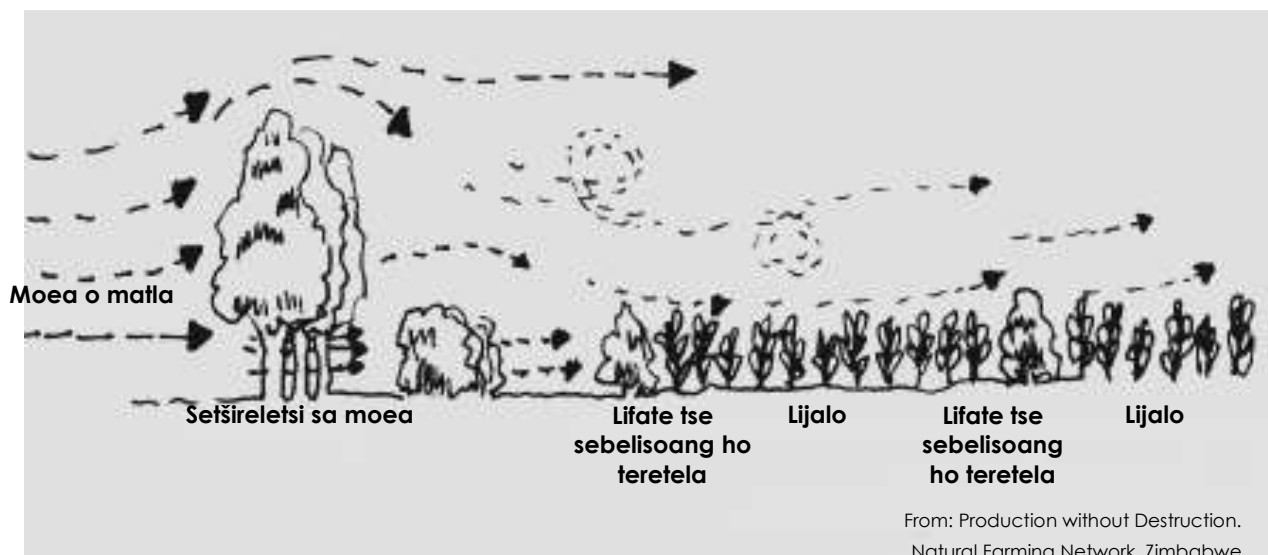
Litšireletsi tsa moea li ka lengoa moo moea o hlahang teng. Li lokile haholo ha li lengoe malapeng. Hape li ka lengoa pela tsela. U ka li sebelisa hape ho teratela jarete kapa tšimo ea hau.

**Bohlokoa ba litšireletsi tsa moea**

- ❖ Li fana ka patsi
- ❖ Li fana ka litholoana
- ❖ Lia hlaba ho tšireletsa masholung
- ❖ Li fana ka lijo tsa liphoofole
- ❖ Li fana ka meriana

**Mokhoa oa ho etsa setšireletsi sa moea**

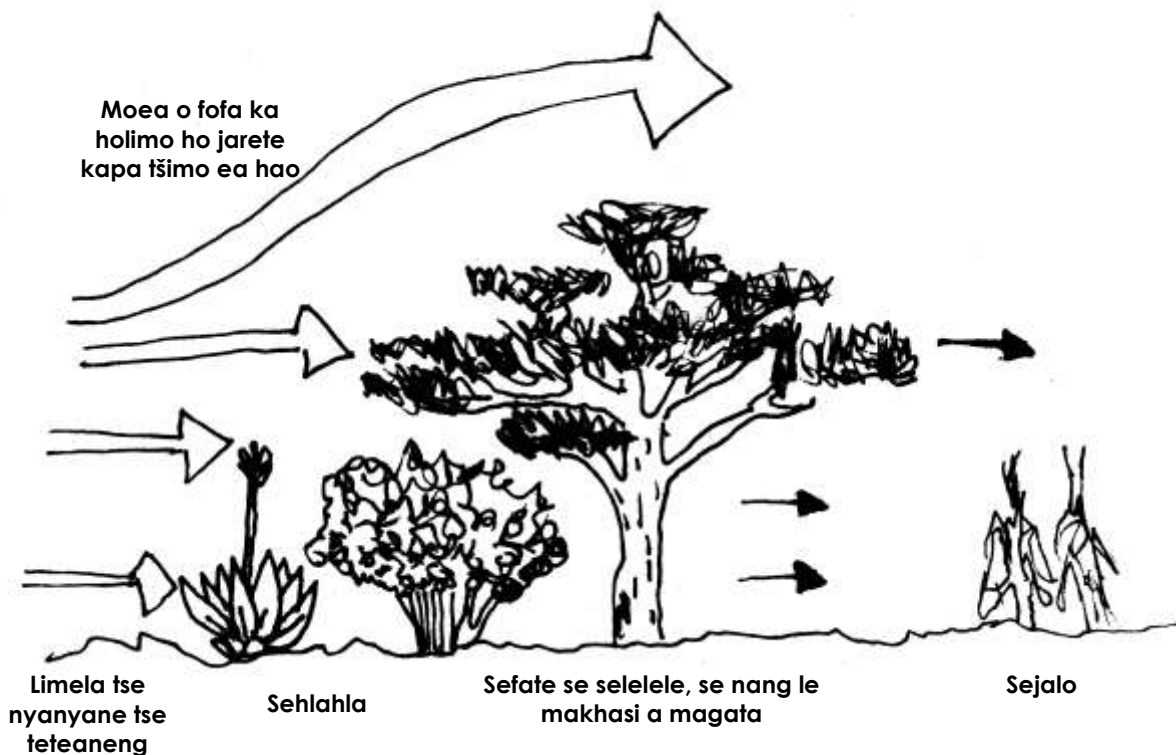
Setšireletsi sena se etsoa ka ho lema lifate le lihlahla tsa mefuta le bolelele bo fapakaneng. Li lengoa li teteane hanyenyane hore moea o tsebe ho feta lipakeng empa o se ose matla hakaalo. Li tšireletsi tse matla haholo ke tse entsoeng ka bonyane mela e meraro ea lihlahla le lifate tsa bolelele bo fapakaneng.



Lifate kapa li hlahla li kanna tsa lengoa moleng o le mong kapa ho e 'meli ha feela u ka oa etsa bonnete ba hore makhasi le makala a tsona a tla fihla fatse. Ha ele lifate tse telele feela tseo u tšireletsang ka tsona, makala a tlaase a shoa ka mora nako e be a sia lifate lepalapaleng, moea o ntano iphethela feela o le matla o le joalo e be o lo senya lijalo tsa hau.

Lifate tse khutsoanyane le lihlahla li ka lengoa ka lehlakoreng leo moea o hlahang ka lona.

Tse latelang ke mehlala ea limela, lihlahla le lifate tseo u ka lisebelisang!



From: The People's Farming Workbook, EDA, 1995

Limela tse nyeyane	Lihlahla	Lifate
<ul style="list-style-type: none"> <li>❖ Lekhala</li> <li>❖ Comfrey</li> <li>❖ Wormwood</li> <li>❖ Herbs such as rosemary, thyme, lavender</li> <li>❖ Marigolds</li> <li>❖ Fennel</li> <li>❖ Runner Bean</li> <li>❖ Lifate tsa morara ka</li> </ul>	<ul style="list-style-type: none"> <li>❖ Napier Fodder</li> <li>❖ Pigeon pea</li> <li>❖ Buddleja or Sagewood</li> <li>❖ Halleria or Tree Fuchsia</li> <li>❖ Dovyalis or Kei-Apple</li> <li>❖ Carrissa or Num-Num</li> <li>❖ Euclea or Blue Guarri</li> </ul>	<ul style="list-style-type: none"> <li>❖ Casuarina or Beefwood</li> <li>❖ Cheche</li> <li>❖ Mulberry</li> </ul>

mefuta		
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## Linthla tse ling mabapi le limela, lihlahla le lifate tse kothalelisoeng

### ***Lekhala***

Le letle haholo bakeng sa ho tšireletsa kaha e bile le a hlaba, hape le fana ka tšireletso mollong hobane makhasi a lona a na le metsi a mangata. Le ka boela la sebelisoa e le moriana. Mofuta o motle oo u ka u sebelisang oa lekhala ke o bitsoang 'aloe maculate'. Lena ke lekhala le sa holeng hore le be le lelele haholo, le na le mathebatheba a masoeu makhasing. Lero le fumanoang makhasing a lona le letle haholo e le moriana oa ho sokela. Lekhala lena le boetse le na le letsoai le bitsoang 'selenium', le o lona e leng tlatsetso ea bohlokoa masoleng a 'mele oa hau.

Haele lekhala leo batho ba tloaetseng ho itemela lona malapeng a bona le bitsoa 'aloe striatula', lona le hola haholo, le tla sebak.



### ***Marigolds and Fennel***

Tsena ke limela tse nyenyane tsenang le monko o bohale. Lithusa hore jarete ea hau e se futuheloe ke likokoanyana. Lipalesa tsa fennel tse bopehileng joalo ka sekhela, li thusa ka ho bitsa likokoanyana tse tlo ja tsena tse bakang tsenyo jareteng, tse kang hoaba le liboko. Marigolds tsona li ka sebelisoa e le chefo e tla bolaea liboko ka mobung.



### ***Napier fodder***

Sena ke semela se matla sa mofuta oa furu. Se boetse se se tle bakeng sa ho tšireletsa mobu (mulching). Se hola kapele. Se nyalisoa ka ho nka lehlomela le lenyenyane ho tsoa sefateng seo re ka sebitsang ka hore ke 'ma sona. Hape, se kanna sa hlahisoa ka tsela ea hore mahlaka a sona a aloe ka hara foro e sa tebang haholo, moo se tlang ho hola ka lebaka la linoko tse fumanoang moo lehlakeng (stem). Sebakeng seo ho batang, semela sena se tla robala mariha (empa makhasi a omeletseng oona a tla sala a tširelelitse). Se tla boela se hloma hape ka selemo (spring).



### ***Lelothoane***

Tsena ke lihlahla tse holang kapele, tse lulang li le tala selemo ho pota. Hona ho bolela hore ha li hlohllorehe makhasi mariha. Hape, ha li bolaoe ke serame (frost). Ha li sale nyenyane li hloka tšireletso e matla empa hang kamorao ho moo li ikholela hantle ho se mathata. Lipalesa tsa tsona li bitsa/likhahla linonyana le linotsi. Makhasi a tsoana a ka sebelisoa e le moriana oa mahlo

kapa e le tee.



### ***Lebetsa***

Sena ke sehlahla feela se ka hola ho fihlela e kaba sefate se senyenyane. Se hola ho fihlela se eba bolelele ba limithara tse tharo hoisa ho tse leshome (3-10 m high). Sena le mahlaka a mangata a ka holang hore a etse patsi, lithupa tsa jareteng (joalo ka ho phahamisa tamati) kapa ho teratela. Sena le lipalesa tse fubelu kapa tse mobala ekang oa lamunu tse khahlang linonyana le linotsi. Litholoana tsa teng lia jeoa.



### ***Mohlakolo, Motsoetla***

Ke sehlahla kapa sefate se lulang se le setala ho pota. Se hola ho fihlela se eba bolelele ba mithara ho isa ho tse hlano (1-5 m). Sena le litholoana tse nyenyane tse ntšo tse bopehileng joalo ka erekisi, tse jeoang. Se atile haholo Lesotho.



### ***Carissa bispinosa; Num-num***

Ke sehlahla se na le makala a mangata a hlabang. Se setala ho pota. Makhasi a sona a matenya a benya. Litholoana tsa teng li nyenyane, likhubelu, li monate hape li ka sebelisoa ho etsa jeme.



### ***Cajanus cajan; Pigeon Pea***

This is a small tree that is native to Africa. It fixes nitrogen in the soil and has deep roots. It can be used for firewood. It is frost tolerant, but needs to be protected when young. The young leaves can be eaten as spinach and the seeds are eaten as beans or 'dahl'. The leaves are also good fodder for animals; especially cattle and goats.

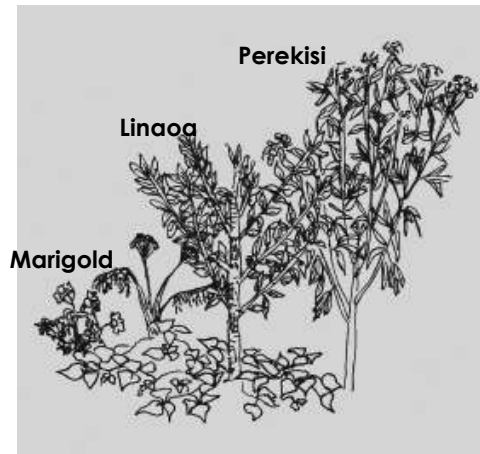


### ***Dovyalis caffra; Kei Apple***

Sena ke sefate se senyenyane senang le meutloa le makhasi a nang le boeanyana bo boseou ka holimo. Se sebelisoa haholo ho teratela (hedge). Se batla se lieha ho hola. Se mamella komello le serame. Se hloka ho tšireletsoa serameng ha se sa le senyenyane. Litholoana tsa teng li monate, hape li ka etsoa jeme kapa 'jelly'. Hlatsoa boeanyana bona bo bosoeu peong pele u e jala.

**Mulberry**

Tsena ke lifate tse kholo, tse hlohlorang makhasi a tsona mariha. Makhasi ana a matle haholo bakeng sa furu. Monokotsoai (berries) oa teng o motšo ka 'mala, o tsoekere hape o ka etsa jeme. Ho bobebe ho hlahisa mulberry ka mokhoa oa nyaliso. Li ka purungoa ea ba makala ao a sebelisoa ho teratela, e le patsi kapa ho tšehetsa lijalo serapeng.



Ho a lumelleha hore u leme lifate tsa litholoana hammoho le tsena tse boletsoeng ka holimo. Ka tsela ena, u tla thusa ho tšireletsa litholoana tsa hau serameng, moeeng le ho hlaseloa ke likokoanyana. Ka lehlakoreng le letšehali ke mohlala oa sefate sa perekisi se lengoeng hammoho le linaoa, 'marigolds', 'fennel' le lierekisi.

Motsoako oa limela tse fapakaneng o ka sebelisoa.

***Casuarina Cunningham; Beefwood***

Sefate sena se tsoa Asia le Australia. Ke sefate se seholo se fanang ka moriti, senang le makhasi a kang a sefate sa phaena. Se hola kapele ebile se hola hantle mobung o seng motle ha kaalo. Se fana ka patsi le timber (e etsang mapolanka). Se lengoa ha bonolo ka peo. Se mamella serame (frost) hanyenyane feela, se bile se hloka ho tšireletsoa ha se sa le senyenyane.

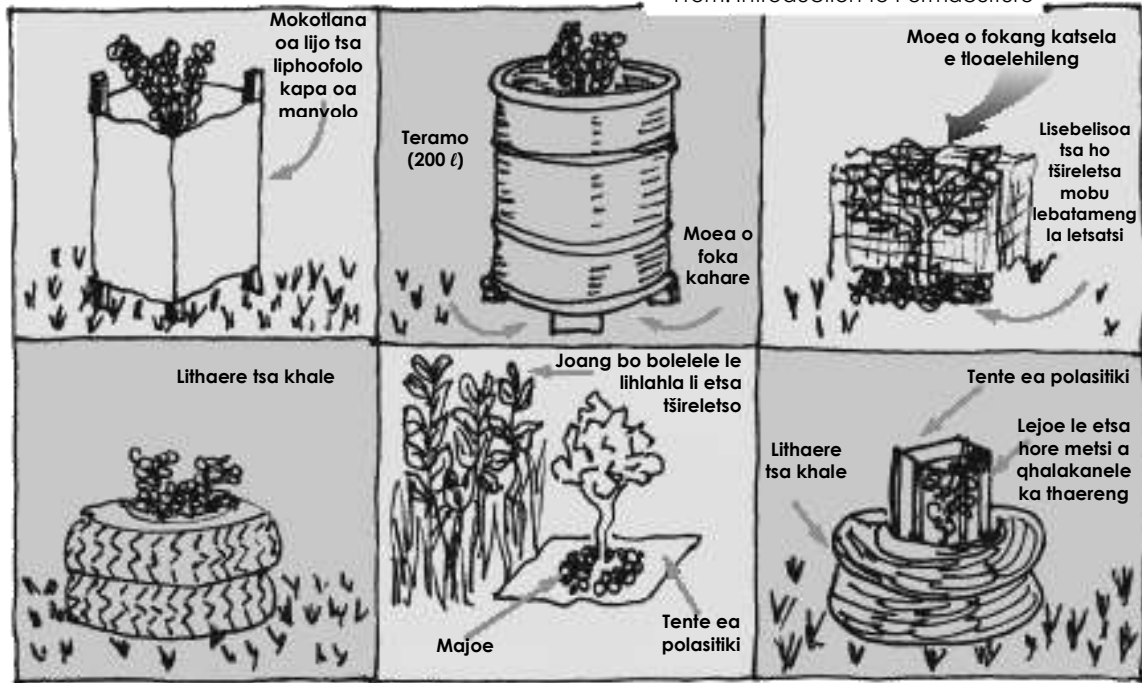
***Creche***

Tsena ke lifate tsenang le mamello, tse holang kapele, ebile li na le meutloa. Li mamela serame le komello. Li sebetša (fix) letsoai nitrogen ka mobung. Li fana ka patsi. Makhasi, lipalesa le mokotlana (pods) ea tsoan e ka sebelisoa e le furu.

Ho kanna ha se be bonolo ho fumana tse ling tsa limela/lifate/lihlahla tse boletsoeng mona. Ha li sale nyenyane, li hloka ho tšelloa le ho tšireletsoa serameng. Litšoantšo tse latelang ke mehlala e bontša mokhoa oa ho tšireletsa lijalo le lifate tsa hau moeeng le serameng.

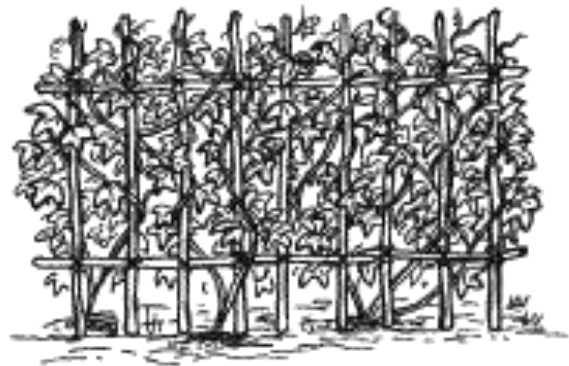


From: Introduction to Permaculture



U kannna oa sebelisa lintho tse ling hape bakeng sa ho tšireletsa moea jareteng ea hau. Tsona ke:

- ❖ Terata e entsoeng ka lithupa tse sesane. U ka sebelisa lithlaka tsa poone tsa khale kapa tsa semela se bitsoang 'black jack'.
- ❖ U ka lema morara kapa lijalo tse ling tse itšoarelletsang terateng, feela ha ho bonolo ho fumana lijalo tse joalo tse sa tšabeng serame. Le ha holejoalo, 'passion fruit' kapa 'granadilla' ha li setšabe hakaalo. Hona ho bitsoa ho mamella serame (frost tolerant). Ho bolela hore haeba u lebeletse hore ho tla ba le serame se sengata, hape le morara oa hau o sa le monyenylene, u tla lokela hore u koahela o se fumane serame. Ha nako e ntse e ya, le morara oa hau o se o holile, u tla atleha ho mamella serame ha bonolonyana. Mefuta e meng ea lijalo tse itšoarelletsang terateng e hlohlora makhasi mariha. Le ha hole joalo, entse e fana ka tšireletso.



Mehlala ea eona ke; morara, 'kiwi', linooa tse itšoarelletsang joalo ka 'lima', 'seven year beans', 'red runner beans'.

- ❖ Sehlotšoana sa mohlomo kapa lithlaka tsa poone li ka fasetletsoa terateng lehlakoreng leo moea o hlahang ka lona.
- ❖ Mekotlana ea lijo tsa liphoofole kapa ea lilamunu e ka rokelloa 'moho ebe e fasetletsoa terateng entse ele e ngoe tsela ea ho tšireletsa moea.



## Teko/Patlisiso



U lokela ho etsa geto ea hore na u hloka ho tšireletsa ha kae le hore na setšireletsi seo e be se entsoeng ka eng. Ho lema lifate le lihlahla ho nka nako e telele, empa li etsa litšireletsi tsa šmakhonthe. Hape li fana ka litholoana, lijo bakeng sa liphoofole le patsi.

Kapa mohlomong u hloka feela ho tšireletsa sethopo sa hau kapa sekhechanayana sa seratsoana.

U kanna oa etsa teko ka ho sebelisa setšireletsi sa nakoana ka mekotlana e tšelang lijo tsa liphoofole e faselelitsoeng terateng. Ha u etsa teko ka tsela ena, ho ke ke haeba bonolo ho bona hore na e feela teko e atlehile kaha ha hona letho leo u bapisang le lona. Le hahole joalo, u kanna oa bona phapang ea ho tšireletsa le ho se tšireletse.

### *Lipotso tseo u tšoanelang ho ipotsa tsona:*

- ❖ Na lijalo tsa hau li shebahala li phetse hobane ha lia rojoa kapa hona ho sengoa ke moea?
- ❖ Na ha u sa tšella khafetsa hobane moea ha o sa nka mongobo o mongata mobung?
- ❖ Na u nahana hore u behile setšireletsi sa hau sebakeng se nepahetseng? Na ke moo moea o fetang teng? Se lokela hoba hau fi kapa hole le jarete ea hau?
- ❖ Lintle le limpe tsa setšireletsi e bile life? Etsa lethathamo la tsona. Empa hopola hore lintle tse ling ha li bonahale hang hang. Mohlala, mohlomong ha u sa tšella lijalo tsa hau khafetsa le khoholeho ea mobu e theohile. (Ho koahela mobu (mulching) ke tsela e ngoe entle ea ho thibela khoholeho ea mobu). Lintle tse ling tsa ho lema lifate kapa lihlahla bakeng sa ho tšireletsa moea ke hore li fana ka patsi, litholoana, lithupa tse sebelisoang jareteng hape ke mokhoa oa thlaho oa ho tebela likokonyana (Pests).
- ❖ U tla sebelisa eng ho etsa setšireletsi sa moea? Heaba u tlo sebelisa lifate le limela, ke life tse tlang ho u sebeletsa ho feta tse ling? Ke life tseo u ka lifumanang ha bobebe? Ha li se li holile, na li tla etsa mola oo moea o ke keng oa feta habonolo, joalo ka ha ho bontsitsoe leqhepheng la pele? Ipotse hore na li tla hola ho fihlela li eba telele ha kae, le hore na li tla hlohlora makhasi mariha kapa che? Na moea o tla khona ho feta? U lokela ho hlophisa setšireletsi sa hau ka hlokolosi.

## Tšireletso ea serame

Serame e kare metsi a batang, ka ha se theohela fatše moo se fihlang se ipopa teng. Moea ona o batang hangata o ka tlase ho bolelele ba kharafu ka botebo. Ho bata haholo hoela fatše.

Serame sa pele se fumaneha haholo se koahetse fatše feela. Hona ho bolela hore mohatsela o moholo (freezing point) o feela fatše haholo, ha o fete licentimithara tse mashome a mararo (30 cm), eleng bophara ba kharafu, 'me ka tsela eo, ke lijalo tseng tseng li le nyenyane haholo tse tla bolaoa ke serame. Lijalo tse kholo joalo ka lierekisi, haholo ha liphahamisitsoe li tla phela. Empa ha nako e ntse e ea, serame sena e tla ba serame sa moea. Hona ho bolela hore mohatsela o tla eketseha, feela o se o nyolohela holimo ho ka etsang mithara le halefo (1.5 m above ground), 'me ka tsela ena serame se tla tšoara lijalo kaofela. Ha se se sele tjena se bitsoa lebabo (frost killer), 'me hangata le bonahala ka ho koahela lintho tsohle ka 'lekoko' la lehloa le thata, e seng phoka.

Mabalane le mesikong ea lithaba tsa Lesotho, lebabo la pele le ka lebelloa lipakeng tsa 5-15 Motseanong, ha la ho qetala lona le ba teng 15-25 Phato ka mabalane. Mesikong teng le lieha ho bateng, 15 Loetse.

Lijalo tse ka sengoang le ho bolaoa ke serame	Lijalo tse ka angoang ke serame	Lijalo tse mamellang serame	
tamati green beans pepere sweet potatoes chilisi le mokopu liekerisi	Makhasi a litapole (empa e seng sejalo kaofela, hobane se tla mela)  Lierekisi tse sa leng nyenyane (lipalesa le mekotlana ea tsona)	sipinache sepaile lihoete bete lettuce linaoa tse separa	kh'abeche kale turnips konogolo leeks anyanese

## Mokhoa oa ho sebetsana le Serame

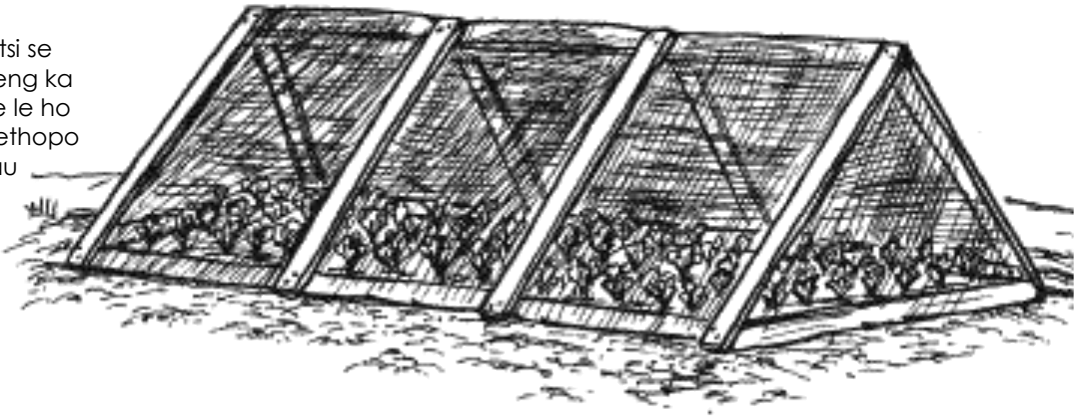
Tsela e le ngoeng feela oa ho sebetsana le mefuta ena e 'meli ea serame, ke ho tšireletsa lijalo tsa hao. Mekhoa e mengata ea ho etsa sena. Emap u tla lokela hore u be u entse lithlophiso pele. E meng eona e tla u hloka hore u be u fetole semelo/sebopeho (design) sa serapa sa hau ka tsela e itseng.

### 1. Koahela lijalo tse tšabang serame haholo

Bakeng sa serame sa pele, o ka koahela lijalo tse nyenyane tseo o tšabanang le tsona ka eng kapa eng eo u ka e fumanang e tla sebetsa joalo ka kobo. U ka sebelisa joang, koranta-u behe majoe hore e se fefohe, kapa mekotlana ea khale ea anyanese kapa ea lilamunu u e rokelletse 'moho. U ka boela oa sebelisa mekotlana ea khale ea lijo tsa liphoofo. U ka reka se tšireletsi (lesela) sa serame moo ho rekisoang lifate kapa likoporasing. 'Lesela' lena ha le theko e phahameng ebile le sebetsa ka tsela e khotsofatsang. Koahela leifo la hau e be u tšoara 'lesela' ka li phek'se (pegs) hore le se fefohe. E tsa bonnete ba hore u koahela lijalo tsa hau mantsiboea.

Hape u kanna oa tširelatsa lijalo tsa hau ka ho nka nete kapa polasitiki e kholo oa e beha holima lithupa e be oa koahela. Mokhoa ona o tla tšireletsa lijalo tsa hau lirameng tsa mariha a maholo. U ka reka nete ea ho tšireletsa moea mabenkeleng moo ho rekisoang lintho tsa temo, feela e theko e phahameng.

Setšireletsi se koahetsoeng ka polasitiki e le ho tšireletsa sethopo sa hau



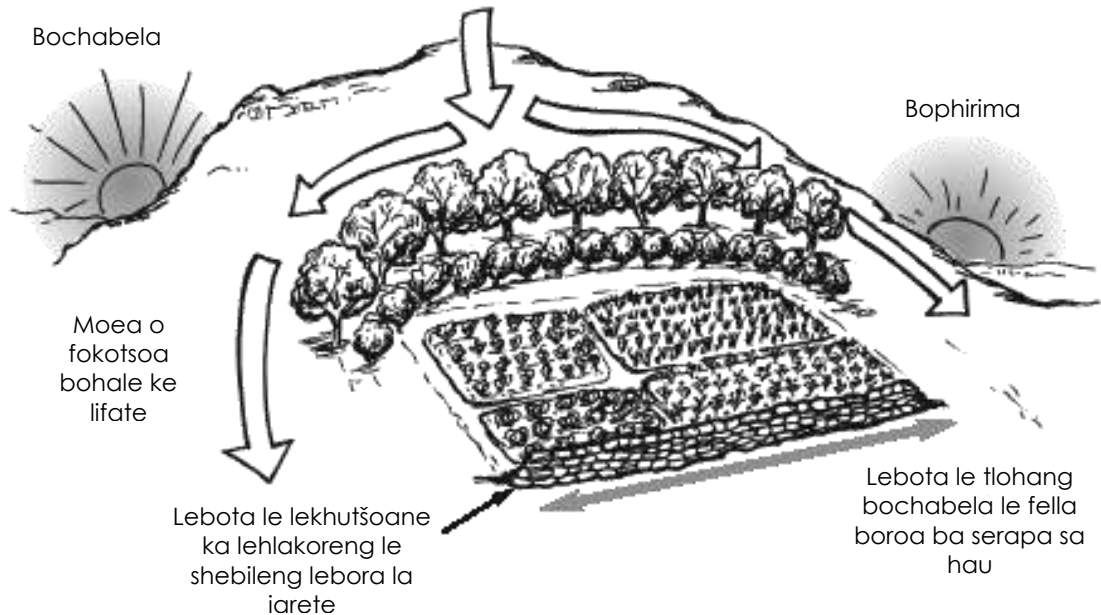
## 2. *Khetho ea sebaka sa seratsoana*

Sebaka se nepahetseng sa ho etsa seratsoana ke se shebileng bochabela, ebile se batla se phaha-phahame. Lebaka ke hobane seratsoana sa hau se tla chabeloa ke letsatsi haholo, ebile se ke ke sa bata hakaalo le bosiu ha ho bapisoa le tse ling.

Haeba jarete ea hau e le motheong, lema lijalo tseo u tšabanang le tsona kapa tse tšabang serame haholo ka holimo.

Haha lerako le lekhutsoanyane ka majoe. Le hahelle ho elella ka boroa le leboea la jarete ea hau, hore ka lehlakoreng le bochabela le tle le tsebe ho fumana letsatsi, 'me le futhumale. Ka tsela ena le tla sebetsa joalo ka setofo e be bosiu le ntša mocheso o le oa motšoare.

Moea

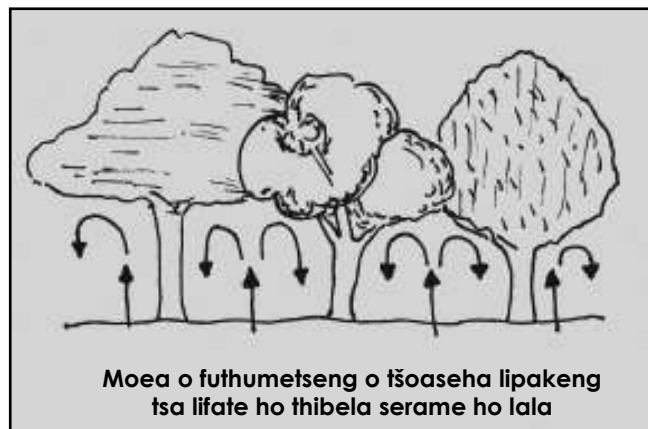


### 3. *Seratsoana se futhumetseng*

Tsena li tla thusa hoetla (autumn) le mariha. Cheka sekoti, se flatse litlama-tlama, leholo, moiteli, joang ebe u khutlisetsa mobu. Jala ka holima sekoti sena, u ntse u lula u tšella.

### 4. *Lifate*

Lifate li tšireletsa lijalo serameng ka ho tšoara mochoso ha o ntse o nyoloha fatše, ebe bosiu lia o lokolla.



### 5. *Ho foka ha moea le ho phalla ha metsi*

Haeba metsi a le mangata ho pota-pota le sejalo sa hau, ha se hangata serame se lalang. Ka tsela ena, leka ho tšella lijalo tsa hau mantsiboea.

Mokhoa ona o leka ho fokotsa serame se tla lala holima seratsoana le lijalong. U ka boela oa etsa lipampiri tse bopehileng joalo ka mokorotlo e be u kaohela sethopo se seng le se seng sa hau. Ke nnete ho etsa mekorotlo ena ke mosebetsi o mangata, empa qetellong e tla be e le ntho e molemo thleng ea ho tšireletsa lijalo tsa hau tseo u tšabanang le tsona.

Hape, ho bohlokoa hore u tšelle lijalo tse letseng serame hoseng haholo pele letsatsi le chaba. Ka tsela ena u tla thusa ho fokotsa tšenyho ho lijalo tseo serame seneng se

Kaohela sethopo sa hau ka lipampiri tse bopiloeng joalo kamakorotlo motšhare oa mantsiboea. feela u li tlose hoseng ka letsatsi le hlahlamang

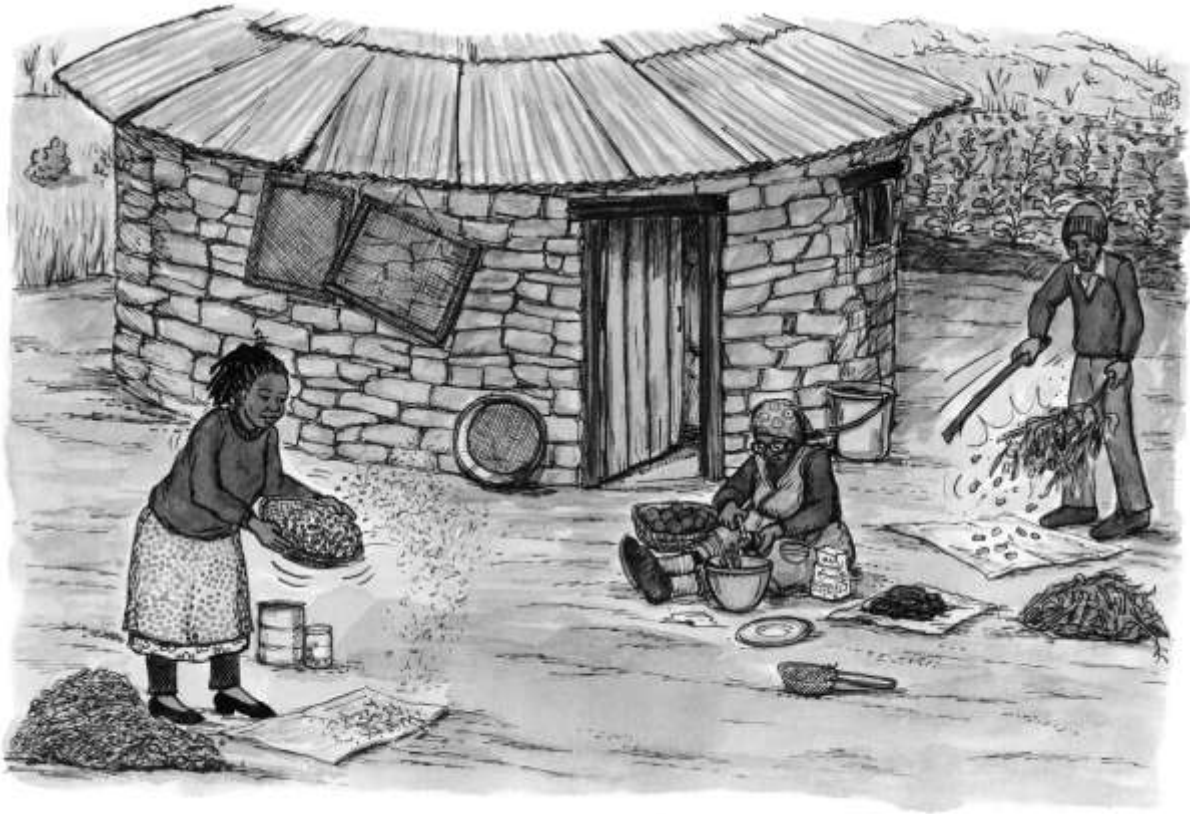


letse ho tsona.

Batho ba bang ba besa mollo liratoaneng tsa bona bosiu. Ho foka ha moea ho fokotsa ho lala ha serame.

Ha eba hona le lefika le haufinyane le lapeng ha hau le shebile ka letsatsing, u ka le sebelisa e le 'hithara' ea leifo le lenyenyane. Etsa leifo lena ka pela lerako hantle, ebe u le teratela ka lithupa tsa sefate se bitsoang boloukatlele/motholo, ebe u koahela ka polasitiki. U ka fumana mapolanka ao u ka a sebelisang mabenkeleng a rekisang litulo le litafole (fanichara). Ho ha ha setšireletsi sena, u tla be u iketsetsa ntlo e bitsoang 'green house' e thusang ho tšireletsa sethopo sa hau ka ha ho mofuthu ka hare ho ntlo ena ho feta kantle.

## 5. Tlhahiso le poloko ea peo ea meroho



Ho ipolokela peo ea hau ho ka u thusa ho ba sehoai se ikemetseng. Hona ho u fa boikhethelo ba hore mofuta oa sejalo seo u batlang ho se lema u se fumane ha bobebe ntle le ho se reka.

Ho teng mofuta e mengata ea peo ea meroho e ka fumanehang ho Bahlahisi ba bangata le libakeng tsa thekiso eo sehoai ka bomong se ka atlehang ho ipolokela eona kamor'a ho e lema.

Ho lema peo e le ho hlahisa peo e ngoe, ho tlama hore peo e joalo e kene mobung 'me e bole e le hore e tsebe ho hlaha, ho lema le ho baballa sethopo sa limela tse phetseng hantle ho fihlela li holile, hona ho tla thusa hore peo ea tsona e tsebe ho kotuloa 'me e bolokeloe ho sebelisoa selemong se hlahlamang.

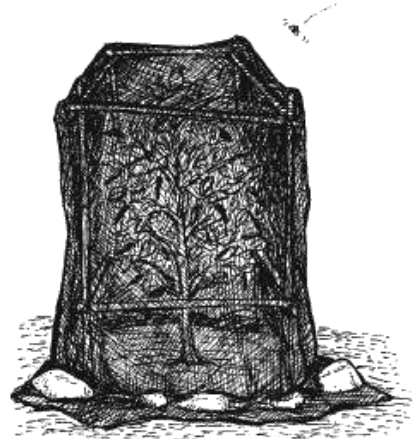
Limela li tseba ho ikamahanaya le maemo a moo li lengoang teng lekhetlo la pele 'me li hlahise peo e nang le makhabane a joalo, e ka tsebang ho hlahisa lijalo tse phetseng hantle tse ka atlehang ho mamella maemo a sebaka se joalo.

Lifate tsa litholoana li nka lilemo tse ngata li ntse li hola, 'me ho bohlokoa ho li lema sebakeng se nepahetseng e sa le qalong.

## Ho hlahisa/ boloka peo e hloekile

Lijalo tse nyalisoang ke moea kapa ke linotsi li hloka ho arohanngoa le mefuta e meng ea bo tsona e le ho thibela hore li se inyalise. Mekhoa e sebelisoang ho thibela sena ke e latelang:

**Lema libakeng tse fapakaneng:** Lema mefuta e 'meli ea lijalo e ka inyalisang e arohane bonyane ka sebaka se ka etsang halefo ea lebala la bolo ea maoto kapa ho feta (50 m). Likokoanyana tse ngata tse ka fetisang peo ha li tsebe ho fofa ho feta sebaka se sekaalo, ka ntle ho linotsi tse tsona li ka fofang likilometara tse 'ne. Litsitiso tse ling tse ka etsoang ho thibela peo ho fetisoa ke moea kapa likokoanyana ke ho lema lifate, ho etsa makhoakhoa kapa marako a ka thibelang phetisetso e joalo.



HO KHUKHUMETSA SEJALO SA CHILISI

**Lema ka linako tse fapakaneng:** Mokhoa ona o sebelisoa hangata lijalong tse etsang lithung-thung ka nako e le ngoe joalo ka poone le sonobolomo. Ho inyalisa ho ka qojoa ka ho lema mefuta e behang lithung-thung ka nako tse fapakaneng e le hore phoshoana ea botona e tle e se ke ea fetela bots'ehaling ka nako eo e lebeletsoeng.

**Ho khukhumetsa:** Sena se etsoa ha ngata lijalong tse behang lithung-thung nako e telele, joalok'a kh'abeche le chilisi. Sireletsa lithungthung ka lesira e le ho thibela likokoanyana ho ka fetisa phoshoana 'me e be ho nyalisoa ka letsoho.

**Li khukhumetse ka matsatsi ho fapana:** Mokhoa ona o sebelisoa ha ngata ho thibela phoshoana ea sejalo se seng ho ea ho se seng, 'me ho ke ke hoa nyalisoa ka letsoho. Mofuta o mong oa sejalo o oa koaheloa ha o mong o tloheloa hore linotsi li o nyalise. E be se ts'oanang se etsoa mofuteng oa bobeli, ha li se li nyalisitsoe li koaheloa ho fihlela lithung-thung li oele.

## Ho khetha le ho kotula peo

### Ho ka nka nako e kae?

#### *Tse behang ka selemo:*

Tsena ke lijalo tse phelang le ho beha peo ea tsona ka nako e khuts'oane feela e be lia shoa. Sena se nka likhoeli tse ts'eletseng hoisa tse robong. Mohlala ke tamati.

Kotula peo bonyane lijalong tse ts'eletseng tsa mofuta oo u batlang ho o boloka. Lijalong tse ling joalo ka hanyanese kotula peo ea lijalo tse 20, sonobolomo le poone u hloka peo ea tse 50-100. Mefuteng e mebala e fapakaneng ea poone e ka lahla mebala e meng le makhabane a ho loants'a likokoanyana ho ka khethoa lijalo tse 'nyane ka palo.



***Tse behabg kamor'a lilemo tse peli:***

Lijalo tsena li hlaha Lehlabula la pele li lingoe, li robale Mariha e be ha Lehlabula le thoasa lia thunya 'me li behe peo Hlabuleng la bobeli. Boholo ba tsona li tsoa Europo moo ho batang haholo 'me ho se bobebe hore semela se behe peo ka selemo se le seng. Sena se nka likhoeli tse 18. Mehlala ke kh'abeche, cauliflower, lihoete, parsnips, turnips le rapa.

***Tse phelang nako e telele:***

Tsena li phela lilemo tse ngata li sa shoe. Boholo ba tsona ke lifate tsa litholoana le lihlaha 'me ha ho meroho e oelang sehlopheng sena.

**Mokhoa oa ho khetha peo**

- ❖ Peo e tlameha ho ba le boleng bo ts'oanang hantle le ba lijalo tseo e tsoang ho tsona. Haeba ho lengoe sejalo se se telele peo e kotuloe sejalong se se telele. Ha tholoana e fapane le ea sejalo se jetsoeng peo e tla fapana.
- ❖ Tlos'a lijalo tse bonahalang li fapane le tseo peo e tsoang ho tsona pele li thunya. Mehlala ke tse holag butle, tse kulang kapa tse nang le mafu le tse behang peo pele ho nako.
- ❖ Kotula peo lijalong tse phetseng le ho shebahala hantle.
- ❖ Kotula peo ho tse sebetsang hantle tlas'a maemo a thata tse sa ts'abeng mafu le likokoanyana.
- ❖ Kotula peo ea lijalo tse phetseng hantle feela, haeba makhasi a tsona a bolile kapa tsona litholoana se ke ua nka peo ea tsona ho ba mafu a joalo a ka fetela lilemong tse tlang.
- ❖ Se kotule peo ea lijalo tse behang peo pele ho nako ea tsona. Ha u kotula peo ea tse behang pele ho nako u khetha peo ea tse tla beha peo pele ho nako. Sena se bohlokoa merohong e kang spinichi le selae moo nako ea ho beha mahaba e leng telele.
- ❖ Kotula peo ha e butsoitse. Peo e sa butsoang e hana ho hlaha ha e jaloa. Peo e butsoitseng haholo e bola pele e jaloa.
- ❖ Se kotule peo e lomiloeng ke likokoanyana kapa e maseba. Peo e mela ha feela e feletse.
- ❖ Se kotule peo e nang le mafu kapa hlobo le ha e le mafome.

**Mokhoa oa ho tseba ho fumana peo*****Lihooхло tsa peo***

Lijalo tse ling li na le mekotlana e ts'etseng peo, jaolo ka linaoa le le lierekisi tse bitsoang "legumes". Li tseba ho inyalisa ka hona ha li hloke ho aroloa.

Mefuta ea kh'abeche e qala ka ho etsa hlooho kapa mahaba a thata selemo sa pele sa kh'abeche, cauliflower, broccoli, kholrabi, kale, le sepinichi. Selemong sa bobeli e be lekala le jereng thung-thung le ea hlaha 'me le behe peo. Sena se nka likhoeli tse 18.

Lelapa lena la kh'abeche le hloka linotsi le mefuta e meng ea likokoanyana ho fetisa phoshoana e etsang peo. Lijalo tse seng ka tlase ho ts'elela tse seng ka holimo ho 20. Sejalo se le seng se ke ke sa hlahisa peo 'me mefuta e na e ea nyalana lelapeng lena ka hoo ho molemo ho arola mefuta e fapakaneng e le ho fumana peo.

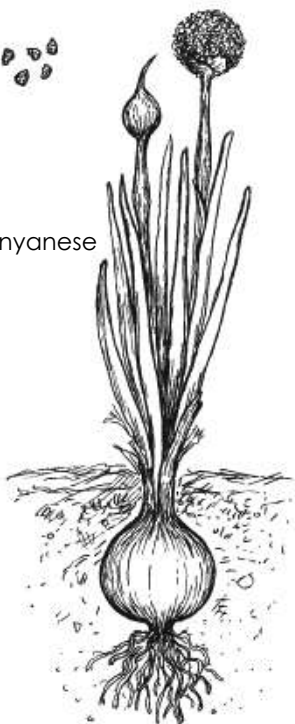


Selae

**Tse behang ka tlase joalo ka lihoete:** Kotola e qala ho ba thata e be e hlahisa lekala leo lithungthung le peo li tla behoa ho lona. Sena se nka likhoeli tse robong 'me likokoanyana li fetisa phoshoana ho tloha karolong

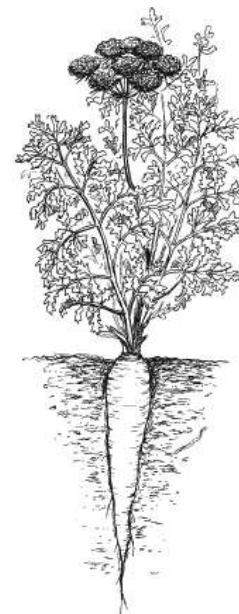
engoe ea sejalo ho ea ho engoe. Mefuta e meng e oelang lelapeng lena e its'oarang ka ho ts'oana ke celery, parsely, fennel le liparsnip.

Hanyanese



**Tse behang ka tlase joalo ka hanyanese:** Mothapo o thunyang o loka mokhahlelong oa bobeli ha ho futhumetse.

Tse ling tse oelang lelapeng lena la bo hanyanese ke liki, shallots, konofolo, le eee. Tsena li nyalisoa ke linots'i ha ngata. Phoshoana e ka fetela lithung-thung tsa sejalo se le seng kappa se fapakaneng sa lelapa se le seng. Peo e tlameha ho kotuloa lijalong tse ka bang 20 e le hore mofuta ona o lule o le matla. Peo ha e butsoe ka nako e le ngoe 'me e tlameha ho kotuloa ha e ntse e butsoa sejalong ka ngoe, hobane e tla qhoma e fofe le moea.



Lihoete

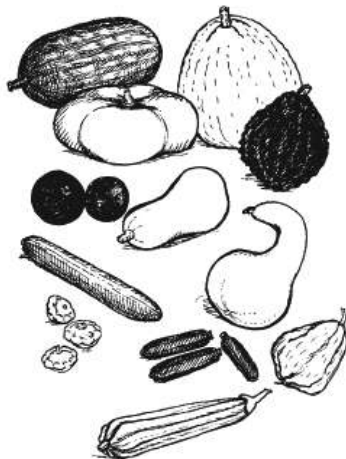
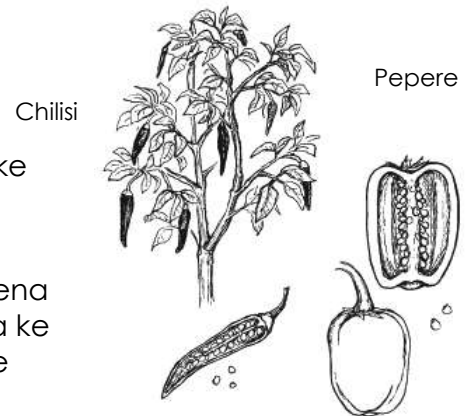
Tlohela peo e omele sejalong. Ho tse qhomang ha li omme li kotule pele li oma e le ho qoba hore li tle li qhome li fofe le moea. Mohlala ke selae, lihoete, parsnips le hanyanese.

### ***Litholoana tse behang peo***

Tholoana e hlaha ha nyaliso e etsahetse ka katleho kahar'a tholoana 'me peo e hlaha ka hara tholoana.

- ❖ Tholoana e kotuloa ha e butsoitse phere. Mohlala ke tamati, chilisi, pepere.

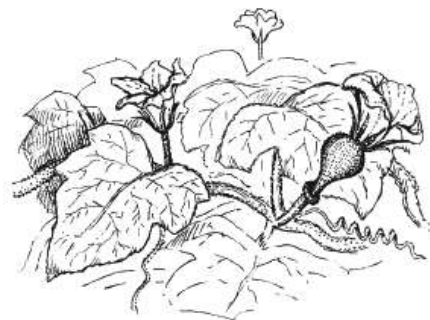
Tamati le lipepere li ea inyalisa. Tse ling tsa lelapa lena joalo ka chilisi le eggplant tsona li hloka ho nyalisoa ke linotsi kapa moea 'me ka hona li hloka ho aroloa le mefuta e meng e le ho qoba hore li se nyalane tsa hlahisa mehlolo.



Mefuta e fapakaneng ea mekopu

- ❖ Mekopu, mahapu, le mehope le tse oelang lelapeng leo li kotuloa ha li se li butsoitse phere 'me li tloheloe hore peo e butsoe ho qeta. Hona le mefuta e mengata ea mekopu le mahapu. 'Me mefuta ena e fapakaneng ea mekopu e ka nyalana empa ha e nyalane le mahapu le licucumber kappa limarrow tse oelang lelapeng le le leng.

Lithung-thung tse tona le hlaha melebong e metelele e mesesanyane 'me li buleha pele ho tse ts'ehali tse hlahang melebong e mekhuts'oane 'me tse nang le kotolanyana ka hare.



Lipalesa tse tona le tse tsehali sefateng

- ❖ Li-cucumber le li-marrow li tlohelloa hore li butsoe phere pele li kotuloa, li-cucumber li ba sootho ha li-marrow li ba ts'ehla ha li butsoioe 'me liba tenya.

### **Peo e jeoang**

Mehlala ke poone, linaoa, lierekisi le sonobolomo. Tsen a li tlohelloa sejalong ho fihlela li holile li bile li omme.

U ka tseba joang ha peo e lokela ho kotuloa?

- ❖ Tholoana e etsa molumo o moholo ha e butsoitse e be e ea kotuloa. Mohlala ke mokopu, le li-cucumber. Ho molemo ho tlohela peo kahar'a litholoana tsena kamor'a ho kotuloa hore e butsoe phere.
- ❖ Mebala, boholo le sebopeho sa tholoana; mehlala ke tamati le chilisi. Pepere e tala e tlameha ho tloheloa hore e be khubelu ha e le tala ha eso butsoe.
- ❖ Ho qhoma ha mekotla; joalo ka linaoa le lierekisi.
- ❖ Ho oma ha lithung-thung le mahaba, mehlala ke lihoete, sepinichi, le kh'abeche.

## Tlhoekiso ea peo

### Ho olosa

Lithupa le makhapetla li tlameha ho tlosa hoba li ka pata likokoanyana tse ka jang peo e bolokiloeng.

- ❖ Peo le matlakala e olosa moeeng o seng mongata e hore matlakala a nkuoe ke moea peo e khetheloe ka thoko.
- ❖ Mokhoa o mong o ka sebelisoang ke ho hlokola peo e be matlakala a phaphamalang ka holimo a ea khethoa a lahloe.
- ❖ Linaoa le lierekisi li ka ts'eloa ka mokotleng 'me tsa poloa li le kahar'a mokotla eaba lia khethoa ka ho hlokola.



### Ho hloekisa peo ka metsi

Mokhoa ona o sebelisoa haholo lijalong tse behang peo ea tsona ka hara litholoana tse jeoang joalo ka tamati, mahapu, mokopu, le li-cucumber.

- ❖ Khaha peo u e ts'ele ka hara metsi e hlatsoe qhala metsi e be peo e ea omisoa.
- ❖ Ts'ela peo ea tamati le cucumber ka metsing nako e telele. Hona ho etsoa ho tlosa lera le potapotileng peo 'me peo e ke ke ea mela ha le ntse le le teng le ho tlosa mafu le likokoanyana.
- ❖ Ts'ela peo ka nkhong ea metsi, e be u ts'ela khaba tse peli tsa tsoekere 'me u

fulooe hore e qhibilehe. Tlohela matsatsi a mararo ho isa a mahlano. Hlatsoa ka metsi a mangata e be u omisa peo 'me u o ts'ele ka moo ho omeng ha e omme.

### ***Mokhoa:***

1. Ts'ela peo ka sets'elong. Koahela ka metsi. Ts'ela khaba ele e ngoe ho isa tse peli tsa tsoekere 'me fuluha ho fihlela e qhebilihile.



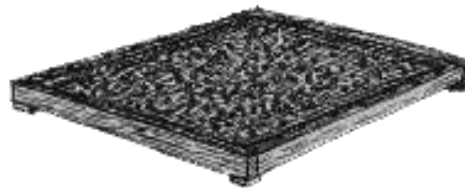
2. Boloka motsoako matsatsi a mararo ho isa bohlanong (eseng ho feta) lekoeba kapa bohoho botla teng ho supa hore ho puta ho bile teng.

3. Hloekisa peo ka metsi a mangata.



4. Ala peo hore e ome sebakeng se pholileng

le ho e boloka ka khalaseng e koetsoeng ka thata.



## Ho omisa peo

Peo e tenya e nka nako e telele ho oma ho feta e ts'esanyane, peo e ka shejoa hore na e omme ka ho e loma ka meno, haeba meno ao a sa sie mats'oao peong eo, ho bolela hore e lokile.

- ❖ Peo e lokela ho omisetsoa moo ho seng letsatsi empa moo ho ommeng ho bile ho le moea.
- ❖ Maemong a mongobo a bileng a batang, beha peo kahar'a sets'elo se kenyang moea, 'me se ts'irelelitsoe likokoanyaneng e be e behoa moo ho phahameng.
- ❖ Ts'ela peo e seng kae kahar'a mekotlana ea pampiri e leketlisitsoeng holimo.
- ❖ Peo e ngata e ka ts'eloa kahar'a 'methe, e seng ka polasetiking.



## Ho boloka peo

Nako eo peo e e nkang e ntse e

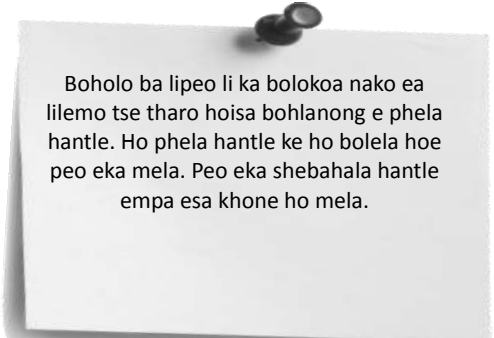
bolokiloe e  
ipapisa le:

- ❖ Mofuta oa peo ka ngoe;
- ❖ Boleng ba peo ka ngoe le;
- ❖ Maemo a moo e bolokoang.

## Maemo a moo peo e bolokeloang

### *Lefifi*

Etsa bo 'nete ba hore peo e behoa moo ho leng lefifi. Sebelisa mekotlana ea lipampiri, mekotla ea lipolasitiki e mets'o le botlolo ea khalase ebe e koalloa ka rakeng. Se ke oa boloka peo sebakeng se bulehileng e le ka botlolong e bonaletsang.



Boholo ba lipeo li ka bolokoa nako ea lilemo tse tharo hoisa bohlanong e phela hantle. Ho phela hantle ke ho bolela hoe peo eka mela. Peo eka shebahala hantle empa esa khone ho mela.

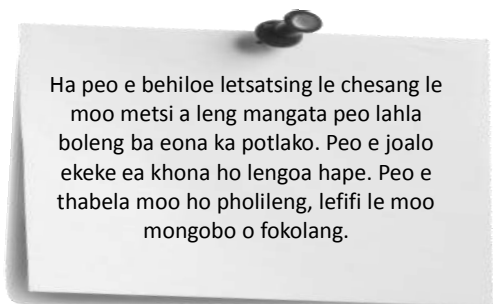
### *Mongobo*

Le ha peo e omme ha e bolokoa sebakeng se mongobo e khona ho nka mongobo o joalo, 'me boemo bona bo ka ama boleng ba peo. Peo e ka omisetsoa feela moo moea o fokang, moo ho leng moriti. Ha ho le maruru, pula e le ngata haho bobebe ho omisa peo haholo ea linooa le lierekisi.

**Bophelo ba peo boa imenahanya ha boemo ba mongobo botheoloa ka karolo ea leshome lekholong.**

### *Maemo a serame le mocheso*

Peo e phela nako e telele maamong a pholileng hantle ho sa bate. E ka bolokoa ka lerits'oaneng, moriting oa sefate kapa ea chekeloa fats'e.

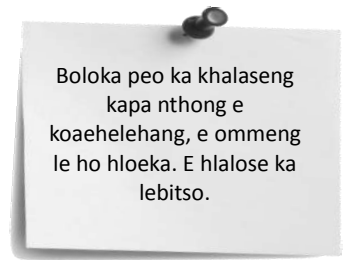


Ha peo e behiloe letsatsing le chesang le moo metsi a leng mangata peo lahla boleng ba eona ka potlako. Peo e joalo ekeke ea khona ho lengoa hape. Peo e thabela moo ho pholileng, lefifi le moo mongobo o fokolang.

**Bophelo ba peo bo menahana habeli ha maemo a serame le mocheso moo e lulang bo theoha ka bohlano lekholong.**

### **Likokoanyana**

Peo e bolokiloeng e ka theoloa boleng ba eona ke likokoanyana tse kang ts'upa le tse ling tse ke keng tsa bonoa ka mahlo a nama.



Boloka peo ka khalaseng kapa nthong e koaehehang, e ommeng le ho hloeka. E hlalose ka lebitso.

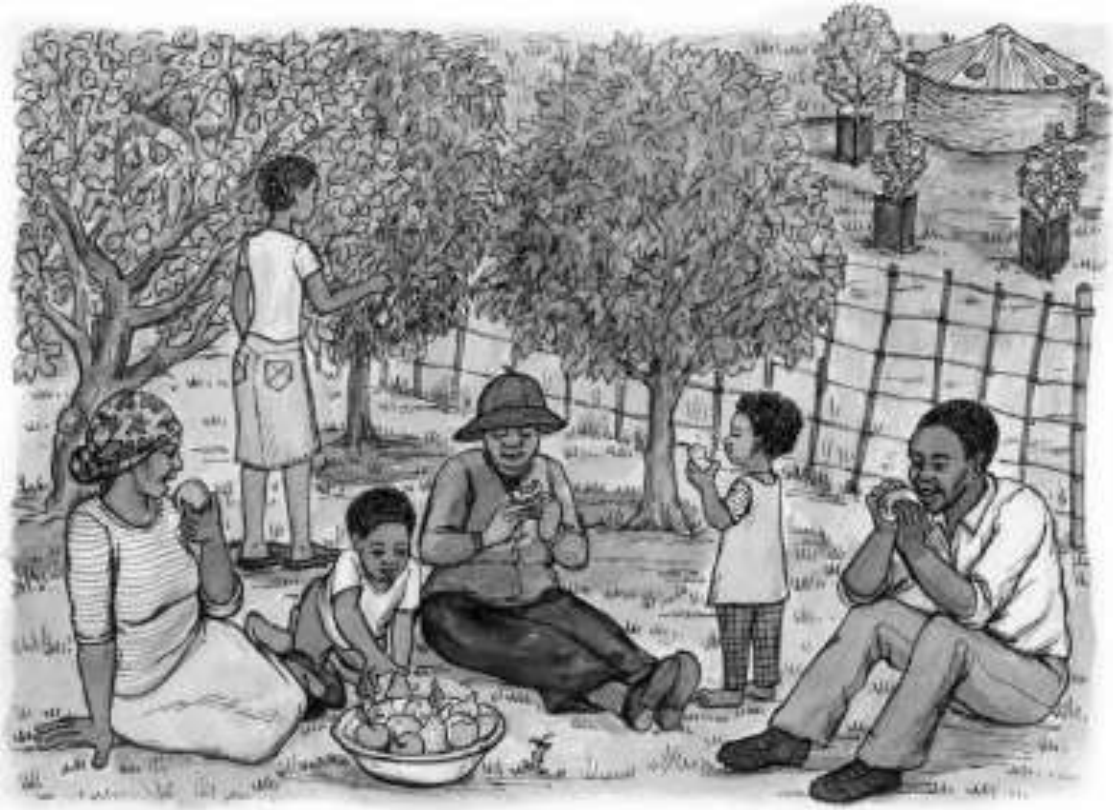


- ❖ Ts'upa e khona ho ikatisa ka potlako ha mongobo o eketseha. E behela mahe kahar'a peo kapa ka tlasa letlalo la peo e joalo , e be a sa qhotseha ha mongobo o ba mongata.
- ❖ Hlobo le eona e hlaha ha mongobo o le mongata haholo. Ka ha ho kaba thata ho metha mongobo peong ho molemo ho e beha e omme nako tsohle.

Lintho tse ka sebelisoang ho thibela likokoanyana ho ja peo:

- ❖ **Molara o ommeng:** oona o monya mongobo kamoo peo e ts'etsoeng e be o thibela ho hola ha ts'upa. Ts'ela halefo ea kilokharama kahar'a kilokharama ea peo.
- ❖ **Kalaka:** e sebelisoa joalok'a molara o ommeng. Ts'ela likhaba tse leshome le metso e mehlano kahar'a kilokharama ea peo.
- ❖ **Oli e phehang:** kopanya oli le peo ho thibela ts'upa ho ata. Ts'ela khaba e kholo ea oli ka hara kilokharama ea peo.
- ❖ Makhapetla a sitsoing a litlama tse latelang tseo ts'upa e li ts'abang:
  - CHILISI: kopanya likhabana tse 'ne ho isa tse ts'eletseng kahar'a kilokharama ea peo.
  - MOHLONYANE (WORMWOOD): sila makhasi ebe ua kopanya le peo.
  - LEKHALA: joalok'a e ka holimo.

## 6. Temo ea lifate tsa litholoana



### Selelekela

Ho oa lumelleha hore mefuta e mengata ea lifate tsa litholoana e ka lengoa ho pota lelapa. Li ka itlhalisetsoa ka mokhoa oa peo, ka ho khaola makalana ho tsoa ho tse kholo, le ho reka tse nyalisitsoeng ho Bahlahisi ba tsona.

### Khetho ea sebaka

Mefuta e fapakaneng ea lifate tsa litholoana e mela hantle maemong a leholimo a fapakaneng. Tlhaloso e latelang e fana ka malebela hore na ke lifate life tse ka melang ka libaka ho fapana.

<b>LIBAKA TSE BATANG HAHOLO:</b> Tseo serame se oelang hangata Mariha le tseo lehloa le khethehang	<b>LIBAKA TSE SA BATENG HAHOLO:</b> Tseo serame se sa oeleng hangata, moo lehloa le ts'ohang le khethehile
Liapole, lipere, liperekisi, matebele, lipolamoliamonds, morara, licheri, le mabolilana/apolekose	Liapole, lipere, liperekisi, matebele, lipolamo, lialmonds, morara, licheri, le feekha mabolilana Hape: feiye, granadillas, citrus fruit



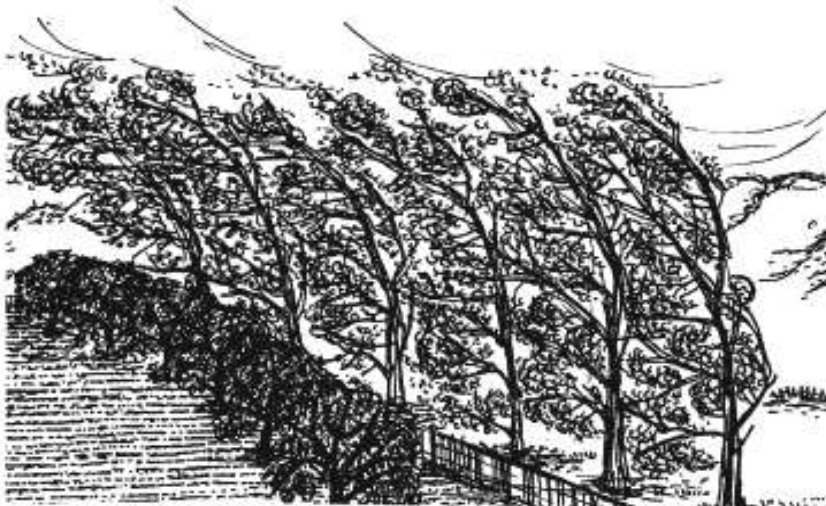
(dilamunu, diorange, dinartjiesi, grapefruit)

Lifate li ka hola nako e telele 'me ho bohlokoa ho khetha sebaka se nepahetseng ho lilema.



Ho hloka hlahla sebaka se:

- ❖ Mobu o tebileng o sa lumellang metsi hore a eme.
- ❖ Letsatsi le lekaneng, se be moathameleng eleng letsoapong le shebileng ka Leboea. Lifate li se ke tsa lengoa phuleng, le matsoapong a shebileng ka Boroa hobane ha ho futhumale joale ka matsoapo a shebileng ka Leboea.
- ❖ Moo lifate li ts'ireletsehileng moeeng.



Ha nako e atamela Maria lifate li qala ho hlohlora makhasi e le mokhoa oa tsona oa tlholeho oa ho phomola. Hore li hlasimolohe phomolong ena ea tsona li hloka mohatsela o khethehileng. Bongata ba mohatsela bo fapana ka mofuta oa sefate ka nngoe, se seng se tla hloka o mongata ha se seng se tla hloka o fokolang.

Ho molemo hape ho tseba hore na difate di thunya neng. Serame kappa mohatsela wa morao o ka bolaya ditholwana tsa sefate se thuntseng ka nako eo, ha mpe-mpe hoo sefate se ke keng sa ntsha ditholwana tse ntle kappa tse hlabosehang. O loketso ho kgetha mofuta wa sefate o thunyang kamorao hore serame se fete.

Empa ka nako engoe ho etsahala hore khoeling tsa Phuptjane le Phupu ho se ke ha bata haholo, 'me hoo ho etsa hore lifate li liehe ho lahla makhasi ka hona li lieha ho phomola. Hona ho etsa hore nako ea selemo ha lifate li boetse li thunya ebe lithunthung lia oela 'me makala a mang a ikhethela ho se hlasimolohe e be a roballa ruri.

Ka hona lifate ha li behe hantle. Ke ka hona ho leng bohlokoa hore ha li lengoa moo ho chesang ho se ke ha khethoa tse hlohang mohatsela o mangata Mariha.

## Ho khetha mofuta oa sefate sa litholoana

Sefate ka seng se na le mofuta e fapakaneng ka hona ho hlokahala hore ho khethoe mofuta ka mong o tla lokela sebaka se itseng le maemo a teng a leholimo.

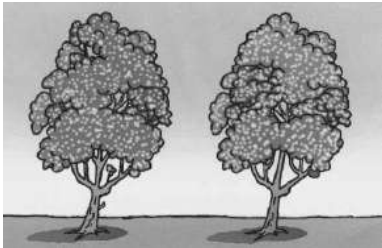
Mefuta e meng e mela hantle libakeng tse batang ha e meng e mela hantle ho tse futhumetseng.

### Ntho e lokeloang ho eloa hloko ha ho khethoa mofuta ke phoshoana e fetisetsang botona botsehaling (pollinators)

Mona ho hlokahala hore mofuta e 'meli e fapakaneng ea sefate se ts'oanang e be e khethehileng Mohlala: ho ka lengoa lifate tsa liapole tse bitsoang Granny Smith le Golden Delicious.

- ❖ Li tla thusana hore li behe litholoana ka ho romellana phoshoana e nang le botona bots'ehaling. Lithung-thung tsa mofuta o mong o tla hloka ho neheloa ka phoshoana ea mofuta o mong. Li hloka ho beha lithung-thung ka nako e le 'ngoe li be li lumellane e le hore mofuta ena ka bobeli e tle e behe litholoana.
- ❖ Lifate tsena li se ke tsa lengoa li arohantsoe ho feta linoko tse 30 e le hore phoshoana e tle e flohe sefateng se seng ho ea ho se seng ka thuso ea linotsi le moea.
- ❖ Ho ka lengoa sefate se le seng sa mofuta o itseng le tse 'ne hoisa bohlanong tsa mofuta o itseng ho ea ka khetho ea motho ka mong. Hona ho bolela hore ho ka lengoa mofuta o itseng oa sefate ho feta o mong.

### Lifate tsohle tse lengoang Lesotho li hloka phoshoana ntle le morara

<p><b>EYA</b></p> <p>DIAPOLE</p> <p>DIPIERE</p> <p>PECANS</p> <p>DIPOREMA TSE DING</p> <p>PAWPAWS</p>		<p><b>TJHE</b></p> <p>DIORANGE/DILAMUNU</p> <p>MANGU</p> <p>MORARA</p>
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## Mefuta eo ho ka khethoang ho eona

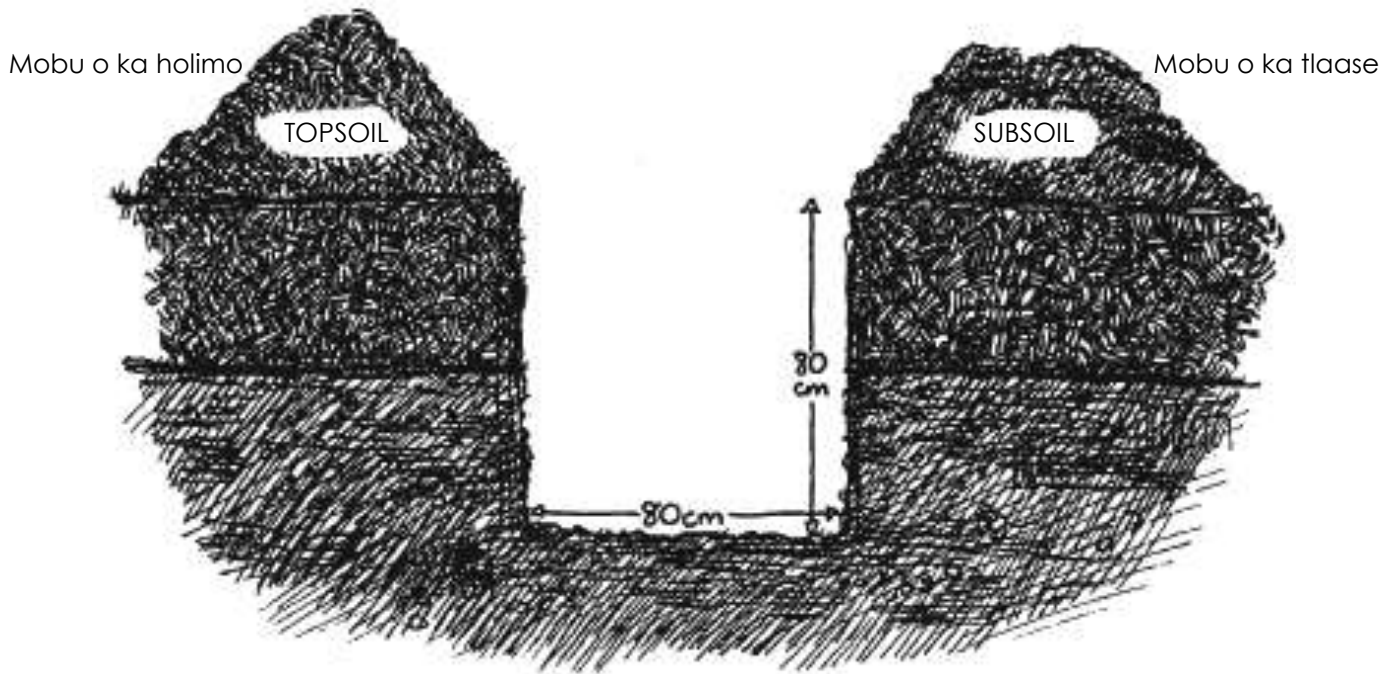
Ho na le mefuta e mengata haholo eo ho ka khethoang ho eona, `me e mengata e tsoela-pele ho etsoa. Ka hona ho molemo ho botsa pele litsing tsa tsoaliso ea lifate tsa litholoana hore na ke mefuta e feng e atlehang hantle sebakeng ka seng.

MEFUTA E RATANG SERAME SE SENGATA			MEFUTA E TS`ABANG SERAME SE SENGATA		
LEBITSO	SE FETISANG PHOSHOANA	NAKO EA HO BUTSOA	LEBITSO	SE FETISANG PHOSHOANA	NAKO EA HO BUTSOA
<b>LIAPOLE</b>					
<b>Granny Smith: apole e tala</b>	Ke: Golden Delicious kapa Starking /Top Red	`Mesa	<b>Granny Smith; apole e tala</b>	Ke: Golden Delicious kapa Starking /Top Red	`Mesa
<b>Golden Delicious: apole e ts`hla</b>	Ke: Granny Smith kapa Starking /Top Red	15 Hlakola	<b>Golden Delicious: apole e ts`hla</b>	Ke: Granny Smith kapa Starking /Top Red	15 Hlakola
<b>Starking/Top Red: apole e khubelu</b>	Ke: Golden Delicious kapa Granny Smith	Hlakubele	<b>Starking/Top Red: apole e khubelu</b>	Ke: Golden Delicious kapa Granny Smith	Hlakubele
<b>LIPERE</b>					
<b>Packhams: e talanyana</b>	Bon Chretien and Forelle	Mahareng a Hlakola	<b>Packhams; e talanyana</b>	Clapp's Favourite	Mahareng a Hlakola
<b>Bon Chretien; apole e ts`ehla</b>	E ea inyalisa	Hlakubele			
<b>Forelle; e ts`ehla bo kopaneng le bokhubelu</b>	Packhams and Bon Chretien	Maqalong a `Mesa			
<b>LIURUMU</b>					
<b>Santa Rosa: e khubelu `mele kaofela</b>	E ea inyalisa	15 Ts`itoe – maqalong a Pherekhong	<b>Pioneer; e khubelu</b>	E ea inyalisa	20 Pulungoana
<b>Songold: e ts`ehla `mele kaofela</b>	Santa Rosa, Laetitia	15 Hlakola	<b>Songold: e ts`ehla `mele kaofela</b>	Santa Rosa, Laetitia	15 Hlakola
<b>Laetitia; e khubelu</b>	Songold	30 Pherekhong	<b>Laetitia; e khubelu</b>	Songold	30 Pherekhong
<b>LIPEREKISI</b>					
<b>Elberta; motloha o mosehla</b>	E ea inyalisa	25 Phato 1 Hlakola	<b>De Wet; motloha o mosehla</b>	E ea inyalisa	25 Phuptjane 25 Ts`itoe
<b>Kakamas; e ts`ehla</b>	E ea inyalisa	15 Phato 15 Pherekhong	<b>Oom Sarel; e ts`ehla</b>	E ea inyalisa	5 Phato 15 Ts`itoe
<b>Early Dawn: motloha o mosoeu</b>	E ea inyalisa	15 Phato 20 November	<b>Boland; motloha o mosoeu</b>	E ea inyalisa	15 Phato 15 Ts`itoe
<b>MATEBELE</b>					

<b>Flavortop; e khubelu bo lefifi</b>	E ea inyalisa	20 Phato 5 Pherekhong	<b>Sunlite; e khubelu ka ntle e ts`ehla ka</b>	E ea inyalisa	5 Phato 5 Ts`itoe
<b>LIAPOLOKOSO</b>					
<b>Peeka; e ts`ehla</b>	E ea inyalisa	15 Loetse 25 Ts`itoe	<b>Palsteyn; e ts`ehla</b>	E ea inyalisa	30 Phato 30 November

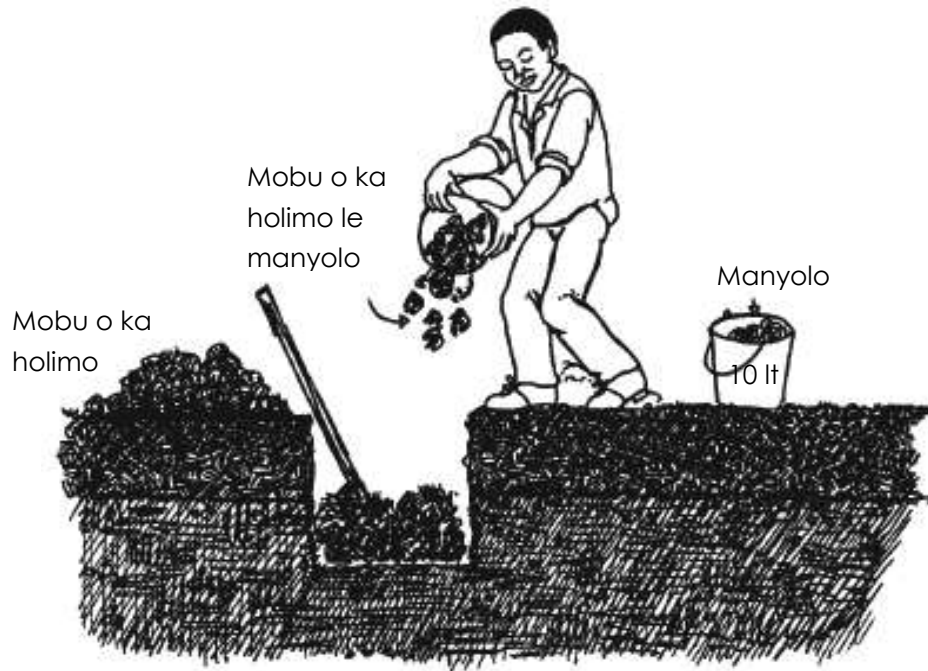
## Mokhoa oa ho lema lifate tsa litholoana

Ho bohlokoa ho lokisa sekoti libeke tse 'maloa pele sefate se hlongoa. Mobu o phomola hantle le hore mosuela o sebe kotsi haholo methapong ea sefate.



### Tokiso ea sekoti

1. Cheka sekoti sa bophara le botebo ba linoko tse 80 mahlakore a mane. Sefate se hloka sekoti se seholo hore se hole hantle. Arola mobu o ka holimo le o ka tlaase.
2. Ts'ela emere ea manyolo (10 litres) ka sekoting. E kopanye le mobu o tsoang ka tlaase.



3. Tsoaka likharama tse 500 tsa superphosphate kappa kilokharama e le ngoe ea masapo a sitsoeng.



4. Ts`ela liemere tse peli hape tsa manyolo li kopanye le mobu o neng o le ka holimo.
5. Busetša mobu ka sekoting kaofela. Mobu o mong oa kaholimo o ka nkoa sebakeng se seng.

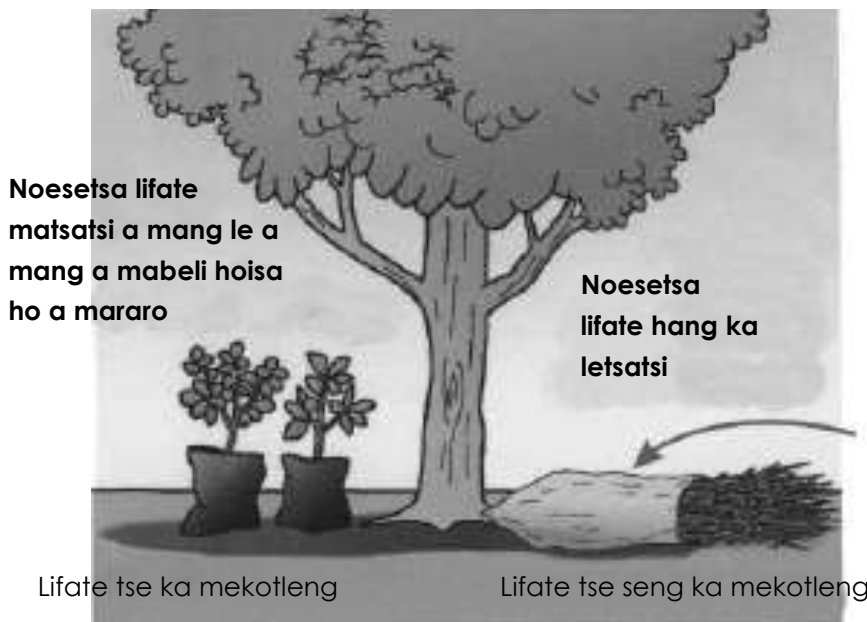
# Ho hloma sefate

## Tlhokomelo ea sefate se senyane pele se lengoa it

- ❖ Ha se ts'etsoe ka mokotleng oa polasetiki se ts'elle khafetsa.
- ❖ Ha metloang e sa koaheloa ka letho, e koahele ka lehlabathe 'me u koahele ka 'methe ho fihlela se hlongoa. Ts'ela methapo ea lifate ka nkhong ea metsi lihora tse peli ho isa tse tharo pele se hlongoa.



Beha lifate ka metso ka emereng lihora tse peli pele li hlongoa



Noesetsa lifate matsatsi a mang le a mang a mabeli hoisa ho a mararo

Noesetsa lifate hang ka letsatsi

Lifate tse ka mekotleng

Lifate tse seng ka mekotleng

BOLOKA LIFATE MORITING PELE LI LENGOA

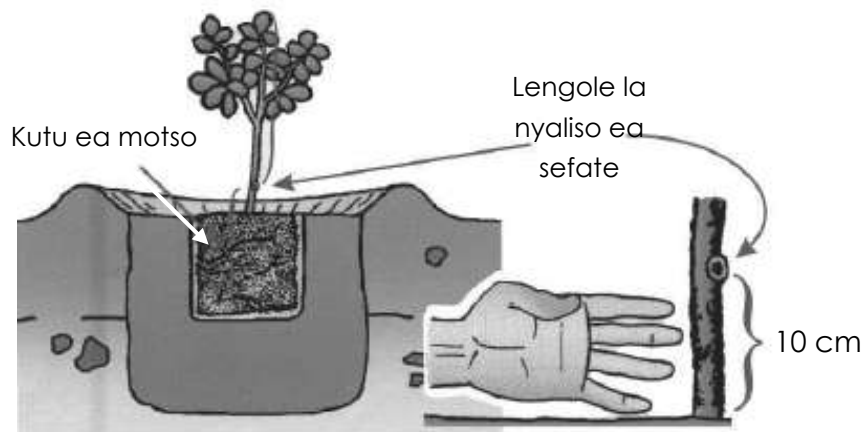
KOAHELA METSO KA JOANG, MARATH'A-LILEPE KAPA LEHLABATHE LE MONGOBO

## Ho lema sefate se ts'etsoeng ka mokotleng oa polasetiki

Tsena ha ngata li lengoa Lehlabula (Loetse - Pulungoana) 'me li flabe li hlahisitse makhasi ha li lengoa.

1. Noesetsa sefate se ntse sele ka moo u sa choatle mobu
2. Cheka mokoti o lekanang hantle (mokoti o lengoeng pelenyana) le mokotlana oo seleng ka ho ona
3. Se nts'e ka mokotleng
4. Se kenye ka mokoting, koahela methapo hantle, m'e bophahamo bo lokela ho lekana le ba sona ha se ntse sele ka mo.
5. Karolo ea moo se nyalisitsoeng e tlameha ho hlaha ka holimo ho mobu ka linoko tse leshome (10 cm)

Bokaholimo  
ba sefate 7



❖ CHEKA SEKOTI BOHOLO BO LEKANANG LE MOKOTLA.

❖ TABOLA MOKOTLA KA HLOKO NTLE LE HO SISINYA MOBU O KOAHETSENG METHAPO.

**TLHOKOMELISO:** LENGOLE LA NYALISO EA SEFATE LE LOKETSE HOBA KA HOLIMO HO MOBU KA LINOKO TSE LESHOME (10 cm).

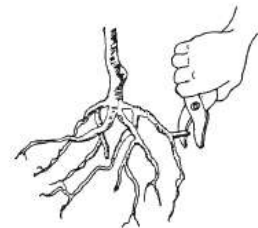
### Lengole la nyaliso ea sefate:

Lifate tse hlaha li mela mebung e fapakaneng le maemong a fapakaneng a leholimo 'me li na le methapo e matla. Litholoana tsa lifate tsena ha li tenya haholo li bile li hloka tatso e monate. Lifate tse ling tse seng matla li ka beha litholoana tse hantle li bile li latsoeha. Ho fumana sefate se methapo e matla le litholoana tse hantle, metso ea lifate tse hlaha e kopangoa le makala a sefate se behang litholoana tse latsoehang. Mokhoa ona o bitsoa ho nyalisa sefate; me sena se etsoa ka ho khaola sefate se hlaha ka holimonyana ho metso e be se kopangoa le makala a sefate se behang litholoana tse monate tse kholo. Likarolo tsena tse peli li hola ha 'moho 'me li fetoha sefate se le seng. Lengole moo tsena tse peli li kopantsoeng le tlameha ho ba ka holimo ho mobu nako eohle ha sefate se lengoa.

### Ho lema sefate se sa ts'eloang ka mokotleng

Tsena li lengoa ha ngata Mariha ho isa mafelong (Phupu-Phato).

1. Cheka sekoti se seholo bo fetang metloang ea sefate seo.
2. Poma ka bohloeki metloang e bonahalang e utloile bohloko e le ho qoba mafu.



3. Ts'oara sefate hore se be holingoana ka sekoting ho feta ka moo se neng se le kateng pele.

4. Koahela methapo kahloko, ts'ela le lipakeng tsa eona e le hore ho sebe sebaka se salang. Sefate se ts'oanetse hore lekane ka botebo bo lekanang le moo se fohang teng ka mobung.

5.

e



Karolo ea moo se nyalisitsoeng tlameha ho hlaha ka holimo ho mobu ka linoko tse leshome.

Lengole la nyaliso ea sefate le loketse hoba ka holim'a mobu ka linoko tse leshome (10 cm).



6. Hang ha sefate se qeta ho hlongoa, se faole makhasi, sena se thusa hore se hole ka pele ka ha metloang e satlo tlameha ho fepa makhasi a mangata. Ho kgaola lekala ka tlasa senoko.

7. Hore sefate se hole hantle se otlolohile se ts'ehetse ka ho hloma thupa pela sona 'me se tlamelloe ho eona.

Ha sefate se ntse se hola se nka sebaka se se ngata, ka hoo li arohanye hantle ha li lengoa.

Liperekisi, lipurumu le apolokose li arohanngoa ka bolelele ba kharafu tse tharo (3metres) lipakeng tsa lifate, likharu tse hlano (5 metres) lipakeng tsa mela.

Lipere, liapole le lilamuno tsona e be likharu tse hlano (5 metres) lipakeng tsa lifate le mela.



Lengole la nyaliso ea sefate le loketse hoba ka holim'a mobu ka linoko tse leshome (10 cm)





## Noesetso ea lifate tse sa tsoa lengoa

1. Hatella ka hloko mobu o pota-potileng sefate.
2. Etsa letangoana le tla ts'oara metsi.
3. Noesetsa sefate ka liemere tse 'ne.



4. Koahela mobu o pela sefate ka joang bo ommeng, kapa ka lipampiri e le ho ts'ireletsa mongobo hore o se lahlahe ha ho chesa, hape le ho thibela hore lehola le se hlahe.

5. Metsi a fohang marulelong a ntlo le a mathang fat'se a ka lebisoa lifateng ka foro e le hore ha pula e na, lifate li fumane mongobo.
6. Sebelisa mekhoe e latelang ho noesetsa lifate.

Selemo	Hoetla le selemo	Mariha
1	Emere tse peli (20 L) kamor'a matsatsi a mang le amang a supileng ha ho omeletse	Emere e le ngoe (10 L) ka mora libeke tse peli ho isa tse tharo
2	Emere tse tharo (30 L) kamor'a matsatsi a mang le a mang a supileng	Emere e le ngoe (10 L) kamor'a libeke tse peli ho isa tse tharo
3 le tse latelang	Emere tse tharo (30 L - 40 L) ho isa tse nne kamor'a matsatsi a mang le a mang a supileng	Emere tse peli (20 L) ka mora libeke tse peli ho isa tse tharo

## Mokhoa oa ho fepa lifate tsa litholoana

### Ts'ebeliso ea manyolo

Kamehla ts'ela manyolo pela lifate feela a se thetse kutu ea sefate, koahela manyolo hore a se lahle boleng kapa matla.

Lilemo tsa sefate	Loetse	Ts'etoe
Year 1	Emere e le ngoe (10 L) ea manyolo	Emere e le ngoe (10 L) ea manyolo

Year 2	Emere tse peli (20 L)	Emere tse peli (20 L)
Year 3	Emere tse tharo (30 L)	Emere tse tharo (30 L)
Year 4	Emere tse nne (40 L)	Emere tse nne (40 L)
Year 5	Emere tse hlano (50 L)	Emere tse hlano (50 L)

Ho tloha selemong sa bohlano ho ea pele ts'ella ka metsi a lekanang ka selemo.



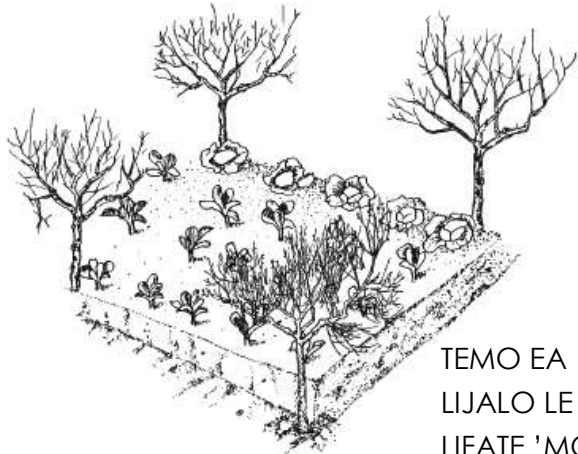
## Tlhokomelo ea lifate

### Tlhakants'uts'u

Ho tloaelehile hore lifate ho mela `moho le limela tse ling ka tlhaho, ha li lengoe li le ling li ka hlaseloa ke likokoanyana. Ka hoo ho molemo ho li lema le lijalo tse ling tsa mefuta hore li thusana le ka ho tebela likokoanyana tse ling.

Ho ka ba bobebe hape ho lema lijalo tse butsoang ka nako e khuts'oane lipakeng joalo ka habore le harese tse e tlare ha li shoa li etse mosuoela bakeng sa lifate.

Empa ho ka lengoa hape le tse nkang nako e telele joalo ka lesere tseo le tsona li tla heloa ho etsa mosuoela kapa eona furu ea liphoofole.



TEMO EA  
LIJALO LE  
LIFATE 'MOHO

### Mafu le likokoanyana

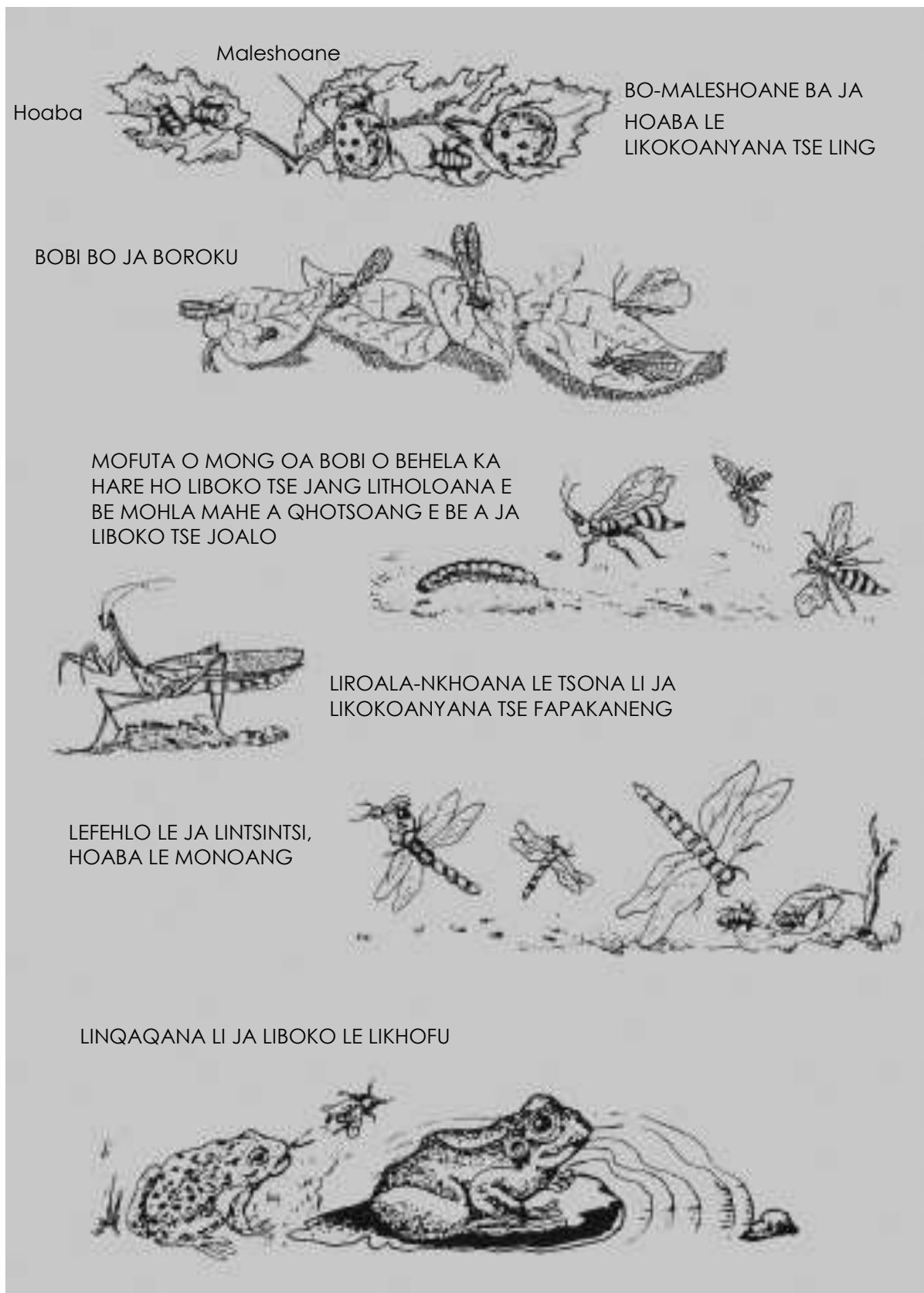
Ho lema lifate tse phetseng hantle tse hlokanang mafu ke mohato oa pele hobane li tseba ho mamella mafu le likokoanyana. Sebelisa manyolo a mangata `me li

hlaolele khafetsa.

Mekhoa e meng ea ho etsa lifate tse phetseng hantle:



- ❖ Ho lengoa hoa menkhane, leeks le konofolo e tebela likokoanyana tse ka senyang lifate.
- ❖ Linots'i li ka ruuoa e le hore li tsebe ho fetisa phoshoana e etsang litholoana.
- ❖ Bona hore likokoanyana tse kang bo-`mantsoai-tsoai, seroala-nkhoana, maleshoane le maroana, le liqaqana li ba teng hoba li ka ja liboko le tse ling tse ka senyang lifate le litholoana.



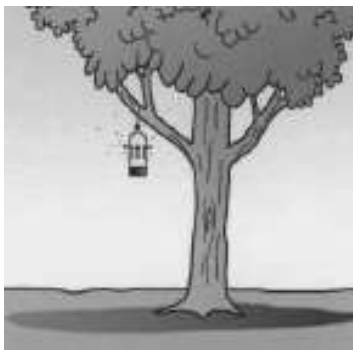
❖ Ritela metsoako e ka nkhelang likokoanyana tse senyang ha mpe

– **Konofolo (Garlic) le hanyanese:** Khabela kotola ea konofolo kapa ea

hanyanese li inele ka likhabaneng tse peli tsa parafini letsatsi lohle. Sefa motsoako ona, 'me o tsoake le metsi a halefo ea lithara. Seha kotola ea sesepa sa "sunlight" se setala ka lehare, se ts'ele ka motsoakong ho fihlela se thuheile. Hona ho tla thusa hore motsoako o lule mahabeng a sefate.

- **Motsoako oa Koe:** Motsoako ona o lokela ho sebelisoa ka hloko e kholo ka ha o le chefo likokoanyaneng tsa bohlokoa joalo ka linots'i le tse ling, o oa libolaea. Belisa litompi tsa sikarete kapa koe ka lithareng ea metsi. sefa motsoako 'me o hlapolloe ka lithareng tse peli tsa metsi joale o fafatse lifate.

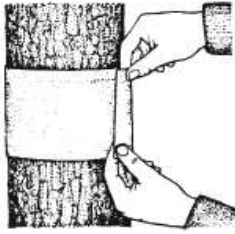
- **Sefi sa lintsintsi ka litholoana tse bolileng:** Lintsintsi tsa litholoana li shemola le ho behela mahe ka hara tholoana. Liboko tse nyane li qhotsetsoa kahare ho tholoana ebe lia e bolisa. Lintsintsi tsena li rata ho ja litholoana tse butsoitseng joalo ka morara, lilamuni le lipolamo. Metsi a kopaneng le lero la litholoana le tsoekere li ka sebelisoa e le ho ts'oasa lintsintsi tse joalo.



- Mokhoa o mong oa ho ts'oara ntsintsi ea litholoana ke ho tsoaka "Bovril kapa Marmite" le chefo e kang motsoako oa koe joaloka' tlaloso e boletsoeng ka holimo.

- ❖ Mokhoa o mong oa ho thibela lintsintsi e ka ba oa ho thonaka litholoana tse oeleng tlasa lifate tse bolileng letsatsi le letsatsi, 'me li t'seloe ka emereng e tletseng metsi a tla thusa hore liboko li tebe kahara ona. Litholoana tse joalo li ka sebelisoa ho fepa likhoho le likolobe. Ho bohlokoa hore liboko tseo tse nyenyane li se thetse fats'e ka ha li fumana monyetla oa ho tsoa kahara litholoana e be li kena mobung joale li qalelle ho qhotsa lintsintsi tse ling tsa litholoana.

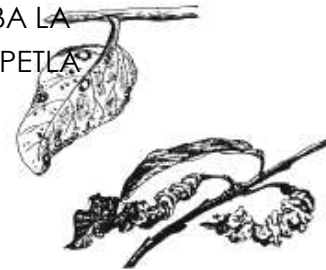




- ❖ Thatela sefate ka lesela kapa pampiri e flotsitsoeng ka kirisi 'empa etsa hore e se thetse sefate ka ha e chefo sefateng, likokoanyana tse nyane tse hloang sefate li tla tsoaseha ebe li a shoa.

- ❖ Mafu a kang mildew e leng mofuta oa hlobo, phofshoana e ts'oeu e atisang ho bonahala mahabeng a liapole le lipere, black spot e leng matheba a mats'o a atisang ho bonahala mahabeng a lifate le litholoaneng, leaf curl e leng ho sosobana ha mahaba ho bonahalang hangata lifateng tsa liperekisi le ho tsa matebele e behoa taolong ka ho hlohlora lerole le ka fumanehang lifateng kapa litholoaneng ka lime sulphur kapa copper-oxychloride, 'me meriana ena e ka fumaneha mabenkeleng a rekisang lipeo.

LETHEBA LA  
LEKHAPETLA



HO SOSOBANA HA  
LEKHAPETLA LA  
SEFATE SA PEREKISI

## Poloko ea litholoana

Ho boloka litholoana ka mokhoa oa ho li omisa, ho li ts'ela libotlolong kapa ho etsa jeme ke mokhoa o nepahetseng haholo oa ho li boloka nako e telele.

### Ho omisa litholoana

Haho thepa e khethehileng e hlokahalang sebakeng sa ho omisa litholoana, le hoja liomisi tse entsoeng ka mokhoa o bonolo li ka thusa. Tholoana e omme ha fela ho se na metsi a tsoang ka nako eo e pepetoang.

Li ka lokisoa ho latela lisepepe tse tlang ho latela eaba li behoa moo ho tsetsitseng kapa holima boto. Li ka omisetsoa ka tlung kapa ka ntle letsatsing. Ka mokhoa o ts'oanang, ho molemo ho li koahela ho li ts'ireletsa likokoanyaneng le leroleng le ka li bolisang, li ka koaheloa ka lesela, pampiri kapa terata e ts'esanyane (wire mesh).

#### Lisepepe ho tokisetsoeng ea ho omisoa oa litholoana:

- ❖ Liperekisi, lipolamo le mabolilana: seha litholoana lihalefo e be u tlosa tholoana kahare. Beha litholoana holima terei li shebile holimo.
- ❖ Liapole: Ebola liapole e be u nts'a litholoana tse kahare. Li khabele ka mokhoa oa selikalikoe (rings) e be a hanyeo terateng holima setofo se chesang. Liapole li hloka hore li ome ka potlako ka ha li fetola 'mala, li ba sootho kapa li be nts'o joale e ba ha li sa hebahala hantle sebakeng sa ho jeoa.
- ❖ Lipere: Li ebole 'me o tlose litholoana tse kahare. Etsa motsoako oa metsi a lithara tse peli le letsoai ebe li karoloana tse sehiloeng la lipere li akheloa ka teng. Li nts'e ka motsoakong e be ua li omisa ka floaelo.



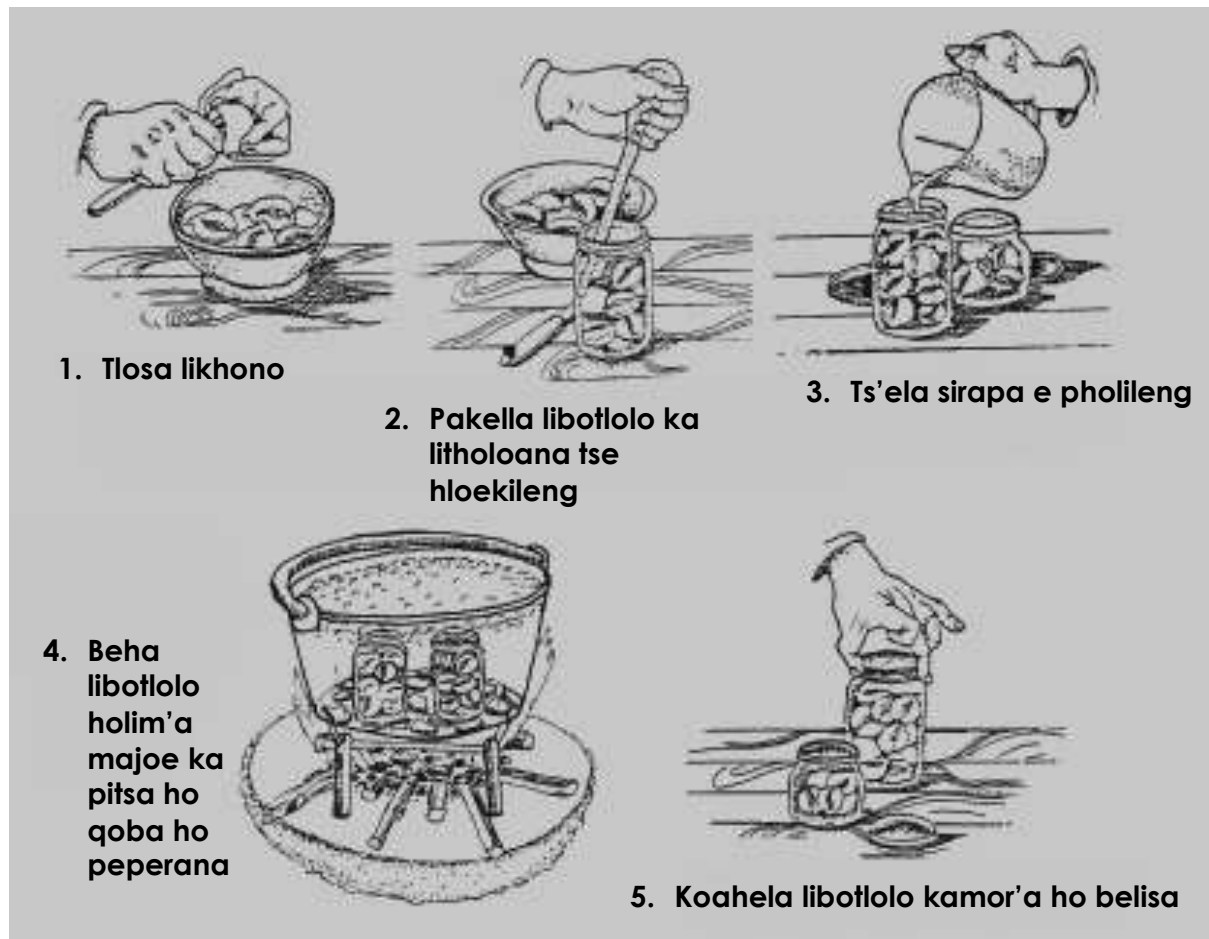
FOREIMI EA BOSEKA

FOREIMI E OMISANG  
EA TERATA

FOREIMI E OMISANG EA LELAPI LA CHISI

### Ho ts'ela litholoana ka libotlolong

Ho ts'ela litholoana ka libotlolong ke mokhoa o bonolo oa hoba le litholoana tse tsoekere le tatso e monate ka lapeng selemo sohle. Ho tla hloka hahla theko ea libotlolo tsa polokelo tse nepahetseng ho netefatsa hore litholoana ha li bole. Libotlolo tse nepahetseng ke tse nang le sekoahelo sa ts'epe le rabara kapa libotlolo tsa mofuta o sothoang likoahelo ho qoba hore moea o se kene.



- ❖ Ho hlokahala litholoana tse sa butsoang haholo. Liperekisi, lipurumu, le liapolekose li ka arola ka ho lekana. Lipere le liapole li hloka ho ebeloa.
- ❖ Libotlolo li hloka hore li bolaoe likokoana-hloko (sterilize) pele li ts'eloa litholoana ka ho li belisa ka metsi 'moho le likoahelo tsa tsona nako ea metsotso e leshome
- ❖ Libotlolo li ts'eloe litholoana tse hloekileng
- ❖ Ts'ela sirapa: Halefo ea kopi ea tsoekere metsing a futhumetseng a lilithara tse peli le halefo. Thetsa-thetsa botlolo ho netefatsa hore haho moea o tlaaba teng lipakeng tsa litholoana.
- ❖ Belisa litholoana tse ka libotlolong nako ea hora le halefo: Beha likoahelo le lokolohile botlolong 'me libotlolo li behoe holim'a majoe a manyenyane ka pitseng e kholo e ts'etseng metsi. Metsi a loketse ho koahela libotlolo.
- ❖ Nts'a libotlolo ka pitseng kamor'a metsotso e leshome e pholile. Tiisa likoahelo ho lekana.

## Ho etsa Jeme

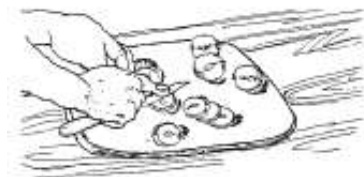
Litholoana lia tiea ha li belisitsoe 'moho le tsoekere ka lebaka la boteng ba lero le bitsoang "pectin" le hlahang ha litholoana le tsoekere li bela. Litholoana tse ling li khona ho etsa jeme ha bobebe ho feta tse ling hobane li na le pectin e ngata.

**Litholoana tse ntle bakeng sa ho etsa jeme:** Liapole, lipurumu, liperekise le liapolekose

Litholoana tse ling li hloka pectin ka mokhoa oa lero la lamune (1 lemon/kg ea tholoana). Litholoana tsena ke licherri, feekha le merara.

## Rasepe:

1. Hloekisa 'me u khaole tholoana ka likaroloana tse nyenyane, likhono le maqeba a mang li tlositsoe.



2. Ts'ela litholoana ka pitseng. Metsi a koahela litholoana. Belisa ho fihlela ho ba bonolo.

3. Ts'ela tsoekere. Ho hlokahala tsoekere e lekanang le litholoana. Litholoana tsa boima ba kilograma ele 'ngoe bo lekane le kilograma ea tsoekere.







4. Ts'ela lero la lamuni haeba ho sebelisoa litholoana tse haelloang ke pectin.

5. Belisa butle metsotso e leshome hoisa horeng ho fihlela jeme e loketse ho tiea. Ho fumana bonnete

bona, ts'ela jeme e nyenyane sekotloloaneng ho fihlela e pholile. Ha bokaholimo boba thatanyana joalok'a jeli ke sesupo sa hore jeme e tiile 'me e ka ts'eloa ka libotlolong.

6. Belisa libotlolo metsotso e leshome. Ts'ela jeme libotlong tse ntseng li chesa. Koahela ka thata. Li lumelle ho phola.

Kkoahela libotlolo  
tse ts'etseng  
litholoana ka  
pampiri e boka



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Robyn Neeson. 1997. AgnoteDPI/190. Organic Fruit Production. NSW Agriculture. Australia

Sheard, Andrew. 2007. Fruit Production in KwaZulu-Natal. Department of Agriculture and Environmental Affairs, KZN, South Africa.

Parker, W., Bolus, R. and Hosack, P. 1985. The Soil is Good for Fruit; A guide to fruit growing in the Transkei. The Transkei Appropriate Technology Unit, Umtata, Eastern Cape, South Africa.

## Ho faola lifate tsa litholoana

### Selelekela

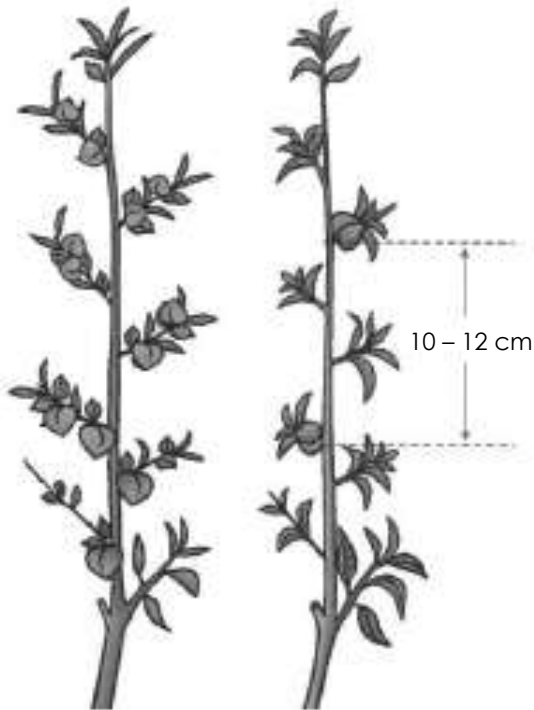
Ho faola lifate ke ho li tlosa likarolo tse ling tsa tsona e le ho atlehisa kholo ka mokhoa o ts'oanang. Ho tloaelehile hore ke makae, kutu kapa makhasi, athe methapo kapa tsona litholoana le tsona ekaba karolo tse ling tse ka faoloang ho atlehisa kholo ea sona ka mokhoa o ts'oanang. Tholoana e atleha hantle makaleng a macha ho feta a khale. Ka hona, sefate se metseng makala a macha kamor'a ho faoloa se bea litholoana tse atlehileng ho feta se sa faoloang hohang.

Litholoana li ka qalella ho fokotsoa makaleng libeke tse 6-8 ha li lekana le mapanaki, 'me boleleleng ba mithara ba lekala ho sale litholoana tse 7-8, kapa litholoana tse 'ne boleleleng ba sephaka.

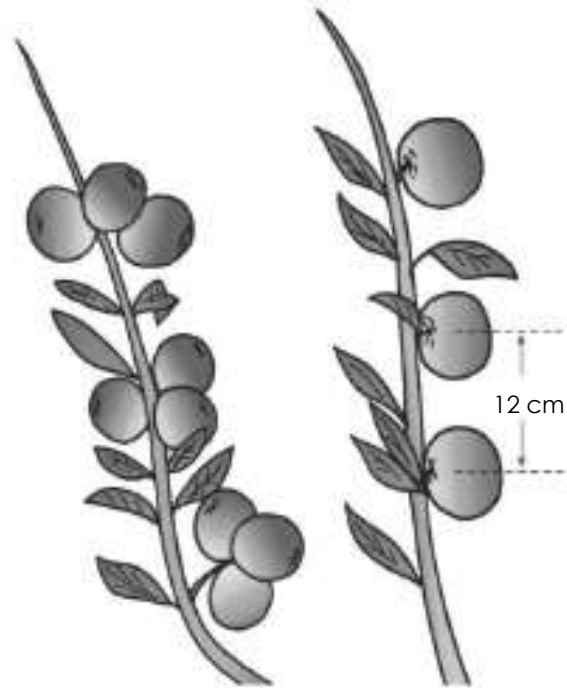
Ho lifate tse etsang pete (tholoana) joalo ka liperekisi, lipurumu, le apolokose, le tse senang pete joalo ka apole, pere le mefuta ea lilamonu, li ka beha selemo sa pele empa tsa beha ha nyenyane selemong se hlahlamang kapa tsa se behe hohang. Makala a tsona a ka imeloa ke litholoana tse ngata 'me a robaha, ke ka hoo ho hlokalahalang hore ho fokotsoe litholoana e le ho thibela sena le hona ho fa tse fokolang monyetla oa hore li atlehe hantle. Hona ho ka thusa hore litholoana tse

beoang ke sefate se joalo li be nyane ka palo empa li be tenya, ho feta ha li ka ba ngata empa li le ts`esanyane.

LIPEREKISI LE LIPOLAMO



LIAPOLE LE LIPERE



*`Me boleleleng ba methara ba lekala ho sale litholoana tse 7-8, kapa litholoana tse `ne boleleleng ba sephaka*

### Mabaka a ho faola lifate tsa litholoana

Ho faola makala sefateng sa litholoana ho etsa hore:

- ❖ Sefate se be matla khahlanong le meea e ka se robang
- ❖ Sefate se tsebe ho jara boima ba litholoana
- ❖ Kotulo ea litholoana e be bobebe ho ba se sa phahama.

Ho faola sefate sa litholoana ho thusa ho eketsa khanya le ho foka hoa moea lipakeng tsa makala `me sena se thusa ho fokotsa mafu le hore litholoana li bope le hore li butsoe ka potlako.

### Ho faola lifate tse `nyane tsa litholoana

Lilemong tse tharo tsa pele ho bohlokoa ho bopa sefate kamoo u lakatsang hore sebe ka teng, `me hona ho tla fokotsa mosebetsi oa ho faola makala a mangata ha se sentse se hola.

## Ho faola lifate tse kholo tsa litholoana

Sefate se qalang ho faoloha se se se holile se hloka ho faoloha haholo, ka hona se ka beha palo e fokolang ea litholoana selemong seo, `me sa beha haholo selemong se hlahlamang.



SELEMO SA PELE

## Mehato e latelang ha ho faola lifate tsa litholoana

Kamehla faola lifate ha ho omme ho phema mafu maqebeng a bulehileng.

- ❖ Mohato oa pele: qala ka ho tlosa makala a omeng a nang le ts'oaetso ea mafu.
- ❖ Mohato oa bobeli: tlosa makala a palamaneng, a atamelaneng kapa a thetsanang.

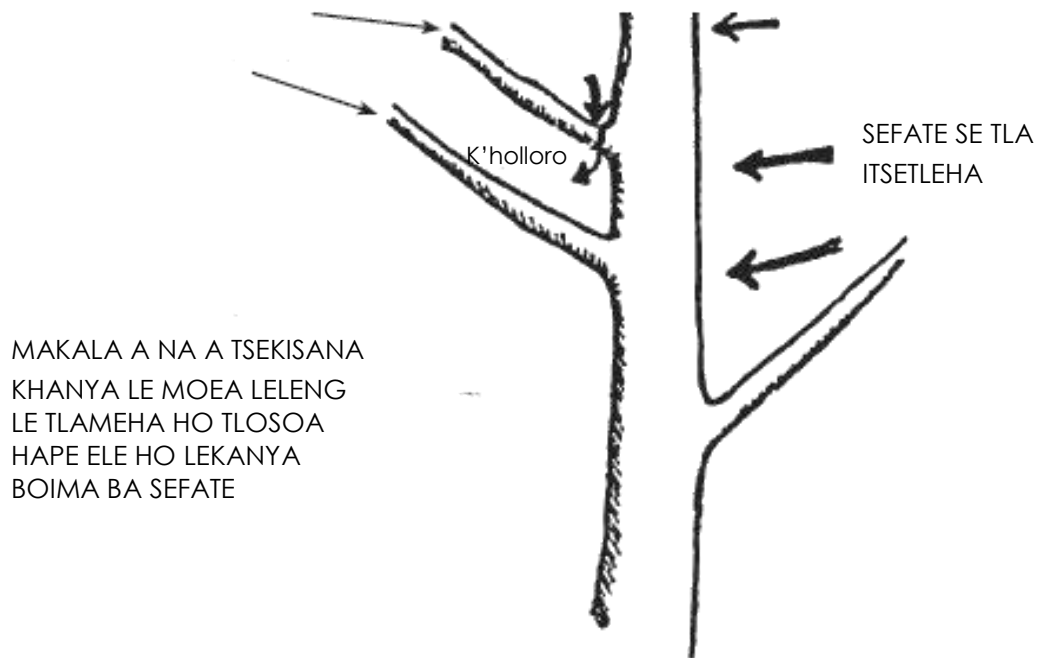


SELEMO SA BOBELI LE TSE LATELANG

❖

MAKALA A  
PALAMANENG

Khaola  
mona

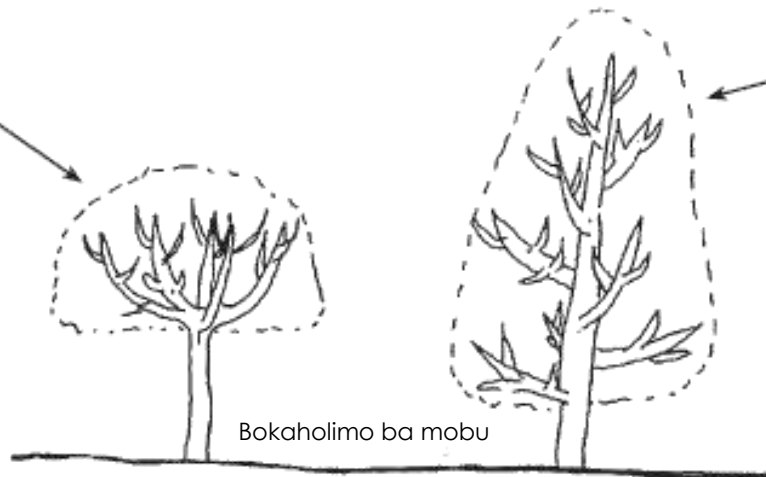


- ❖ Kamehla poma makala ohle a hlahang katlase ho leqeba moo sefate se nyalisitsoeng teng, ka ha makala ao a tla jella karolo e ka holimo ho leqeba matsoai ao e a hlohang.



- ❖ Lifate tsa litholoana li faoloe hore li bulehe bohareng kapa li shebe holimo.

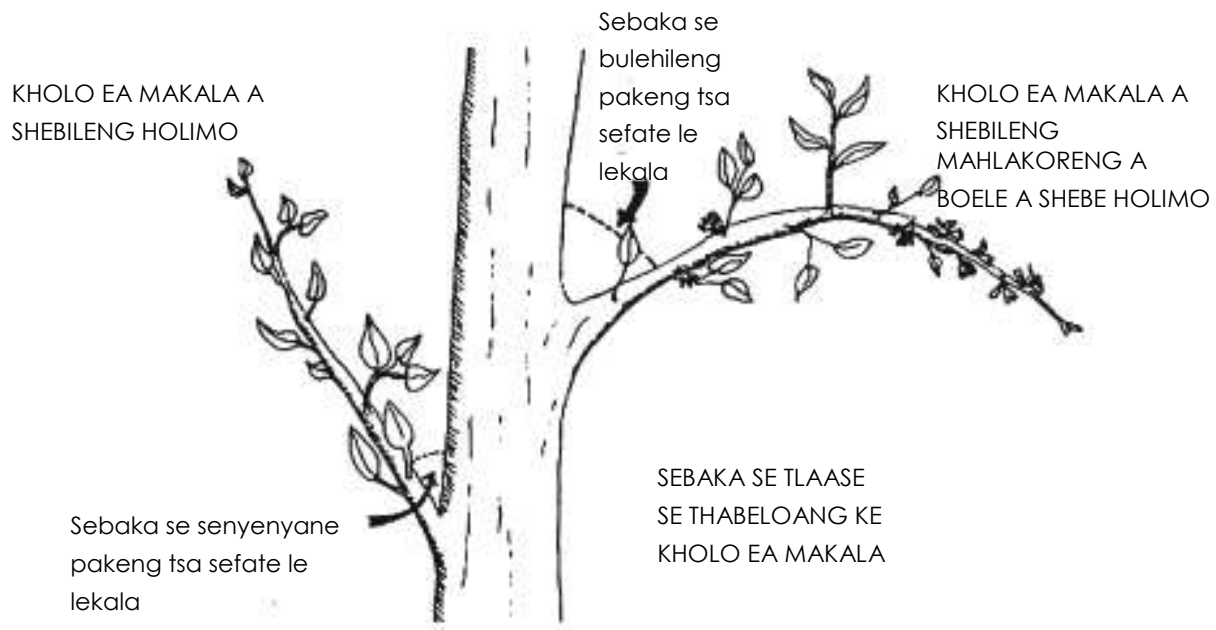
**Ho buleha bohareng (cup shape):**  
Hona ho lumella kahanya ho kenella bohareng ba makala hore libehe litholoana, ha ngata ho etsoa lifateng tsa liperekisi le tsa liplum



Mokhoa ona ha o nke sebaka se se holo joalo ka o bulehileng. O sebelisoa haholo lifateng tsa liapole le lipere

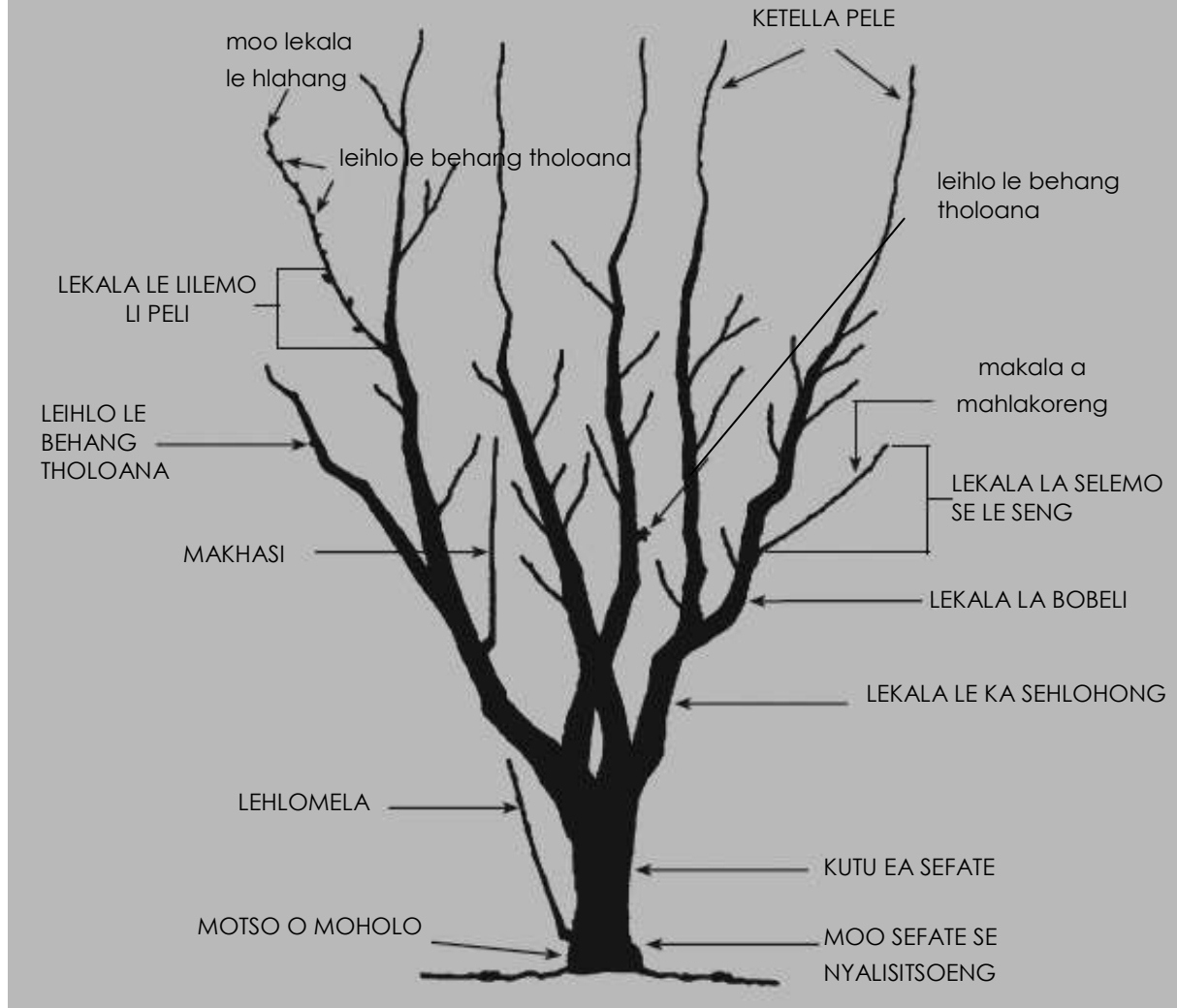
- ❖ Hangata makalana a behang litholoana ke a mahlakoreng a lekala le

bohareng eleng lona le tsoereng boima ba sefate, ha ele a sa kobehang a robeha ha bobebe ha meea e tla ka sekahla. Ka hona ho molemo ho sia lekala le bohareng le a mahlakoreng e le ho akofisa tlhahiso ea litholoana ho feta ho hola ha sefate.



**KA HOLIMO:** SEBOPEHO LE SEBAKA BAKENG SA MAKALA A LITHOLOANA

**Likarolo tsa sefate tseo ho ngotsoeng ka tsona holima ho faola lifate maqhepheng a latelang:**



**Ho faola lifate tse etsang li-pete**

Ho tseba hore na sefate se beha litholoana joang, ho ka thusa hore na se faoloe jaong:



**KA HO LE  
LETSE'HALI:  
MAKALA A  
BEHANG  
LIPEREKI**

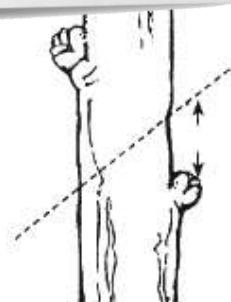


**LIPEREKISI:**

Tholoana e hlaha makalaneng a ngoahola feela.

**LIPLUM:**

Tholoana e hlaha makalaneng a lilemo tse peli tse fetileng kapa a khalenyana ho moo.



Khaola lekala ka holimonyana ho moo leihlo le leng hona teng e le ho kothaletsa ho hlaha ha lekala le lecha joalo ka ha ho bontsitsoe setsoantsong se ka tlase.

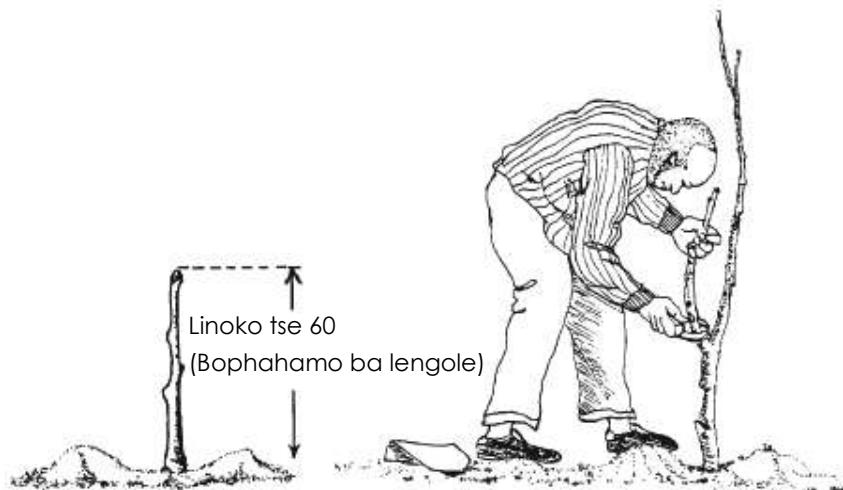
5 cm

### **E LETONA:**

*ur on older  
plum trees*

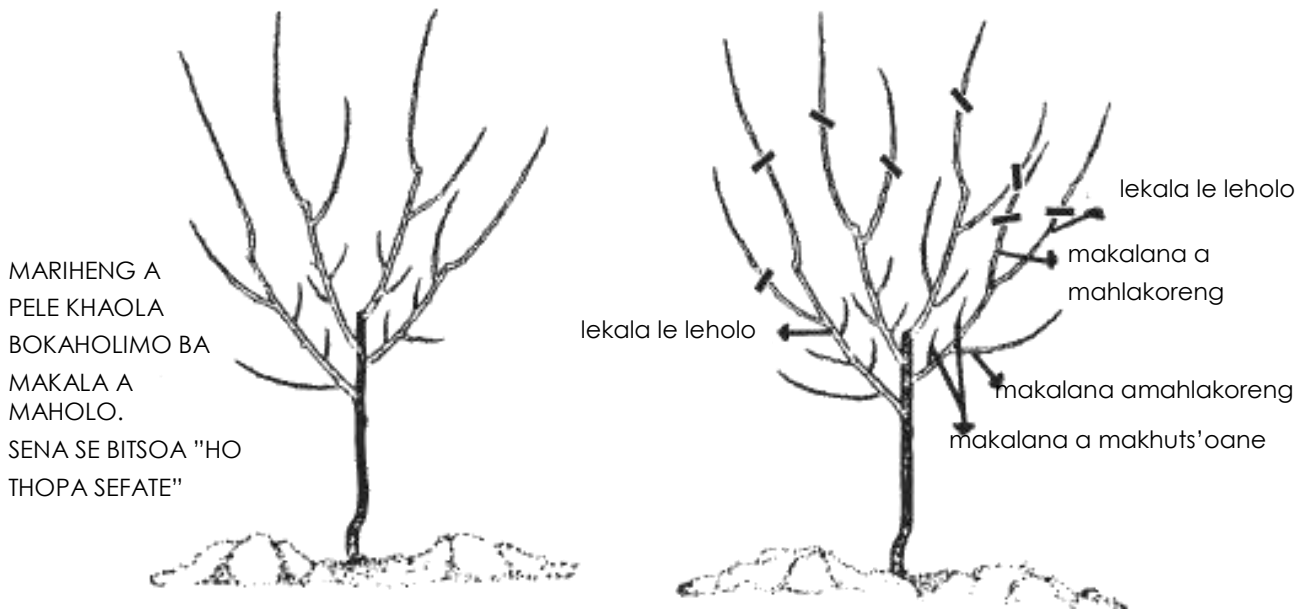
## 1. Nakong ea ho lema sefate:

Poma metso ea sefate pele u selemo, `me le sona se pome bophahamo ba lengole, e leng linoko tse mashome a tseletseng (60cm). Hona ho tla thusa sefate hore makala a sona a hole a ea mahlakoreng ho feta ho ea holimo.



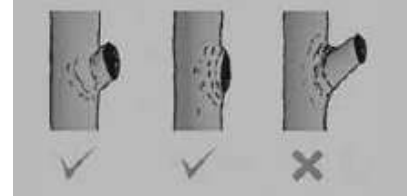
## 2. MARIHENG A PELE:

- ❖ Khaola bokaholimo ba makala a maholo.



- ❖ Poma makala a maholo ka holimo, Makae a mangata a tla be a hlahile makaleng a maholo. Siea makae a 2-3 lekaleng kangoe; lekalana la pele le be bolelele ba seatla ho tloha lekaleng, la bobeli le be leteleletsana, joalo joalo.

Ho faola makala a mahlakoreng:

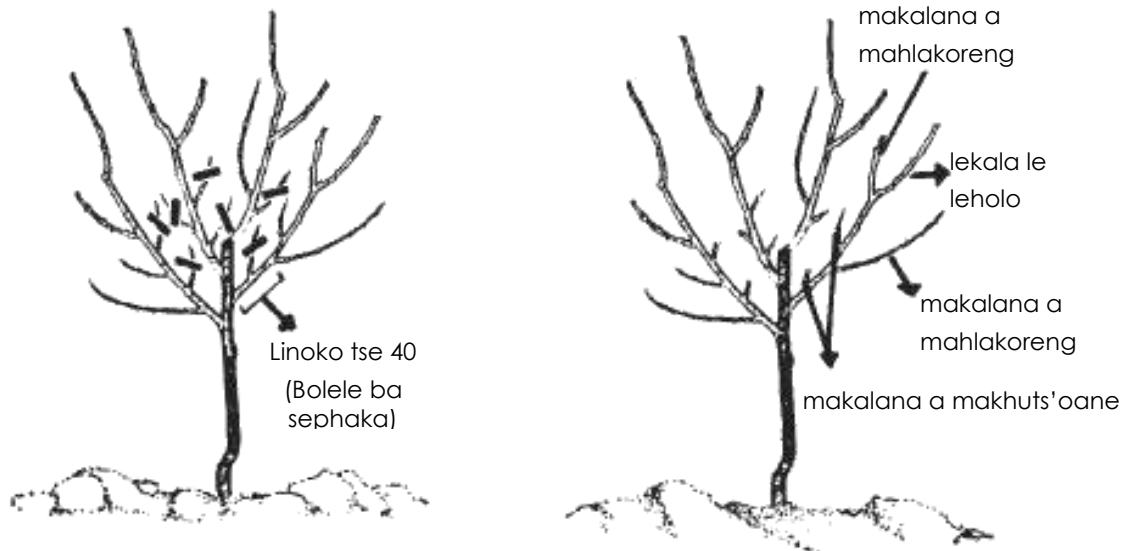


### 3. Mariha a bobeli le a bararo sefate se lengoe:

- ❖ Fokotsa hanyenyane bo kaholimo ba makala a maholo kaha ha a ka khaolelloa tlaase a tla lieha ho beha litholoana.
- ❖ Khutsufatsa makae ka senoko holima leihlo le thuntseng kapa moo le neng le pongoe selemo se fetileng.
- ❖ Khutsufatsa makalana a mahlakoreng a lekaee. Siea a 2-3 lekaeeng ka leng.

Selemong sa boraro litholoana li tla hlaha makaleng ona oa. Ha a se a tiile, a faole hanyenyane Mariha a mang le a mang.





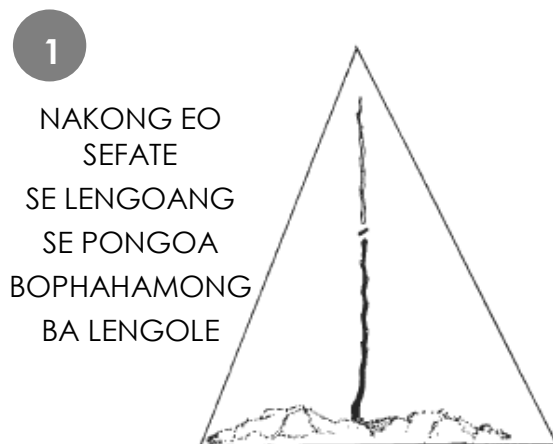
### Ho faola lifate tsa litholoana tse sa beheng li-pete

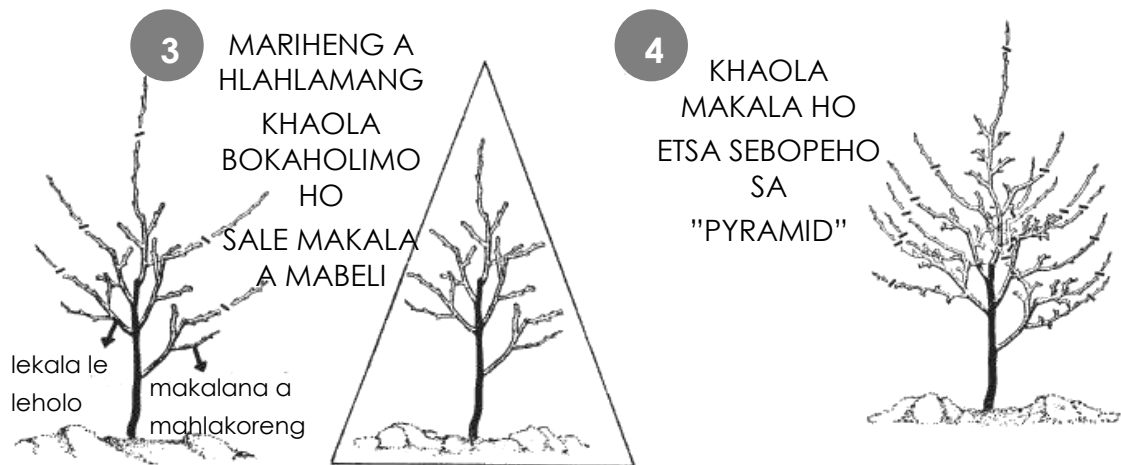
Lifate tsena li qallela ho beha litholoana selemong sa bohlano. Litholoana tsa teng li ka khuoa tsa butsoa li se sefateng. Mokhoa o amoheloang oa ho faola ke oo makala a shebileng holimo.

Litholoana li hlaha makalaneng a manyenyane a mahlakoreng ho tloha makaeeng, a beha lithoalana lilemo tse ngatanyana.

### Ho faola lekhethlo la pele

- ❖ Khaola sefate se lengoeng ho isa bophamong ba lengole.
- ❖ Fokotsa makala a maholo u sie le le leng le bohareng, e be u siea makae a mabeli lekaleng ka leng.
- ❖ Mariheng a bobeli le a boraro fokotsa makala a maholo le makae, u siee makala a 2-3 a mahlakoreng ho tloha lekaeeng ka ngoe.





## Ho faola merara

Merara e beha litholoana lehlomeleng la ngoahola leo lona le hlahang ho la ngoahola koola. Haeba le beha lehlomeleng la khale ho feta moo le tla beha litholoana tse nyane.

- ❖ Mariheng a pele poma lekala ho ea boleleleng ba linoko tse mashome a mararo (30 cm).
- ❖ Mariheng a bobeli faola makala haholo o siee a 3-4 a bolelele ba linoko tse mashome a mararo ho isa ho a mane (30-40 cm). Siea makalana ao lehlomela le tla mela ho ona.
- ❖ Selemong sa boraro le tse sehlahlamang tlosa boholo ba lehlomela u siee ho lekaneng bakeng sa beha litholoana.

## 7. Mokgwa wa ho jala sefate sa ditholwana se seng (Grafting)

### Ke eng grafting? (Ho jala Sefate ho se seng)

Difate tse hlaha tsa ditholwana di hlaha mebung e mengata e fapaneng le boemong ba lehodimo bo fapaneng di ema le metso e matla, empa ditholwana tsa tsona dise kgolo ebile di sena tatso. Tse ding tsa difate tse se nang matla, dika hlahisa ditholwana tse tatso e monate e bile di le kgolo.

Hoba le sefate se matla se nang le ditholwana tse hlabosehang, methapo ya sefate sesetle se nonneng se e ka kopanqwa ho kapa ho hokelwa makaleng a sefate se nang le ditholwana tse hlabosehang.

#### Dikeletso ho etsa GRAFTING e atlehileng

- ❖ Sebedisa sekere se hlwekileng ho kqaola sefate – indla thipa ya hao pakeng tsa dikgaolo ka 10% tsa bleach motswako (1 telepele ya bleach e tswakilweng le 9 telepele ya metsi.)
- ❖ Ha ose o entse dinoko, sebetsa kapele-pele patsi ta thupa ya hao e so omdle.
- ❖ Seke wa tshwana karolwana e sehilweng.
- ❖ Etsa bonnete ba hore kutu ya bao le moo ho kgaotsweng; di nepana hantle. O ka botsa ra nursery kapa otketsetse teko. Ka kekeretso o ka iketsetsa ka sefate sa apole ho sa apole se seng; pere ho pere, mora ho mora, ditholwana tse lejwe ho tsa lejwe tse ding (diperekisi; diapolkosi) le dilamune ho di lamune tse ding.
- ❖ Jala kutu ya methapo mobung o nonneng ose tebise ka mobung sebe letsatsing le moo ho senang moya ha ho hlokahala. Noketsa kgafetsa.
- ❖ Se nyahane ha o qala mokgwa ona wa ho jala hoba osa ithuta. Etsa mekgwa e mengatanyana haeba esa loke. Boikwetiso boa atehisa.

**Scion** ke lekala leo o le jallang ho sefate se seng. Scion e tswa sefateng se ditholwana di hlabosehang.

**Rootstock:** Kutu-metso ke karolwana ya metso e etsang bokatlase ba grafting. Ho kgomatretsa (grafting) sefate sa ditholwana, ho kgomatretsa lekala le leng le tswang sefateng se seng le kgomatretse motso-kutung. Ktetha motso-kutu o atlehileng se melang hantle moo o phelang teng.

Ketsahalo ena e bitswa GRAFTING; ho na ho ka etswa ka ho kaola kutu mona feela ka hodima methapo ya sefate se seng se matla le ho hokela lekala la sona; sefteng se behang ditholwana tse monate kapa tse hlabosehang. Difate tsena ebe mona moo di tang ho hola mmoho ese ele sefate se le seng.

Difate tsa ditholwana tse rekwang hotswa dinuserng di sentse di graffitwe. Molimi aka iketsetsa ka bo yena difate

tša hae lapeng hoiketsetša phapang ho iphumantsa mofuta wa ditholwana oo a o hlokanq mohlomong leha ekaba ka mofuta e fapa – paneng ya ditholwana sefateng sele seng!

## Melemo ya GRAFTING

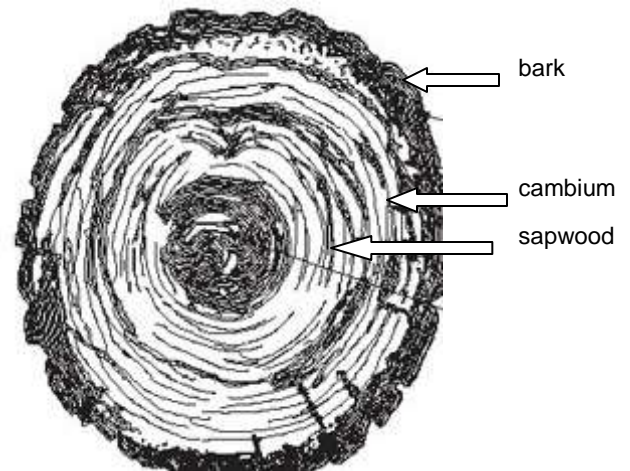
Emeng ya melemo ya GRAFTING ho molemi ya iketsetsang diteko eka tlisa:

- ❖ O ka itlhaahisetsa difate tse kang tša diapole tse pedi ka ho lema tse pedi tse tlang ho itswadisa ka bo tsona.
- ❖ O ka kgetha kutumothapo o tša ntsha sefate se boholo bo botle se tla ho thibela mafu le dikokwanyana le tse kotulehang haholo mme o se kopanye se etsang ditholwana kgahlisang tse monate tseo o dihlolang.
- ❖ O fumana ditholwana kapotlako kerolwana eka hodimo (scion) e kopanqwa ho semela (rootstock) ka methapo e metle e nontshitsweng. Ho hlalosa hore methapo etla khola ho fepa karolo eka hodimo (scion) hantle, ho bolelang hore o se o na le hlooho ya ho qala ya selemo kaofela.



## E etswa jwang grafting?

Hona le mofuta e mengata ya ho etsa grafting. Ntho ya bohlokwa ke hore mekqwa kaofela ke ho netefatsa hore bokehare ba kutu (cambium) le bokahodimo (scion) le kutumetso ditlangwa mmoho hantle hore di tle di hole mmoho. Bokahare (cambium) bo fumanwang ka hare ho (bark) letlao la kutu, ke yona e hlahisang kapa ho medisa kerolo ya kutu.



### Ho kgaolwa jwang

- ❖ Kgaola hotswa sefateng se setle se matlafetseng.
- ❖ Sebedisa thipa e motsu kapa lehare ho kgaola dikarolo tša kutu tse botenya ba pitiloto.
- ❖ Kgetha butu e nang le dinolo.
- ❖ Kgaola koka hodimo o be o sale ka sekoto se nang le dinoko tse 4 (4 buds)
- ❖ Kgala boka hodimo sekgutlong le boka fatshe pentong e tsepaneng e tsebe ho fapana.

*Mariha:*

Nka bokahodimo ba kutu (scion). Hopola, seng setswa sefateng sa ditholwana tseo o di batlang kapa tseo o di hlokanq tseo o batlang hore kutumothapo eo hlahisetse tsona. Ha o kepola bokahodimo ba hao, kgetha makela a tsepaneng le a nonneng. (Hopola, di tla etsa kutu ya sefate sa hao se

tsepameng.) Kgaola 23-25 cm (bolele bofetang bophara ba letsoho) sekoto se ka bang 4 cm ka tlasa senoko (bud). Netefatsa hore bophareng ka fatshe (moo okqaotseng) bolekanane le baphara ba kutumetso (1 cm). Kgaola thupa ka fatshe e seng thata ho hang. Kgaola dikarolwana tse itseng tsa bokahodimo ba kutu. Bo kopanye kapa botlame ka ho hong, o di thatele ka plastiking ebe o di beha moo ho phodileng ho bile hole lefifi.

### **Jwale o se o kanna wa kgaola (grafting)**

*Phato kapa lwetse*

1. Hang pele dinoko di hlaha maqalong a hlabula, kgaola bo ka hodimo metsokutung ho ema 15-30 cm (letsoho le le leng) kahodima mobu. Faola makala ohle a hlomang kutung. (Ha ho kgaotswe lekaleng le hlahang, kgaola ha nyenya morao.



2. Kgaola morao kutumetso moo bokantle bo loketsweng ho kgaolwa teng. Etsa ho kgaola o tshekabiditse.



3. Lokisa bokahodimo: kgaola hodimo ka hodima senoko hoba 4 dinoko floha kgada hotswa botsitsong ba bokahodimo o etse sekqutlo ho lekena le kamoo motsokutu ya hao e kgaotsweng ka teng.



4. Tshekalatsa moseo wa hao hodima motsokutu wa hao hotswa 1/3 tlasa sebaka se sekameng.



5. Seha ka botebo ba bokahodimo ho tloha 1/3 ho dima bokgalong babo bo sekameng.



6. Kenya moo a kgaotseng kaha kutumotso hore mmoho ditsebe ho kopana.



7. Tlama makopanong ka theipi. Tiipa bokahodimo ka setlotlo ebe owa ethatela theipi ya hao ka setlotso ha ho hloka haba.



8. Kamorao ho kqwedi tse pedi, ha dinoko se di hlaha kapa dibonahala, tlosa ntho eo o tla mmeng ka yona (tape). Kgaola motso kutu ofe kapa ofe o kahlahang – o ntse o flatsa hotswa senokong moo ho kgaotsweng tsohle tse hlahang hotswa mobung.

## 8. Tlhophiso la ditholwana le meroho

Ha ona le tamati, diperekisi, kapa ditholwana le meroho ka tshimong ya hao. Ke bottle ho tseba hore o diboloka jwang. Hore o disebedise pele di ka fellwa ke boleng (kapa di re boleng bo bottle). Ka ho ithuta ho diomisa, ho etsa jeme kapa o di tshole dibotlolong. O ka etsa bonnete ba hore matla ao o a sebedisitseng tshimong ya hao ha a senyehe. Haeba ona le jheseho ya ho etsa kuno hotswa tshimong ya hao, oka fumana ho hlophisa kotulo ya hao pele o ka etsa kuno e ngata ha o rekisa disa le (fresh) kapa disale maamong a matle.

### Bohlweki dijong

Ho bo hlokwa ho tshwara dijo ka bohlweki nakong ya ho lokisa dijo, ho thibela peo tsa mahloko hlwekisa matsoho a hao pele o tshwara dijo, ha o tswa ntlwaneng, ha o hleka ka (kitjihning) ka kamoreng ya ho phehelwa (ha holo nama). Etsa bonnete ba hore tlapa la ho sehela, dithipa, mabekere, dijana di hlwekisitse ka makgethe. Etsa bonnete ba hore metsi ao o wa sebedisang ho hlatswa disebediswa tsa ka kitjhining le diperekisi kapa meroho a hlwekile. Haeba a sa hlweka hantle a bedise metsotso e leshome o tshole (Jik) (1 : 50 mixture).



### Komiso ya ditholwana le meroho

- Meroho e meng e batla ho fubetswa pele e omiswa ho bolelwa hore ditshelwa ka metsing a belang nakwana e itseng.
- Komiso e batla maemo a futhumetseng, maemo a ommeng a nang le moyanyana o fokang.
- Komiso e nka nako e telele e kaba hora tse tshelletseng (6) hoya matsatsing a mahlano (5 days) komiso e etswa ke mongobo o merohong kapa ditholwaneng le mokgwa wa ho omisa o sebediswang ho omisa.
- Kamehla sebedisa meroho kapa ditholwana tse satswa kguwa ho etsa bonnete ba ho hlahisa mangangajane a boleng bo hodimo.

### Mekgwa ya komiso

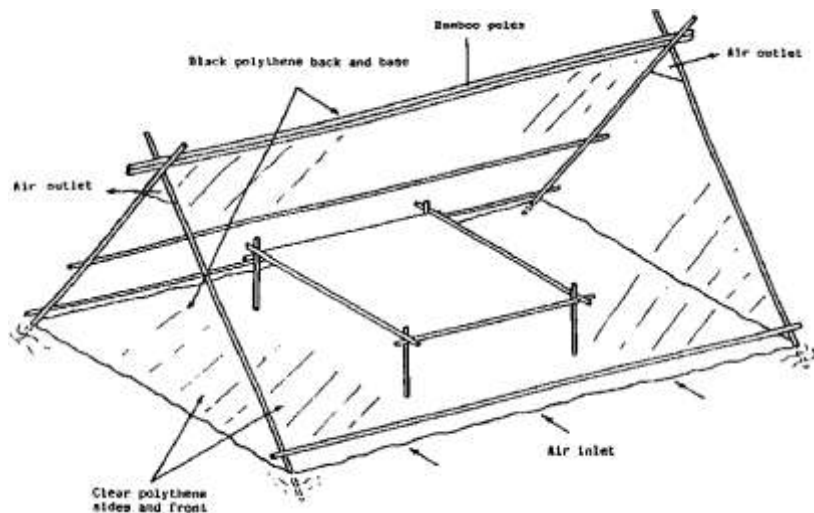
Komiso ka letsatsi: Dihlahiswa di bewa hodima raka e kwahetsweng ka sefe. Ho thibela dikokonyana le lerole, o behe mo letsatsi le jhabetseng.

Komisi e ka nka matsatsi a 3-5.



Dimpe tsa komiso	Melemo ya komiso
Dihlahiswa di lokela ho tloswa ha maemo a lehodimo a le mabe (moya kapa pula ena). Ha dihlahiswa di sa tshireletswe, di ka ba ditshila tse tshabehang.	Komiso ya di raka e bonolo hape hae batle tjhelete e ngata.

Ho omisa ka tente: Dihlahiswa di bewa ka hara moralo wa dithupa mme e kwahetswe ka plasitiki. Mme e bewe moo letsatsi le tjhabelang teng. Komiso e kaba matsatsi a 3-5.



Dimpe tsa ho omisa ka tente	Melemo ya tente
E batla basebetsi le dipalo ho etsa tente.	E tshireletsa dihlahiswa puleng le moyeng.

Ho omisa ka onto: Dihlahiswa di kenywa ka ontong ho dima di raka mme di hadikwe ka motjheso wa 140°C.

Nako ya komiso: dihora tse 8 kapa ho feta.

Dimpe tsa komiso ya onto	Melemo ya komiso ka onto
E tura haholo. E loketse ho etsa diteko.	E omisa ka pelenyana.

## Ho omisa

### Tlhwekiso

- Sebedisa tse boleng bo hodimo, tse butsuweng.
- Tlhwekisa di sebediswa tsohle le moo ho sejeletswang. Sebedisa dihlwekisa le metsi. (20L metsi + 400ml Jik)
- Sebedisa dihlwekise tsatsi le leng le le leng
- **O se kgephole lefallo la dihlahiswa ka nako eo o omisang!!**
- Beha dihlahiswa ka hara sejana se hlwekileng ka mora ho hlatsuwa.



*Kebolo*

- Ho se ebolwe sebakeng sa moo ho ntseng ho hlatsuwa dihlahiswa tse tala.
- Ebola ka hloko o flose letlalo le ka hodimo feela.
- Beha makgapetla moo ho loketseng kapele.

*Ho seha le ho kgabela*

- Mofuta wa dihlahiswa o hlalosa botenya bo lekaneng ba bokuabelwa.
- Karolo e tenya enka nako e telele ho oma (slices)
- Karolo (slices) se se sesane se manama borotong e omisang.
- Ha o ikemiseditse ho rekisa etsa bonnete ba hore dihlaiswa tsohle di a lekana ka botenya.

**Ho fubetsa ho etsang?**

- Ho thusa hore mmala wa sehlaiswa se dule se le jwalo.
- Ho kgutsufatsa nako ya komiso.
- Thibela ho fetola tatso.
- Ho thusa hore di dule dile mongobo.

*Fubetsa (Ho bohlokwa ho meroho le ditholwana)*

- Bedisa metsi a lekaneng se hlahiswa.
- Tshela sehlahiswa se kgabetsweng ka hara sefe e fubetsang.
- Di kenye ka metsing a belang.
- Dintshe ka matsing a belang.

*Ho aneha ho dima lepane la ho aneha*

- Lepane le lokelina ho hlakolwa le ho hlatswuwa hantle pele.
- Ha o ntse o kgabela, di hlahiswa di bewa di atamelang, empa di se hatane hodimo.
- Lepane le bewa moo ho leng level moo ho senang moya kapa moo letsatsi le tjhabetseng kapa moriting.

*Komiso*

- Haeba ho le phofudi ka moo o omisang ka teng bula monyako hanyane.
- Ha ho hlokeha kenya lepane kamoo le satlo wela ke phoka.

*Poloko ka ho beha*

- Ka ditshelong di behe ka makgethe, o qobe mongobo.
- Dithshele ka makgethe ho qoba, tshilafatso.
- Ho bewa holoketswe ho etswa hang kamora komiso.
- Dula o lekola dihlahiswa letsatsi le leng le le leng matsatsing a pele a 7 flosa tse senyehileng le tse nang le hlobo.
- Di tshela ka hara di khemfuruti, mabokoseng mabekereng a kwetsweng ka thata kapa ka di polasitiking tsa mekotlana.
- Boloka ka ditshelong tse nyane ho thibela tahlehelo e kgolo ka baka la hlobo.

- Boloka mofuta ole mong ka setshelong.
- Dikgalase tsa ditshelo di loketswe ho bolokwa moo ho leng lefifi.
- Ditshelo di lokela ho bewa letsatsi leo di bolokilweng ka lona.
- Di boloke moo ho phodileng, ho ommeng le moo ho hlwekileng.
- Di hlahiswa dika bewa selemo hoisa ho tse pedi (1-2 dilemo).

Di hlahiswa tse boleng bo hodimo di tla omiswa hantle di sena hlobo. Di lokela ho ba le mmala o motle, empa hoba swotho ke tlwaelo. Di la tsweha jwalo ka tse ntjha. Di jalo tse omisitsweng di lokela ho oma.

#### Ho omisa mahaba a mokopu:

Kgetha a matjha, a bonejwana.  
A ebole makgapetla a hlabang.  
A hlatswe ka metsi a hlwekileng.  
A habe le metsotso e 3 ho isa 5 metsotso.  
Beha paneng o loketswe ho omiswa.  
Teko ya hore o oomme: o robeha ha bonolo hao o fupara.



#### Diwete ho diomisa:

Kgetha diwete tse ntle tse bonolo tse senang diithupa.  
Di habole ho fihla di butswa empa ese dibe phere.  
Tlosa makgasi le mehatla (methapo)  
Di kgaole ka di reng (2-3 mm) kapa ka bolelele.  
Di behe lepaneng hore di ome.  
Teko ya ho oma: dikobe di lokela hoba thata empa di tla kobeha.



# Souse, dijo tse dibotlolong, le jeme



## Kgetho le tokisetso

- Kgetho dihlahiswa tse ntle tsa boleng bo hodimo.
- Se sebedise tse nang le hlobo kapa tse nang le mahloko. Motjheso oka bolaya boteng ba kato ya dikokwana, empa eke se flose tatso e ka bakwang ke hlobo.

## Tihwekiso

- Di hlatswe hantle (le haeba oka flosa letlalo) ho flosa lepole, ditshila le hlobo.
- Hlatswa tse lekaneng metsing a mathang a bile a bata.

## Kgetho ya dibotlolo

- Botlolo ha e ya tlameha hobal e ho petsoha.
- Dikwahelo tsa masenke di se kobehe kafa tse kobehileng tse senang rusi mme di kwale hantle.
- Hlatswa dibotlolo ka sesepa hape o di hlatswe ka metsi a hlwekileng.

## Ho bolaya mahloko

- Beha botlolo ka hara pane e tshetswe metsi.
- A bedise metsotso e 15.
- Sebedisa tang ya dibotlolo ho ntsha botlolo o tsholle metsi ka hara botlolo.
- Dikgaba le dikwaelana le tsona di lokela ho bediswa metsing.

## Ho tshela dibotlolo

- Ho tshela ha dijo di sa tjhesa ( $\pm 80-85^{\circ}\text{C}$ ).
- Se di tlatse ha holo siya 1-2 cm.
- Ntsha moya ka thipa dipakeng tsa dijo.
- Hlakola molomo wa botlolo ka pampiri e mongobo.
- Kwala botlolo hantle feela.

## Ho futhumatsa di botlolo

- Ho etsa bonnete ba nako e telele kenya di botlolo ka metsing a futhumetseng metsotso e 10-15.
- Sebedisa pane e fetang dibotlolo ka 5 cm. O e tlatse metsi a futhumetseng o ka tshela metsi hape nakong e o bolayang mahloko.
- Futhumetsa metsi ka  $82^{\circ}\text{C}$ . Kenya dibotlolo ka metsing di kwahelwe ke metsi. Bedisa metsi ao metsotso e 10-15. Hlokomela hang ha metsi a bela.
- **Ho bohlokwa ho siya 20mm sebaka ka hodimo ha o tshela dibotlolo ho thibela kopano le metsi ha ho bolawa mahloko.**

*Phodiso ya dibotlolo*

- Ntsha dibotlolo ka metsing di behe rakeng. Dihlakole ka lesela kapa koranta di arohanse ka 3 cm.
- Difodise ka tekanyo ya motjheso wa ntlo 12-24 hora.
- Hlokomela hore dikwaglana di kwetse hantle.

*Mekgwa ya ho kwaholla dibotlolo*

- Ha dikwaelo di sa kwale hantle. Sheba ho petsoha. E tjhentjhe ha ho hlokeha. Phejha o hlatswe ka metsi a futhumetseng di horeng tse 24.

*Ditshwaye o dibehe*

- Ditshwaye ka lebitso le letsatsi, kgedi le selemo.
- Dibehe moo ho hlwekileng, ho phodileng ho leng lefifi (kapa lerotho).

*Kgetha le ho hlokomela botlolo tse sa lokang*

- **Seke wa latswa dijo tseo odi belaelang.**
- Sheba dijo tse omisitsweng mahlakoreng a botlolo, dibudulwana tse phahamang ka botlolong kapa ho fetoha ha mmala.
- Arohanya ho thetsana ha ditshelo le dijo.
- Ha kopana hwa dijo le setshelo.

**The following should be blanched before bottling:**

- All greens should be blanched about 5 minutes to reduce the bulk.
- In order to prevent loss of the milk, maize should be blanched on the cob until it is firm to the touch and until the milk does not ooze out when it is pricked with a fork.
- Beets, carrots and parsnips should be blanched until the skins will slip off easily.

# Mekgwa ya ho pheha

## Jeme ya tamati (Tomato Relish)

1 eeye  
 800 g tamatie kgabetsweng  
 1 granny smith apple: cored and chopped  
 250 ml asane  
 160 g sultanas  
 83 ml fresh orange juice  
 ¼ teaspoon mixed spices  
 1 whole clove  
 ¼ teaspoon chilli powder

Beha tsohle ka paneng le leholo.

Di bidise.

Fokotsa mollo o bidisetse fatshe hora (1 hour). Fuduwa kgafetsa. Tlose mollong. Bolaya mahloko botlolong metsotso e 15. Tshela dijo disa tjhesa ka botlolong e bolailweng mahloko, o e kwale.

## Tomato Chutney

1 kg tomatoes  
 500 ml vinegar  
 12.5 ml mustard powder  
 2 ml red pepper  
 ½ clove garlic  
 300 ml brown sugar  
 12.5 ml ginger  
 125 ml sultanas  
 2 onions

Tshela tamati ka metsing a belang mme o e ebole. E kgabele. Tshela disebediswa ka lepaneng mme o bedise butle, fuduha kgafetsa ka kgaba ya thupa, hofilhela e ba beholo e be borethe. Tshela ka hara botlolo e hlwekileng.

**Piccalilli Relish**

2,75 kg prepared vegetables (Enough vegetables to fit into one big pot. You can use cucumber or cabbage, marrow or carrots, small onions, cauliflower, beans)

3 pints (6 cups) white vinegar

6 teaspoons dry mustard powder

2 teaspoons ginger

250 g sugar (1 cup)

37.5 g plain flour (1/3 cup)

4 teaspoons turmeric

Brine (Very salty water. To make add approx. ½ cup salt to 1.5 litres of cold water)

Hlwekisa le ho hlophisa dijalo (ebola, kgabela 2 cm dinoke kgabela eeye, roba cauliflower). Inela meroho ka metsing a letswai.

Kopanya asene le mustard le ginger tshela tswerere futhumatsa butle ho fihlela tsekwere e qhibidiha. Tsokotsa o ditlhotle hantle (meroho) di tshela ka pitseng o ntano tshela asene e tjhesang. Pheha metsotso e 20. Butle butle. (Ka mollo o fatshe). Ekga meroho ka kgaba e masoba o di tshela ka ditshelong. O se tshela ho feta tekano.

Kopanya flouru le turmeric ho etsa paste e bonojwana o sebedisa asene e lekaneng. Fuduwa tsena ka hara motswako o tjhesang. Bedisa metsotso e mmedi jwale tshela hodima meroho o ntano kwala.

**Curry Cabbage Atjar**

2 cabbages

4 onions

500 g white sugar

30 ml corn starch (or flour)

15 ml curry powder

15 ml mustard powder

7 ml salt

625 ml white vinegar

Kgabela khabetje hasesane. Ebola eeye oe kgabele. Pheha cabbage le onion ka hara metsi a manyane ho fihlela eba bonolo. Ntsha metsi hantle.

Kopanya sugar, corn starch, curry powder, mustard powder le letswai.

Tshela tsohle ka asene e lekaneng.

Tshela asene, mme o e bedise. Phehe nako e etsang metsotso e 5.

Tshela khabeche e phehe hofihla e butswa hantle. E tshela ditshelong e sa tjhesa mme o e kwale hantle.

# *Resource Material for Homestead Food Gardeners*

## Chapter 5: Handouts (seSotho)

- |           |   |
|-----------|---|
| Handout 1 | Pokello le tšebeliso ea metsi (Saving and using water)                      |
| Handout 2 | Mekhoa ea ho noesetsa liratsoana malapeng (Homestead irrigation techniques) |
| Handout 3 | Ho nwesatsa serapa hakae le neng (How Much, How Often to Water)             |
| Handout 4 | Tokiso le polokeho ya tanka   |





# 1. Pokello le tšebeliso ea metsi



Ho bohlokoa hore ha pula e na u bokelle metsi ao u tla a sebelisa nakong ea komello. Hona ho tla u thusa hore u be le metsi ao u ka a sebelisang nako e telele.

Pokello ea metsi e ka etsoa ka mekhoe e mengata:

- ❖ Ka ho a khakeletsa
- ❖ Ka ho a sebelisa ka hloko
- ❖ Ka ho a bokella ho tsoa liphuleng kapa marulelong

## Ho khakeletsa metsi

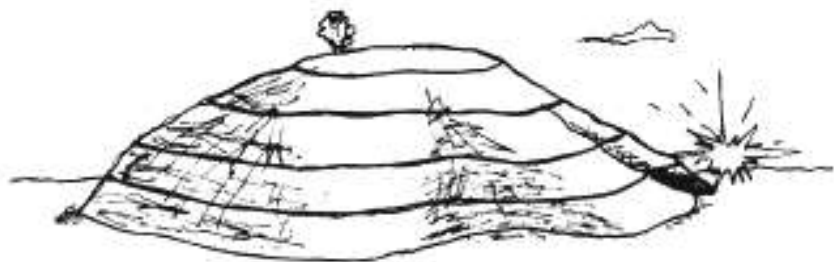
Sepheo sa mantlha ke ho:

- ❖ Hasa mosuoela mobung. U ka ikh'opotsa ka ho bala lihloho tse latelang; 'Ntlafatso ea mobu' le 'Ho haha lirapa'.
- ❖ Koahela mobu ka joang kapa moiteli le tse ling. U ka fumana lintlha ka botlalo tlas'a sehloho sena 'Ho koahela mobu hore o se lahleheloe ke mongobo'.

- ❖ Sireletsa mobu ka ho lema lifate, cheche kapa joang.
- ❖ Sireletsa lirapa ka makhoakhoa. Ikh'opotse ka ho bala sehloho sena 'Tšireletso ea lijalo moeeng le serameng'.
- ❖ Haha lirapa ho tšekalla le motheo e le hore metsi a monyele ka mobung a se ke a phalla.
- ❖ Haha limotomoto ho laola sekhahla sa metsi le ho a bokella.
- ❖ Haha limotomoto tse bitsoang 'swales'. Mofuta ona o hlalositsoe karolong tse hlahlamang tlas'a sehloho sena.

## Limotomoto

Hona ke limotomoto tse bonahalang masimong a mothipolohong. Li hahoa ho latela matšoao a entsoeng a kolokile ho khoahanya mothipoloho. Matšoao ana kaofela a bapile.



Limotomoto tse sebakeng se mothipolohong. Sebaka se lipakeng tsa tsona se batelehile

## Mokhoa oa ho etsa matšoao

U ka sebelisa 'A- frame' ho etsa matšoao a bapileng sebakeng se mothipolohong. 'A-frame' ke kosene e sebopeho sa tlhaku 'A'.



## Mokhoa oa ho etsa kosene:

- 1 Nka lipalo tse peli tsa bolelele bo lekanang. Li fase 'moho lehlakoreng le leng ka terata kapa khoele.

## Tse hlokahalang:

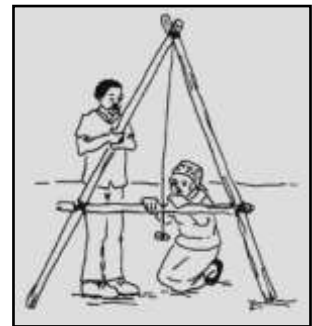
Lipalo tse peli. E le 'ngoe e be bolelele ba likharafu tse tharo.  
Ea boraro e bolelele ba kharafu tse peli.  
Khoele le terata.  
Lejoe le lenyane.



- 2 Faseletsa palo ea boraro ho tseo tse peli feela li takalalitse. O efase bophahamo ba bolelele ba kharafu ho tloha fatše.



- 3 Fasa khoele lehlakoreng le kaholimo la kosene. Ntlheng engoe ea khoele u faseletsa lejoe. Phahamisa kosene, e tšehetse hore e eme e otlolohile holim'a sebaka se batelehileng hantle. Khoele le lejoe li lokela ho leketlela fatše. Etsa letšoao palong e tlamelletsoeng ho tse peli tse telele (maoto) moo khoele e thetsang teng. TEBELLO KE HORE LETŠOAO LE TLABA BOHARENG BA EONA PALO EO.



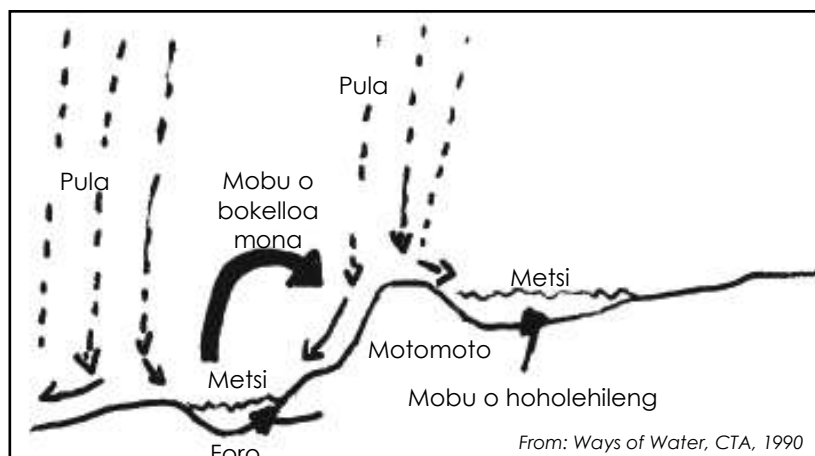
#### Tšebeliso ea kosene:

- 4 Fumana sebaka se batelehileng ka thoko ho sebaka seo u batlang ho haha limotomoto ho sona. Tšoa ea libaka tse peli ka thupa tse peli. Tsamaisa leoto le letšehali la kosene ha le letona le ntse le hatile fatše. Etsa joalo ho fihlela khoele e leketlileng e thetsa letšoao le palong e kopantseng maoto a kosene. Latela mokhoa ona ho etsa matšoao ao u a batlang.



From: Farmer-to-Farmer Handbook, FSG, 1996

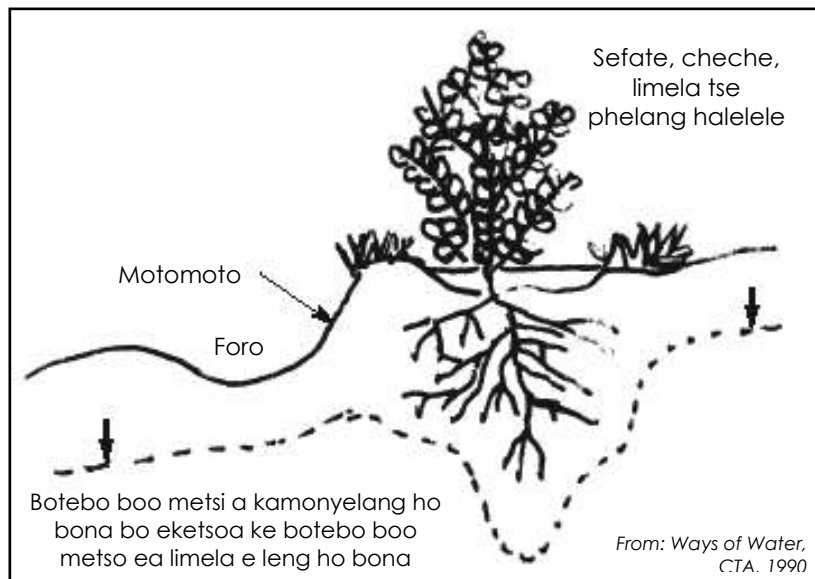
Cheka foro ea botebo ba lisenthimithara tse mashome a mararo le bophara bo lekanang sebakeng seo u se tšoaileng. Bokella mobu lehlakoreng le kaholimo ho foro ho etsa motomoto ka ona. Metsi a pula a tla bokellana ka forong 'moho le lehlakoreng le ka



From: Ways of Water, CTA, 1990

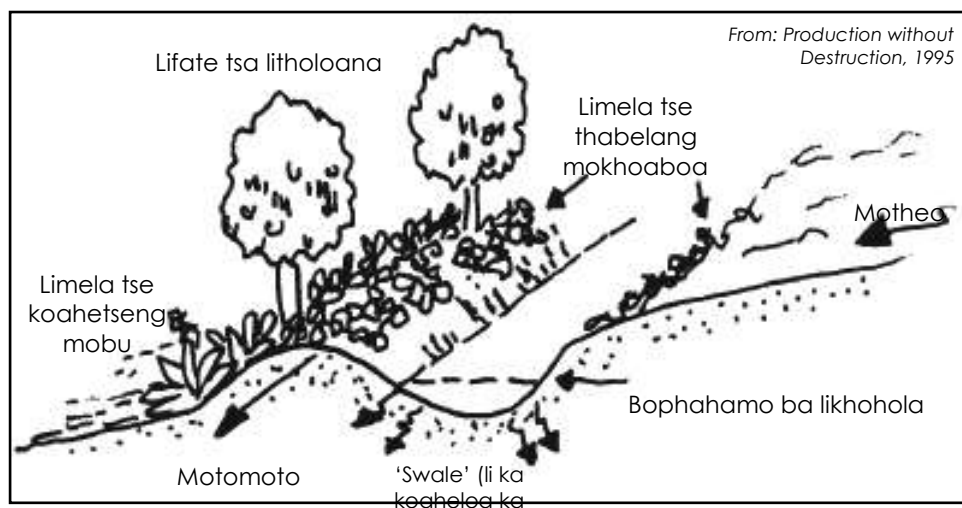
moepeng la motomoto. Metsi a tla monyela ho fapana le ho phalla. Ha mobu o hohotsoeng ke metsi o bokellana lehlakoreng le kaholimo la motomoto sebaka seno se tla qetella se batelehile. Leha ho le joalo hona ho tla etsahala ka mor'a matsatsi a mangata.

Jala mefuta ea limela e sa shoeng mariha holim'a motomoto. Li tšoara mobu ka metso ea tsona le ho o koahela ka holimo. Limotomoto li boloka metsi bakeng la lifate 'moho le licheche. U ka boela ua hloma lifate tsa litholoana le litlama-tlama tsa li matlafatsi. Bakeng la khetho ea mefuta e meng ea limela eo u ka e jalang motomotong u ka bala sehloho sena 'Tsireletso ea lijalo moeeng le serameng'. Ha mobu u tlala ka forong u lokela ho u ntša.



### Limotomoto tse bitsoang 'Swales'

Ke mofuta oa motomoto o sa tšoaneng le mofuta o hlalositsoeng pele ka hore ho oona mobu o bokelloa

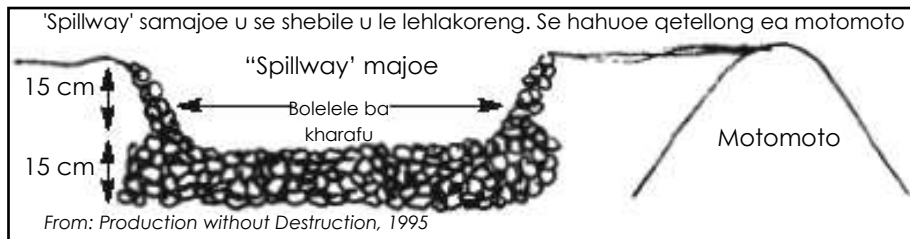


lehlakoreng le ka tlase ho foro. Mofuta ona o na le makhabane a hore o bokella metsi a mangata ho feta a bokelloang ke mofuta oa pele, ka hona mobu o ba le mongobo o mongata.

Mofuta ona ha o qetelle ka sebaka sa batelehileng ka lebaka la mobu o hohotsoeng ke liphororo joalo ka mofuta oa pele. U ka jala limela tse thabelang moo ho leng mokhoabo 'me li sa shoe kapele. Ha mobu o bokelleha u lokela ho

Mefuta e 'meli ea limotomoto e hlalositsoeng kaholimo e lokela ho ba bophahamo bo ke keng ba lumella metsi ho phalla kaholimo. Ho qoba boemo bona u lokela ho hahla 'spillway' ka majoe hore ha metsi a le mangata a tšolohe le hona teng a nto phallela tlase ho mothipoloho

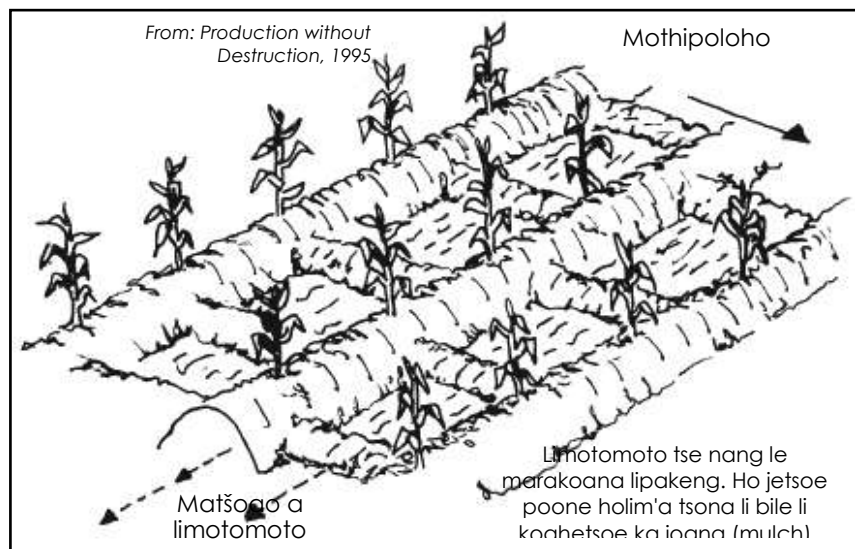
u ntša.



## Limotomoto tse nang le marakoana lipakeng

Marakoana a hahoa lipakeng tsa limotomoto. Marakoana a laola phallo ea metsi haholo nakong ea lipula tsa litloebelele. A boetse a matlafatsa ho monyele hoa metsi ka mobung. Marakoana a ba bophahamo ba halofo ea bophahamo ba motomoto.

Marakoana a hahuoeng ha ho kenakenano le ona. Bonyane u ka mpa ua haha marakoana a mang kapa oa bokella makote holim'a marakoana a seng a ntse a le teng.

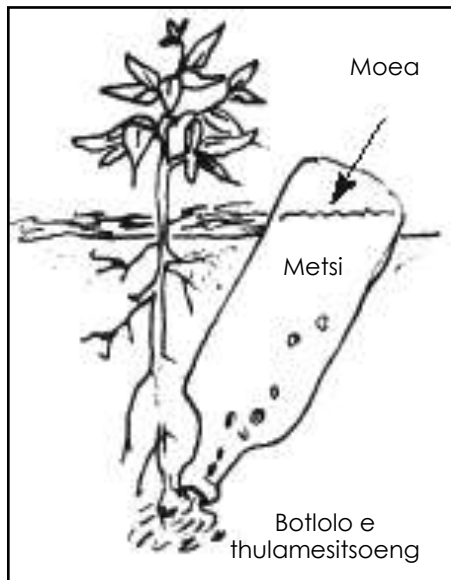


## Tšebeliso ea metsi ka hloko

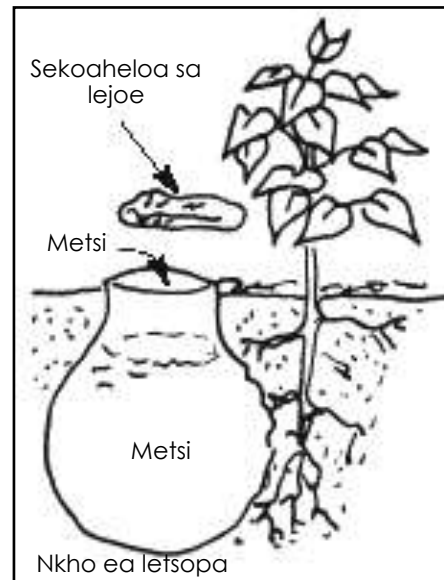
Karolo ena e hlalosa mekhoe ea ho phetaka tšebeliso ea metsi bakeng la serapeng.

- ❖ **Greywater:** Ke metsi ao uena le ba lelapa la hau le a sebelisitseng bakeng la ho ithatsoa 'moho le ho hlatsoa. U ka sebelisa metsi a joalo bakeng la ho tšella.
- ❖ **Drip irrigation:** Ke mokhoa oa ho tšella metso ea lijalo ka kotloloho. Mokhoa ona o nepahetse tšebelisong ea metsi ka hloko.

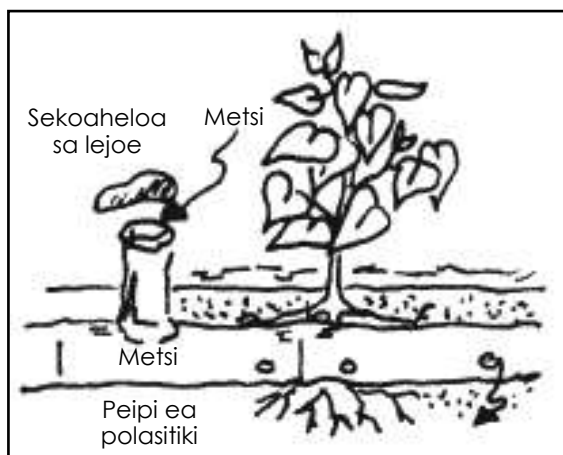
## Mekhoa ea ho tšella e fokotsang tšenyho ea metsi



From: Production without Destruction, 1995



From: Production without Destruction, 1995



U ka sebelisa peipi e nang le masoba e paqamisitsoeng ka tlas'a mobu.

U ka tšella metsi ka kotloloho ka peipeng kapa ua e hokela sekotloloaneng se hlatsoetsang (sink). U ka sebelisa metsi a seng a sebelisitsoe ka mokhoa ona. Hlokomela hore ho se ke hoa e ba le lintho tse kibang masoba ka har'a peipi.

Ha mobu u le lehlabathe haholo u ka ala lipolasitiki ka tlase nakong eo u hahang seratsoana e le hore li thibele metsi ho monyela tlaase haholo.

Peipi e nang le lesoba e qhalla metsi lijalong. tseo e bang li rata metsi haholo li lokela ho jaloa pel'a leboata

From: Introduction to Permaculture

### Mokhoa oa bobele 2:

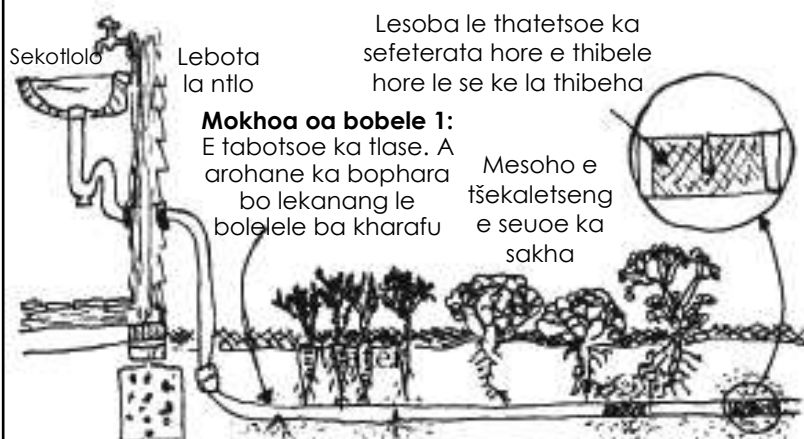
E tabotsoe ka holimo. A arohane ka bophara bo lekanang le bolelele ba kharafu

Lesoba le thatetsoe ka sefeterata hore e thibele hore le se ke la thibeha

### Mokhoa oa bobele 1:

E tabotsoe ka tlase. A arohane ka bophara bo lekanang le bolelele ba kharafu

Mesoho e tšekaletseng e seuoe ka sakha

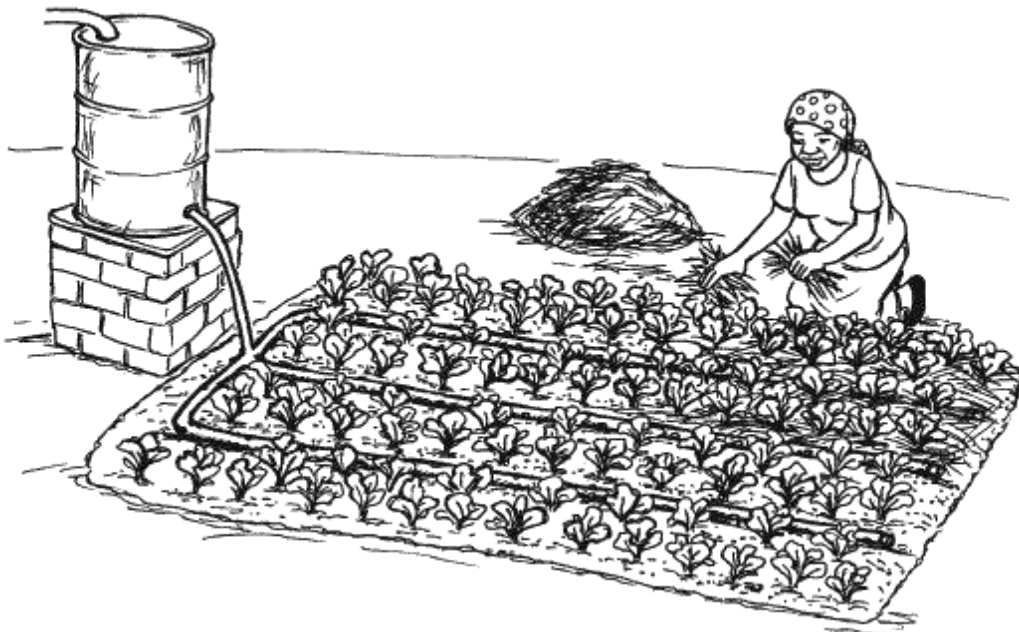


Tlhokomeliso: U se ke ua sebelisa mokhoa ona mobung o letsopa le lengata

Mofuta oa bobeli oa 'drip irrigation' o bontšitsoe ka mor'a mona. Ha u sebelisa mokhoa ona u sebelisa lipeipi tse maloa. U phunya masoba. Kaofela ha tsona li ba kaholim'a mobu oa lirapa tsa hau. Lipeipi 'moho le mobu li koaheloa ka joang.

Lipeipi li hokelloa ho e le 'ngoe e hokeletsoeng mohloling oa metsi. Mahlakore a ka qetellong a lipeipi tsena a koetsoe hore metsi a se ke a tsoa. Masoba a phuntsoeng holim'a e 'ngoe le e 'ngoe a arohana ka lesenthimithara tse mashome a mabeli ho isa mashomeng a mabeli le metso e mehlano. Haele sebaka seo metsi a phallang ho tloha ho sona se lokela ho ba bophahamo ba bolelele ba kharafu kaholimo ho serapa sa hau.

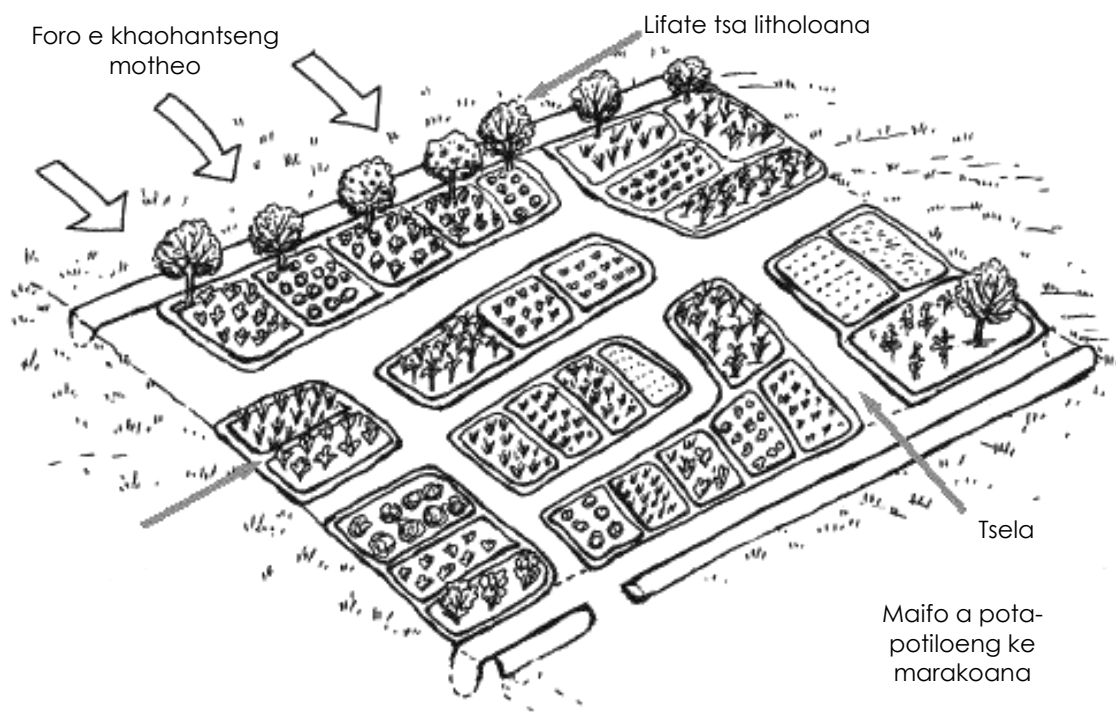
Makhabane a mofuta ona ke hore u ka sebelisa halofo ea metsi ao u ka a sebelisang ha u tšella ka mokhoa o tloaelehileng oa ho sebelisa shetiri.



Mokhoa o mong oa tšebeliso ea metsi ka hloko ntle ho lipeipi le tanka ke ona:

- ❖ Foro e chekoa ho khakeletsa metsi a phallang mothipolohong
- ❖ Lehlakoreng le ka tlase ho foro u etse liratsoana tse lengoeng botebo ba mohato o le mong (bolelele ba kharafu). Phetolella mosuoela le moiteli. Li tla ntlafatsa mokhoa oa ho monya metsi le ho boloka mongobo nako e telele.

- ❖ U ka haha marakoana lipakeng tsa liratsoana. U ka ala majoe a manyane ho sireletsa mobu hore o se ke ua hoholeha.
- ❖ Metsi a ka khelosa ho tloha forong e chekueing hore a phalle lipakeng tsa liratsoana. U ka a khelosa hore a phalle ka har'a litsela tse lipakeng tsa liratsoana.
- ❖ Lema lifate tsa litholoana lehlakoreng le ka tlase ho foro hore li sebelise karolo e 'ngoe ea metsi.

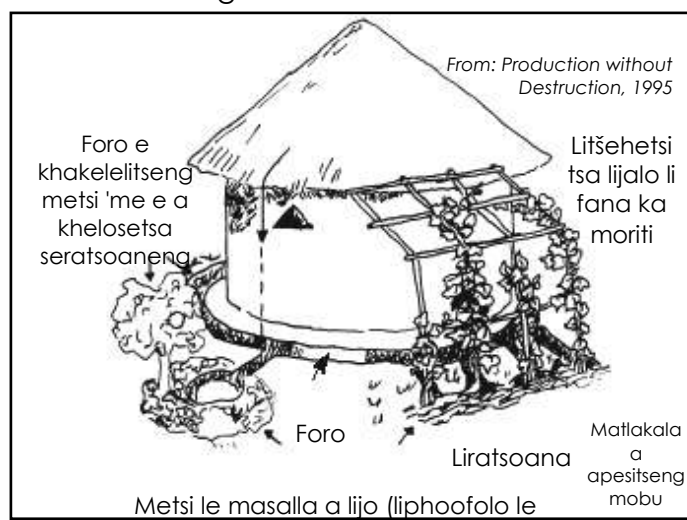


## Pokello ea metsi a phallang liphuleng kapa marulelong

### ❖ Metsi a tsoangmarulelong

Marulelo a ntlo ke sebaka seo u ka khakeletsang metsi ho tsoa ho sona.

- Ho bohlokoa ho etsa foronyana ho potoloha le ntlo hore e khakeletse metsi a theohang marulelong. Metsi ano a ka khelosetsoa seratsoaneng se haueng



Metsi le masalla a lijo (liphoofole le

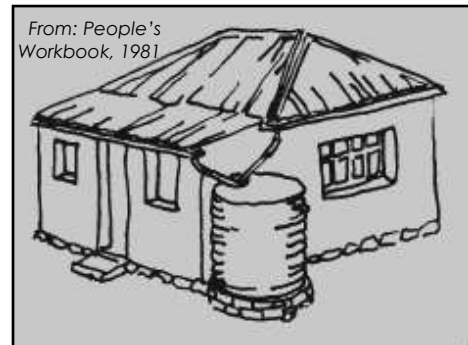


ka sebopeho sa tlhako ea pere. U ka bala sehloho sena 'Ho haha lirapa' bakeng la tlhaloso ea mokhoa oa ho haha seratsoana se joalo.

- U ka sebelisa likhakeletsi tsa metsi (gutters) tse hokelloang marulelong. U ka sebelisa likhakeletsi ho bokella metsi ka tankeng e kholohali. Ho bobebe ho khakeletsa metsi ho tsoa marulelong a masenke le lithaele. U ka sebelisa metsi a joalo ka kechineng.

U ka sebelisa mofuta o mong oa tanka bakeng la ho bokella metsi a ho tšella lirapeng nakong ea komello. Leha ho le joalo metsi ano a ka 'na a ba le litšila.

U ka ikhahela tanka e ka bolokang metsi a bongata bo lekaneng ho sebelisoa nakong ea komello.



Metsi a khelosetsoa ka tankeng

## **Mokhoa oa ho haha tanka ea samente (ferrocement)**

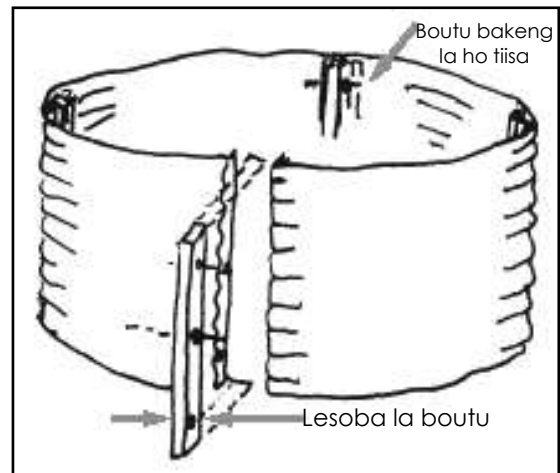
### **Boholo ba tanka:**

Lilithara tse likete li leshome

### **Tse hlokaahalang:**

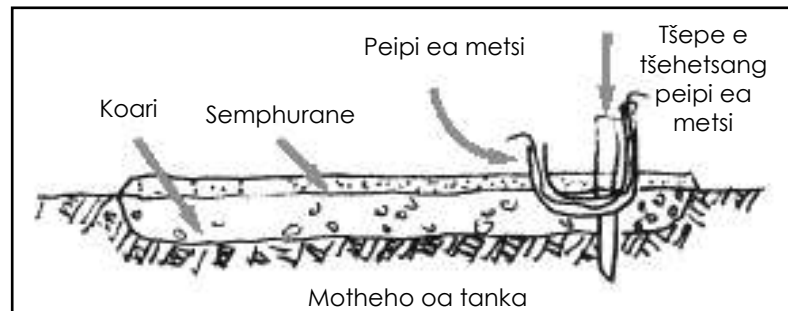
- Samente - 600kg
- Lehlabathe - 1 000 kg
- Koari - 500 kg
- Terata e senang metsu (botenya e be 2.5 mm; bolelele e be 200 m)
- Sefeterata (boholo ba masoba e be 50 mm; botenya ba eona e be 1 mm; bolelele e be 16 m; bophara e be 1 m)
- Peipi ea tšepe (botenya e be 20 mm; bolelele e be 1 m)
- Pompo (mofuta o bitsoang 'No1')
- Peipi e qhalang metsi (ea tšepe: botenya e be 8 cm; ea polasitiki: botenya e be 20 cm)
- Masenke (mofuta o rulelang) le 'angle iron' bakeng la ho koahela.

**Foromo:** U hloka foromo e tiileng e tla u thusa ho hahla tanka ea samente. Mofuta oa foromo oo u ka u sebelisang ka bobebe le ka katleho ke o entsoeng ka mofuta oa masenke a rulelang matlo. U ka sebelisa masenke a leshome le metso e tšeletseng. Bolelele ba le le leng e be likharafu tse peli. U tla hloka 'steel angle iron' (40 mm x 40 mm x 5 mm) bakeng la ho hokella masenke 'moho. Masenke a fasa ka liboutu tšepeng ho etsa sebopeho se chelikoe. Lipakeng tsa masenke ho ba le tšepe (wedge) eo holeng bobebe ho e hula ha u se u hahile tanka. Ketso ena e bebofatsa hore u arole foromo.



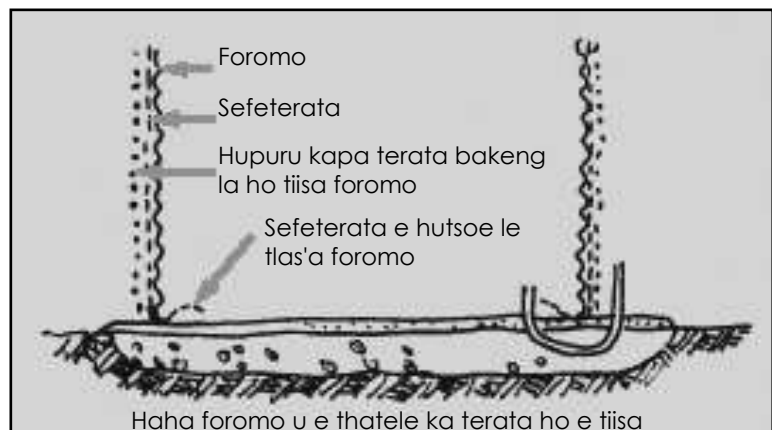
Foromo bakeng la ho hahla tanka ea samente

**Bofatse:** Cheka sekoti se chelikoe sa botebo ba likharafu tse peli le metso e 'meli. Tšela lehlabathe 'moho le koari ka ho lekana. Li etse morumo oa lisenthimithara tse leshome. Beha peipi e bolelele ba kharafo e kobehileng ka mokhoa oa hore karolo e



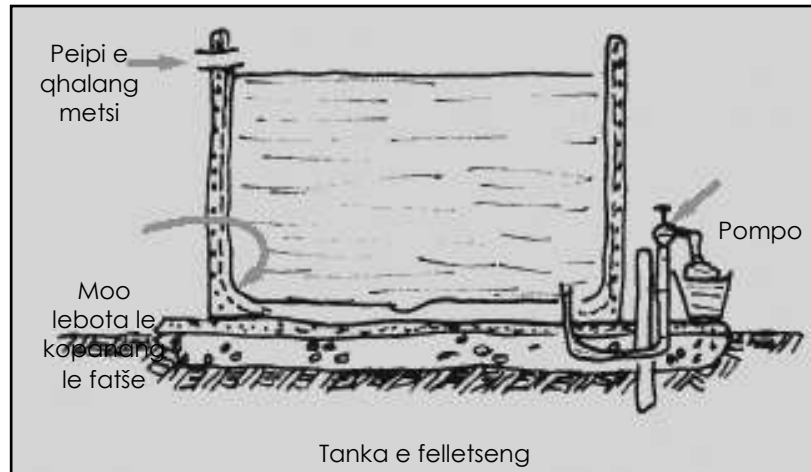
hlaleletseng kantle e be bophamo ba lisenthimithara tse leshome ho tloha moo bofatse ba tanka boleng teng. Tšela motsoako oa litekanyetso tse latelang; karolo tse peli tsa lehlabathe, e le 'ngoe ea samente le tse 'ne tsa koari. Morumo oa motsoako e be lisenthimithara tse supileng le halofo holim'a lehlabathe le koari.

**Mabota:** U faseletsa thepa eohle ho bopa foromo e be u e beha holim'a motheho o tiileng hantle. Potisa sefeterata kantle ho foromo. E faseletse hore e tie. Potetsa karolo ea sefeterata tlas'a foromo e le hore u tle u e lilelle nakong eo u tšelang fatše kahar'a tanka. Potisa terata ka holimo ho sefeterata. Terata ka 'ngoe e lokela hoba kahar'a liforo tsa masenke ao u entseng foromo ka ona.



Etsa motsoako oa lehlabathe le samente ka litekanyetso tsa likaralo tse tharo tsa lehlabathe ho e le 'ngoe ea samente (3:1). Sebelisa metsi ho etsa motsoako oo u tla lila ka ona. U khothaletsoa ho etsa motsoako oa bongata boo u tla atleha ho bo sebelisa bo be bo fele ka nako ea hora. Lila bokantle ba foromo u etsa morumo oa motsoako oa senthimithara e le 'ngoe. Qala ho lila ho tloha tlase ho foromo u ee holimo. Ha karolo ea pele e omme u lokela ho fafatsa metsi ka borashe e be u boela u lila u etsa morumo o lekanang le oa pele. Kaha u lila bokantle ba tanka ha ho boima, u ka qeta kapele.

Tlosa foromo letsatsi le hlahlamang. Kaha bokahare ba tanka bo tla be bo nomorehile ke liforo tsa masenke a foromo, le literata li hlaheletse u lokela ho lila joalo ka ha u entse



kantle. U qale ka ho etsa morumo oa pele. Ha o omme u etse oa bobeli. Le ona ha o omme u eketse oa boraro. U khothaletsoa ho phethela ho lila morumo ka mong ka letsatsi. Ho seng joalo u lile u etsa lebanta ho pota tanka e le hore nakong eo u tsoelang pele ho tle ho be bobebe ho kopanya likarolo tseo. Hona ho tla fokotsa monyetla oa ho peperana hoa tanka. Ha u phethela tšela motsoako fatše oa morumo oa lisenthimithara tse hlano. Karolo eo leboha 'moho le fatše li kopanang li lokela ho liloa ka morumo o lekanang le o tšetsoeng fatše e leng lisenthimithara tse hlano. Ha u phethetse ho lila penta kahare ka motsoako oa samente le metsi ho thiba matlere ka har'a tanka.

Mothati oa ho qetela ke ho fafatsa fatše ka har'a tanka ka metsi e be u bokoahela ka mekotla e metsi kapa polasitiki e ntšo nako ea matsatsi a supileng ho isa ho a leshome. Phunya lesoba la peipi matsatsing a se makae kamor'a ho phethela mosebetsi. Pele u ka qalella ho tlatsa tanka metsi u lokela ho tšela metsi a fokolang nako e ka etsang matsatsi a supileng.

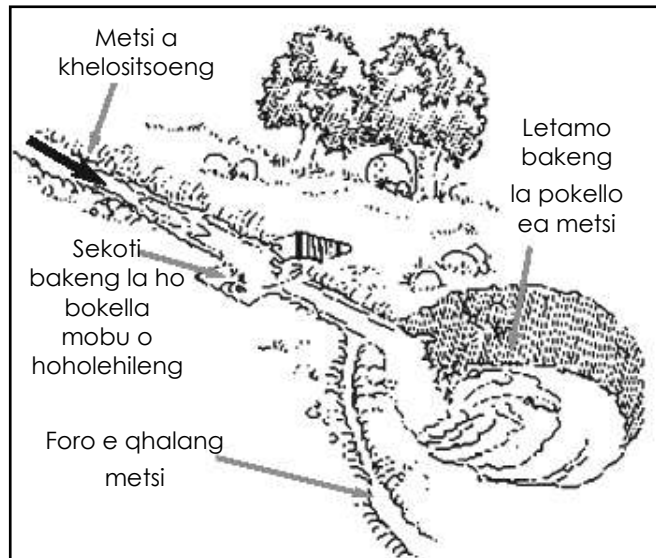


Likhakeletsi tsa lesenke kapa polasitiki li ka sebelisoa ho khakeletsa metsi ho tsoa ntlong ea joang. Leha ho le joalo metsi a joang ha a lokele ho nooa ka lebaka la litšila.

### ❖ Pokello ea metsi ka tlas'a lefatše

#### ○ Matamo

U ka haha letamo ka ho cheka mobu e be u tlatsa metsi a pula kapa a tsoang lengopeng. Mofuta ona ha o boloke metsi nako e telelele. Ka hona u ka ala polasitiki kapa ua lila ka samente hore le seke la lahla metsi kapele.



U ka fokotsa tahlehelo ea metsi ka lebaka la moea le mocheso oa letsatsi ka hore u etse letamo le tebileng empa le se sephara haholo. Letamo le sa tebang le bile le le lephara le lahlaheloa ke metsi a mangata ka lebaka la moea le mocheso oa letsatsi. U ka lema lifate haufi le lona hore li tle li lesireletse. U khothaletsoa ho bala sehloho sena 'Tšireletso ea lijalo moeeng le serameng'.

#### ○ Tanka tse hahueng ka mobung

U ka khelosa metsi a phallang lebaleng kapel'a ntlo kapa leralleng hore u a bokelle ka tankeng e ka mobung. U ka haha lebota le lenyane bakeng la ho a khelosetsa ka tankeng.



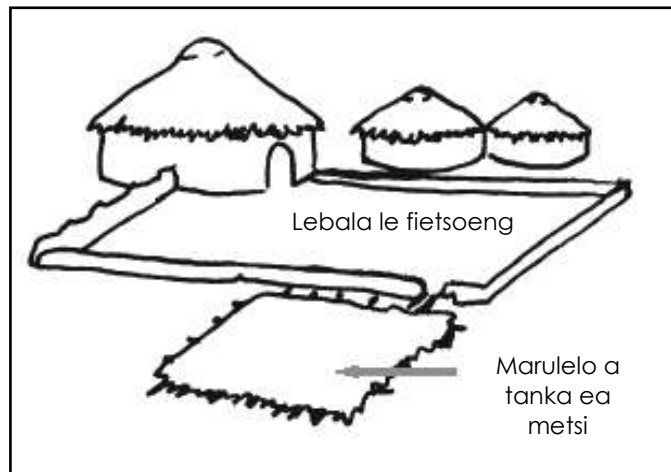
U ka haha tanka e kholo hore u tsebe ho bokella metsi a mangata bakeng la ho tšella lijalo serapeng. U ka sireletsa mabota a mokoti ka mekhoe e latelang:

- Ala sefeterata maboteng le fatše. Lila ka samente. U ka batla sehahi bakeng la mosebetsi ona hore mosebetsi e tle e be o makhethe, tanka e sa lutle.
- U ka haha mabota ka litene ua ba ua lila ka samente ka hare. Mokhoa ona o bobebe, e bile ha u hloke lisebelisoa tseo ho leng thata ho li

fumana.

- U ka ala mofuta oa polasitiki o bitsoang 'HDPE' maboteng le fatše. Mofuta ona o morumo o motenya. U ka sebelisa mofuta o mong o bitsoang 'geofabric'. Mofuta ona oa bobeli o fumaneha e le likaroloana tse ngata. U li ala fatše le maboteng a tanka e be u tlotsa moo

likaroloana li kopanang ka mofuta oa mokeli-keli o khethehileng (sealant). Ha u tlotsa ka 'sealant' u thiba masoba hore metsi a se ke a lutlela kantle ho tanka. Tšebeliso ea mofuta ona oa bobeli e bobebe ho feta mofuta o hlalositsoeng pele ka hore ha ho hlokahale bathusi ba bangata e bile ha o litšenyahelo li phahameng. Theko ea 'geofabric' le 'sealant' e tlase.



*Setšoantso se ka lehlakoreng le letšehali se bontša 'me evamasha oa limpopo naheng ea afrika boroa a le pel'a tanka eo a ikhahetseng eona.*

*Setšoantso se latelang ka letsohong le letšehali se bontša 'me emily ha akhametsi ho tsoa tankeng eo maboteng le fatše ho aluoeng 'hdpe' 'me eona e koahetsoe ka lesenke. Setšoantšo sena se ile sa nkuoa nakong ea komello ha ho ena le khaello ea metsi. U sebelisa metsi a ka tankeng ho tšella lijalo serapeng sa hae joalo ka ha ho bontšitsoe setšoantšong se ka letsohong le letona.*

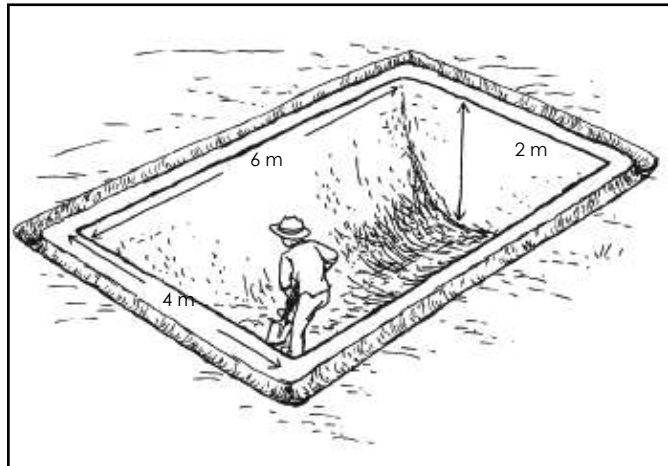


*Pictures courtesy of the  
Water for Food Movement,  
PO Box 796, Derdepoort  
Park, 0035, South Africa*



## Mokhoa oa ho haha tanka ka mobung u sebelisa polasitiki e bitsoang 'geofabric' 'moho le 'sealant'

U ka haha tanka e boholo ba lilitlithara tse likete li mashome a mane a metso e robileng meno e 'meli (48000 L). U hloka bathusi haholo bakeng la ho cheka mokoti. Ka hona e litšenyahelo li phahameng ho e haha.



Cheka sekoti se mahlakore a boholo bo latelang:

Bolelele: likharafu tse tšeletseng,

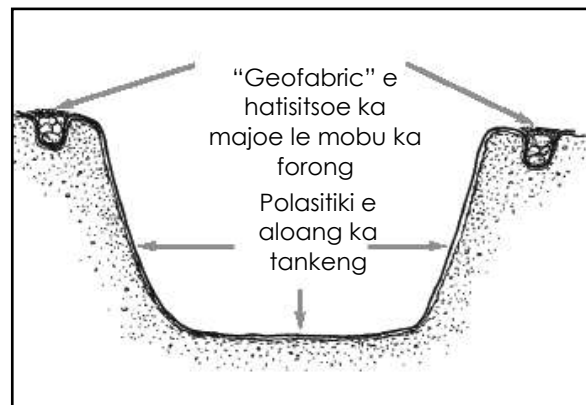
Bophara: likharafu tse 'ne,

Botebo: likharafu tse peli.

Mabota ha a lokela ho otloloha. U lokela hore u a cheke ka mokhoa oa hore a thulame. Lebota le lokela hore le be boreleli.

Cheka foro ho potapota sekoti. E lokela ho ba botebo ba lisenthimithara tse mashome a mararo. U tla hatisa lipolasitiki ka mobu hore o e tšoare hore e tiee.

Ala polasitiki (geofabric) ka sekoting. Etsa bonnete ba hore karolo ea polasitiki e bolelele ba kharafu bo ka forong e potapotileng sekoti. Hatisa karolo ea polasitiki e ka forong ka majoe le mobu. Ka ho etsa joalo polasitiki e ke ke ea huleha ha e utloa boima ba metsi ka tankeng. Tanka ea boholo bona e hloka 'geofabric' ea boholo ba 90 m<sup>2</sup>.



Penta polasitiki ka 'butimen sealant'.

Sesebelisoa sena se lokela ho mamella serame le mocheso. Ho seng joalo se ka peparana ha metsi a bata. U tla hloka lilitlithara tse makholo a mabeli le leshome (210 L) tsa 'butimen'.

### ***Libaka tseo u ka fumanang thepa e hlokahalang ke tse:***

#### **Geofabric:**

Kaytech factory in Johannesburg

Phone: 011 - 452 5310

#### **Sealant:**

Tosas; Spartan factory in Johannesburg

Phone: 011 - 902 1905

## 2. Mekhoa ea ho noesetsa liratsoana malapeng



Ho na le mehato e meraro e nepahentseng ea ho hlokomela metsi malapeng. Oena ke e latelang:

- ❖ Mohato oa pele ke ho bokeletsa metsi a pula a mangata ka moo u ka khonang ka teng.
- ❖ Oa bobeli ke ho fetisetsa metsi ao lijalong
- ❖ Mohato oa boraro ke ho sebelisa metsi ao ka hlokolosi.

### Ho khakeletsa le ho boloka metsi a pula

Mona re tlo shebana le litanka tse khakeletsang metsi a pula, litanka tseo re ka ichekelang tsona hammoho le matampo a ntlafalitsoeng.

## Litanka tse khakelatsang metsi a pula

### *Ba fana ka lithuso tse latelang:*

#### Tseo u li fumanang

- ❖ Ho ahoa tanka e le 'ngoe e le ho bontša kapa ho ruta liahi tse leshome tsa sebaka seo.
- ❖ Ho ahoa litanka tse tharo tsa boholo bo sa tšoaneng. Ketso ena e ipapisa le hore na marulelo a ntlo a maholo ha kae, le hore na ke metsi a make a ka khakeletsoang. Tanka e nyenyane e ba li lithara tse likete li supileng (7 000 l), e mahareng ke likete tse leshome le metso e mene, (14 000 l) ha e kholo eona e le likete tse mahome a mabeli a metso e mehlano a li lithara (25 000 l).
- ❖ Lekala le RSDA li tla fana ka samente, liphaephe, litlamelletsa (fittings), pompo le terata.

#### Tseo u tlamehang ho ba le tsona

- ❖ Sehoai se tšoanela ho ipatlela majoe le lehlabathe la noka
- ❖ Motho ka bo mong a tle le likhakeletsi tsa metsi tse tlang ho faseletsoa marulelong
- ❖ Sehoai se ipatlele seahi

### **Mokhoa oa ho aha tanka**

Ke khakanyo e ntle hore u fumane seahi se tlang ho u thusa ho aha tanka, kapa ha u sa tsebe seahi se joalo, u ka kopa lekala kapa RSDA ho u thusa.

Melemo ea tanka	Bothata ba ho aha tanka
<ul style="list-style-type: none"> <li>❖ Metsi a na a pula a ka bolokoa antano sebelisoa ha morao</li> <li>❖ Litanka tsena ke tsa 'makhonthe 'me li ka sebelisoa nako e telele</li> <li>❖ Metsi a tsoang marulelong a hloekile</li> <li>❖ Liahi li ka iphumanela chelete ka ho aha litanka tsena.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ho aha tanka ena ke mosebetsi o thata o matla</li> <li>❖ E theko e phahameng</li> <li>❖ U tšoanela hore o be u tseba ho aha kapa u batle seahi</li> <li>❖ Metsi ao a ka tankeng a ka se sebelisoa ho fihlela komello e feela.</li> </ul>



Ka letsohomg le letona ke setšoantšo sa tanka e ahiloeng ka majoe. Tanka ena e bophara ba limithara tse tharo (3 m) le bophahamo ba 1.8 m. Ha e tletse e tšela metsi a li lithara tse likete tse 'ne (4000 l). Metsi a ka tankeng e tjena a ka sebelisoa likhoeli tse tharo nakong eo ho omeletseng. E nka nako ea libeke tse peli hoisa ho tse tharo ho e aha.

## Mekhoa ea ho aha tanka

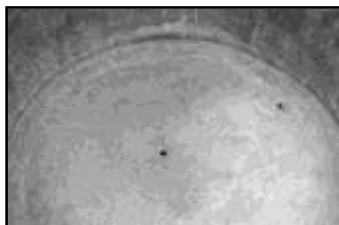
**Khotla le ho hloekisa** sebaka sa boholo ba limithara tse tharo.

**Cheka "foundation" e selika-likoe.** "Foundation" ena e lokela hoba botebo le bophara bo etsang licenthimithara tse mashome a mane (40 cm), hona ke bolelele bo lekanang le kharafu. Tlatsa foundation ka samente.



'Me' ma.... O eme pela tanka ea hae E haetsoeng hore e kahkeletse metsi a pula

**Tšela fatše ka samente.** Lethopo le ntšang metsi le tla tsoa le hona samentneg ena leo lona le tlo kopangoa le pomopo eo metsi a tlang ho khuoa ho eona.



Bokahare ba tanka ena bo bontša lesoba le fatše leo metsi a tlang ho tsoa ho lona

Pompo eo ho tlang ho khuoa metsi ho eona e tsoanela ho hlahela tlase ho tanka e le hore metsi kaofela a ka tankeng a tsebe ho tsoa le moo.



Pompp ea tanka e lokela ho kengoa tlase moo tankeng

**Aha tanka ea hau u sebelisa majoe le samente.** Eona e lokela hoba bophara ba licenthimithara tse mashome a mane (40 cm), le bophahamo ba 1.8 m. Ha u qeta e samente ka hare.



Mona ke lerako la tanka le ahiloeng ka majoe, leo re le bontšoang ke ntate tlale, le ha le e so fele

Etsa bonnete ba hore likhaketse pula (gutters) li eme hantle ka ho lima tanka, u ntano emala hore pula ene.

Bohloko ba nako, li tanka tsena ha li koaheloe. Ho ntse ho khoneha hore u li koaheloe ka masenke, nete kapa ka ho aha sekoahelo sa samente. Metsi a tsoang tankeng e koahetsoeng a ka nooa. Empa ha e sa koaheloe, metsi ao a tla be a le litšila haholo hore a ka nooa.



Sekhakeletsi se entsoeng ka masenke se isa metsi ka tankeng

## Matamo a ntlafalitsoeng

Ke matamo kapa mekoti e chekiloeng fatše. Matamo ana a ka ahoa ka mekhoea e mangata e fapakaneng.

Lihoai tsa Lesotho li lekile mekhoea e mangata e fapakaneng ea ho aha matamo ana. Eona ke e latelang:

- ❖ Matamo a samentiloeng
- ❖ Matamo a ahiloeng ka majoe le samente
- ❖ Matamo a mobu a pakelletsoeng majoe ka holimo
- ❖ Matamo a aliloeng ka polasitiki.

Metsi a kenang ka matamong ana a tsoa fatše. Ka tsela ena, ho ba bobebe hore u iphumanele metsi a mathang ho tsoa marulelong, tseleng le mekotinyaneng e teng pela ha hau.

- ❖ Ho a khoneha hore ho aho matamo a maholo, a tla tseba ho tšela metsi a mangata, hore a sebelisoa nako e telele ha ho omeletse

- ❖ Matamo ana ha a theko e phahameng, a bile a bobebe ho a aha ho feta litanka.

Lebaka le leholo la hore tanka e aho hantle ho tloha fatše le maboteng ke ho thibela metsi ho qhalana. Libakeng tse ling mobu oa teng o na le letsopa le lekaneng hore le thibele letamo ho lutla, ka hoo, ha ho hloka hore le tšireletsoe ka letho. Athe libakeng tse ling teng ha mobu o ba metsi haholo, o ka etsa hore mabota a letamo a oele e be le a lutla.

## Matamo a samentiloeng:

'Me' Mamotepane ea ahileng Ha Licupa, seterekeng sa Mafeteng, o ile a i k'hahela letamo le ntlafalitsoeng eaba o ua le samenta. Letamo lena le ne le ahoa ke batho ba bararo ho tsoa hona moo motseng oa Licupa. Ene e le sehoai se tsoang ha Rabolilane, eo eena a ileng a ba bontša hore na letamo la mofuta oo le ahoa joang, anto ba tlohela hore ba tsoele-pele, empa a ntse a ba bontša mona le mane. Letamo lena le ahiloe ka matsatsi a leshome le metso e mene.



Kahong ea letamo lena ho sebelisoa samente le terata ea lihoko tsa likhoho feela. Ho iloe ha chekoa sekoti, eaba ho aloa terata kahare. Ka morao ho moo, letamo la samentoa. Lehlabathe le neng le sebelisoa le ne le letoa nokeng ka likhomo.



Letamo le batla le lekana ka mahlakore oohle. Le bolelele ba limithara tse hlano le bophara ba tse 'ne. Botebo bona ke mithara tse peli. Letamo lena le boetse la samentoa moo metsi a phallang a tlang ho kena le teng. Hona ho etsa hore le tle le lule nako e telele le sa senyehe.

Letamo le teratetsoe hore bana le liphoofolo li se ke tsa tanakella moo. Hona le tanka e bitsoang "header tank" e ka tšelang metsi a li lithara tse sekete. Tanka ena ha e behoe fatše, e phahamisoa hore e be limithara tse peli le halofo (2.5m). Mosebetsi oa tanka ena ke ho thusa hore metsi a tsebe ho phalla hantle ka hara mathopo le lipompo tse ka serapeng tseo tsona li nkang metsi ho tsoa tankeng ena. Pompo e hatoang ka maoto ke eona e sebelisoang hore ho pompeloe metsi ka tankeng.



Setšoantšo sena se bontša lethopo le faseletsoeng sefe

Lethopo le nkang metsi ho tsoa ka letamong le na le sefe qetellong ea lona e le hore le sefe likhoere-khoere, e be ho tsoa metsi a hloekileng feela.



Pele u pompa metsi, etsa bonnete ba hore hona le metsi ka li silindareng le ka lethopong. Ho nka lihora tse kabang peli ho tlatsa metsi ka tankeng ela e bitsoang "header tank". 'Me oona a ka sebelisoa beke kaofela.

Mona moithaupi o ithuta ho sebelisa pompo ea maoto

'M'e Mamotepane u bolela hore haele mona metsi a se a fumaneha haufinyane, a ka tseba ho tsoela-pele ka mesebetsi e meng ea hae. U boetse u khona ho hlahisa meroho e mangata ho feta pele. U iphelisa ka ho hlahisa meroho le sethopo ebe u oa lirekisa. U li rekisetsa likolo le baitšukuli.



Karoloana ea seratsoana le moo ho hlahisetsoang sethopo teng

'M'e Mamotepane u boetse u iketsetsa phaello ea meroho ka ho etsa jeme le ho boloka e meng ea meroho ka libotlolong.

'Me' mamotepane u bontša botlolo ea jeme ea tjoto le lipeo tseo a lirekisang ho iketsetsa cheletea



## Mabota a mobu a pakelletsoeng ka majoe

Mabota a matamo ana ha a otloloha hakaalo. A batla a kobehile. A batla a tšoana le sebaka se motheong, empa motho a ka nna a tseba ho hloella ka holimo. Bokahare ba letamo kaofela bo aliloe ka majoe (fatše le maboteng). Majoe ana ka bo oona ha a thibele hore latamo le lutle. Le ha ho le joalo, letamo le ka nna la lutla hanyanyane hobane mobu oa lona o na le letsopa le lengata le tsebang ho tšoara metsi.



U ka nna oa lema joang ba mohloa tšepe maphakong a letamo e le ho thibela mobu ho khoholeha. Ketso ena hape e thusa hore maphako ao a seke a oela ka hara letamo ha ho ka etsahala hore mobu o pakellane moo.

## Phetisetso ea metsi lijalong

### Pompo tsa matsoho le maoto

Lipompo tsena ha li sebelise motlakase kapa peterole. Li sebelisa feela matsoho kapa maoto.

#### ***Pompo tsa maoto***

Pompo ena e ahiloe hore e tsebe ho sebelisoa libakeng tsa mahe tse hole le litoropo. E 'mele o monyanyane, e matla e bile a nkeha ha bobebe.

E sebetsa mesebetsi e mengata joalo ka ho pompa metsi nakong ea monoesetso le ho pompa metsi a tla sebelisoa ka lapeng.

Joale re shebana le mefuta e 'meli ea lipompo tsena.

#### **The ApproTEC foot pump (Kenya)**



#### *Tšebeliso ea pompo ena*

Pompo ena ha e nyanyane hakaalo, empa e matla hape ho bobebe ho e hlokomela le ho ilokisa ka ho sebelisa litšepe tse fumanehang mona hae. E



boima ba 22 kg.

Pompo ena e na le mathopo a mabeli, le tsoelang ka ntle leo lona le leng bolelele ba limilimithara tse mashome a mabeli a metso a mehlano (25mm), le kenang kahare lona le bolelele ba limilimithara tse mashome a mararo a metso e 'meli (32mm). E boetse ena le licilindara (cylinder) tse peli tseo e leng tsona tse suthumetsang metsi hore a tsoe.

Hore pompo ea hau e seke ea u senyehela, le ho thibela likhoere-khoere ho feta, faselatsa sefe ea mathopo le thopong le kenang ka hare ho pompo.



Metsi a ka pompeha hoisa bo phahamong (height) ba limithara tse leshome le metso e mene (14m). Ena le matla a ho hula metsi ka bo phahamo ba limithara tse supileng (7m). Ha

pompo entse e hlokometsoe hantle, ena le bokhoni ba ho ntša metsi a bophahamo ba limithara tse supileng hoisa ho tse leshome (7-10m).



Ka motsotsoana, pompo ena e ntša metsi a ka bang halofo ea lithara hoisa ho lithara le halofo (0.4-1.5l). Le ha ho le joalo, nako ena e ipapisa le hore na metsi a ntse a pompua ka bo phahamo bo boake. E kanna ea rekelloa le hlooa e masobana eo eona e tla e tsang hore ho noesetsa ho be bobebe u ntse u sebelisa eona pompo ena.

#### **Barekisi:**

Pompo ena e hlahisoa naheng ea Kenya. Afrika Boroa teng u ka e fumana ka ho ikopanya le:

**Contact: Chris Stimie**, Rural Integrated Engineering on 082 469 4535 or Tel: 012- 842 4106 Email: [dir@rieng.co.za](mailto:dir@rieng.co.za)

Or directly: ApproTEC/ Kickstart, Nairobi; PO Box 64142, 00620.

Tel: +254-(0)-20-787 380 / 787 381. Email: [approtec@approtec.org](mailto:approtec@approtec.org)

## Tšebeliso ea metsi ao u nang le oona ka hlokolosi

Mekhoa ea ho boloka metsi e mangata. Re ile ra shebana le emeng ea mekhoea ena lipampiring tse fetileng tse neng li bua ka ho hlokomela le ho sebelisa metsi. Linthla tsa bohlokoa ke ho:

- ❖ Tšireletsa mobu e le hore metsi a bolokehe ka mobung
- ❖ Lema makorota
- ❖ E tsa liforo tse tla tjekisa metsi hore a kene mobung a se ke a lahleha
- ❖ Tšireletsa serapa sa hau hore mobu oa sona

#### **Melemo:**

- ❖ Nakong ea monoasetso, metsi a ea metsong ea lijalo ka kotloloho, a bile a monyela tlaase mobung.
- ❖ O boloka nako le matsoho.
- ❖ O boloka metsi, empa hona hoipapisa le hore na u sebelisa lethopo lena joang.

o se ke oa omella ke moea

❖ Kopanya mobu le li putisa mobu

Joale re tlo shebisana mekhoe e 'meli ea ho tšella ka tsela eo e tlang ho boloka metsi, nako, e bile e ke ke ea u batla matsoho a mangata. Mekhoe ena ke: ho sebelisa monoesetso o bitsoang "drip", kapa marotholi, moo teng e leng lethopo le phuntsoeng masobana kapa le faselelitsoeng lihlooa tse nyenyane moo metsi a tsoang le teng, le ho sebelisa liratoana tse a hiloeng joalo ka lesoba la senotlolo.

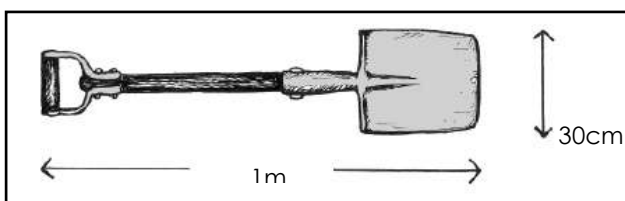
## Monoesetso ka lethopo le masobana

Lethopo lena le noesetsang ka masobana a sentseng a ahiloe ho lona, le ahiloe hore le sebetse ka tsela e itseng feela. U ka le sebelisa kapa oa iketsetsa la hau. Empa ha u khothaletsoe hore u leke ho fetola moetso oa lethopo le rekiloeng, ka ha le ke ke la sebetse.

## Thepa ea lethopo lena

Lethopo lena le tla le tsohle tsa lona tse lokelang hore le tsoele pele ka mosebetsi. Le ha ho le joalo, hona le mofuta e mengata ea lisebelisoa tse tsameang le mofuta ona oa lethopo. E ngoe ea tse tloaelehileng ke e bitsoang "Netafin".

"Netafin" e ahiloe ka teramo ea li lithara tse makholo a mabeli (200l), e tsamaeang le sefe. E tla le mofuta ona oa lethopo le masoba leo lona le leng bolele ba ho lekane serapa sa boholo ba bolelele ba kharafu ka mahlakore a mane, li iphitile makhetho a makholo a mabeli (200 square metres). Halofo ea 200 square metres e leng 100 square metres, e ka noesetsoa hang. Lethopo la mofuta ona le tla le se ntse le entsoe femeng



Masobana a lona a kahare a bile a arotsoe li centhimitara tse mashome a mararo lipakeng (30cm).

Ntate Mokethi, eo e leng moahi oa Mohale's Hoek e sa le a ntse a etsa liteko ka ho sebelisa mokhoa oa ho noesetsa o bitsoang "Netafin drip irrigation" nako e ka bang likhoeli tse tšeletseng.

Eena o boletse joana,

**" Mokhoa ona o mopolokela nako. O boetse o boloka metsi, ka ha metsi joale a ea metsong ea lijalo hang hang "**

Ha letsatsi le likela, ntate Mokethi u flosa se sebelisoa sena seo a noesetsang ka sona e be u se



Mona ntate mokethi u re bontša teramo ea hae ea 200l e kentsoeng sefe ea lethopo. Re bona hape lethopo lenang le masobana le behiloeng pela teramo

busetša hape hoseng, anto tsoela pela ka ho noesetsa. U beha teramo e tletseng metsi holima majoe a mabeli a sephara hore e be holimonyana ho feta liratsaana tsa hae. Ntate Mokethi o arola

lijalo tsa hae e le hore se seng le se seng se be

haufinyana le lesobana. Mokhoa o na o sebelisoa

feela lijalong tse arohaneng joalo ka kh'abeche, e seng tse moleng o le mong joalo ka lihoete.

### ***Linthla tsa bohlokoa***

Teramo e lokela ho behoa moo ho seng maqhutsu, 'me eona e phahamele serapa ka mithara kaofela (Bolelele ba kharafu).

Serapa sa hau se tšoanela hore se se ke sa ba maqhutsu, hobane ha sena le maqhutsu, metsi a tla tsoa masobeng a tlabe a sa lekane. A mang a tla tsoa haholo ha a mang a tla tsoa hanyenyane.

Lethopo lena ha le ea lokela ho robala kantle mariha ka ha masobana a lona a tla choatleha ke serame.

Melemo ea ho sebelisa mathopo ana	Mathata a ho sebelisa mathopo ana
<ul style="list-style-type: none"> <li>❖ Metsi a anela hantle serapeng kaofela, a bile a kena mobung ka tsela e khotsofatsang.</li> <li>❖ Metsi a litšila a ka sebelisoang mokhoeng ona oa monoesetso</li> <li>❖ Lisebelisoa tsohle tsa lethopo lena li fumaneha ha bonolo mabenkeleng.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ha masobana ana a thibane, a ka buloa ka otlala lethopo hanyenyane ka sepekere kapa tšepe e motsu.</li> <li>❖ Ha ho tsela engoe ea ho a thibulla. Haeba a sa thibulohe ka lisebelisoa tse boletsoeng ka holimo, sebelisa lethopo le lecha.</li> </ul> <p><i>THLOKOMELISO: U ka khona ho ithekela lethopo lena le masobana oa o ka oa kenyang moo lethopong oa ba oa ikenyetsa tsona.</i></p>

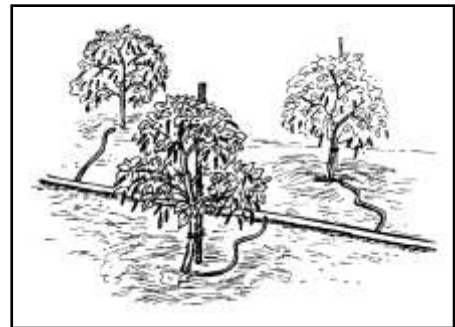
Mona ke mehlala e 'meli e bontšang hore na lihoai tse sebelisang SERUMULA li lekile eng. Re tla li bitsa mela ea sepakh'ethi le mela ea seponche kapa likhoele. Mefuta ena e bobolo hore lihoai tse libakeng tse fapakaneng li e sebelise.

### **Mela ea sepakh'ethi:**

Melemo	Mathata
<ul style="list-style-type: none"> <li>❖ Ha li hloke sefe</li> <li>❖ Li thibuloha ha bonolo; moma qetellong ea lethopo leo la sepakh'ethi e be oa hula</li> <li>❖ Metsi a monyela ha bobobe hofeta ha eba a ene a hasitsoe feela.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Liratsoana li lokela ho ahoa moo ho seng maqutso</li> <li>❖ Mathopo le mela ea sepakh'ethi le tsona li lokela hore li be bophahamo bo lekanang. Ha so se joalo, metsi a tla tsoa moo le oona a ke ke a lekana.</li> </ul>

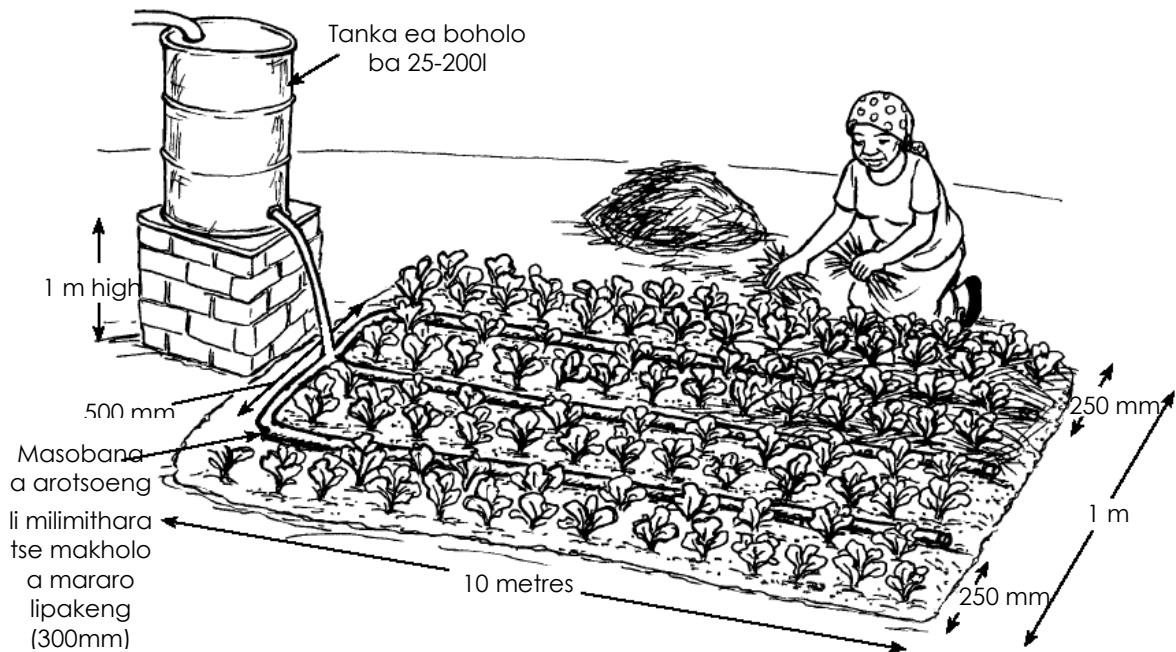
### **Mokhoa**

- ❖ Sebelisa teramo e ka fumanehang ha bobebe, ebe li lithara tse 25-200. Mokhoa ona o entsoe hore o sebelise li lithara tse 25 tsa metsi ka letsatsi. Haeba u sebelisa teramo ea boholo ba li lithara tse 50, e tlatse, empa u noesetse u ntse u tlolisela letsatsi lipakeng. Ha teramo e le ea boholo ba li lithara tse 200, u ka noesetsa ha ngoe feela ka beke. Le ha hole joalo, hona hotla ipapisa le hore na maemo a leholimo a joang, mobu o u nang le oona ke o joang le hore na lijalo tsa hau li se li holile ha kae. Sethopo ha sena batla ho tšelloa hakaalo.



- ❖ Beha teramo ena ka holimonyana ho seratsoana, seo sona se leng bophara ba mithara e le ngoe le bolelele ba limithara tse leshome. Ha seratsoana sa hau se le boholo bo bokana, u tla tseba ho se sebetsa ha bonolo.
- ❖ Sebelisa mathopo a mona a tloaelehileng a matšo ho etsa mola o moholo o tlohang teramong. Etsa e meng hape e meraro eo lipakeng tsa eona e leng li milimithara tse makholo a mahlano (500mm), ha bolelele ba seratsoana sa hau bona ele limithara tse leshome.
- ❖ Phunya masoba a manyenyane lethopong a arohaneng ka li milimithara tse makholo a mararo (300mm) lipakeng, ebe u Kenya mela ena ea sepakh'ethi masobeng ao. U tla hloka mela ea sepakh'ethi e mashome a robong a metso e meraro (93).
- ❖ Lijalo li lengoa hore se seng le se seng se be le mola oa sona oa sepakh'ethi.





Mokhoa ona o noesetsa sebaka sa boholo ba bolelele ba likharafu tse 'ne li menahane ha leshome le metso e mehlano ( $15\text{m}^2$ ). E sebelisa li lithara tse mashome a mahlano tsa metsi ka metsotso e mehlano. Ka letsatsi, mola o le mongo a sepakh'ethi o ntša metsi a ka bang li milimithara tse makholo a mabeli a metso e tšeletseng.

## Mela ea seponche kapa likhoele

Mekhoa ena e lokile haholo bakeng sa ho noesetsa lijalo tse jaloang moleng o le mong tse kang lihoete, anyanese le lierekisi.

### ***Mela ea seponche***

Phunya lethopo masoba u sebelisa sepekere se chesang. Etsa bonnete ba hore masoba ao a hloekile. Masoba ana a be boholo ba limilimithara tse peli le halofo ( $2.5\text{mm}$ ). Sunya likhechana tsa seponche masobeng ao. Ke hona masobeng ao moo metsi a tlo tsoa le teng.

### ***Mela ea likhoele***

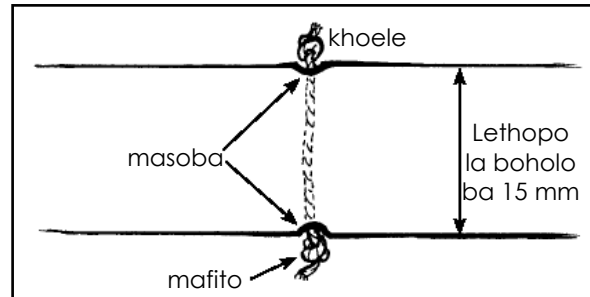
Mela ena e ntse e tšoana le ea seponche e boletsoeng ka holimo. Phapano feela ke hore mona ho sebelisoa likhoele e seng seponche.

Melemo	Mathata
❖ Mokhoa ona oa monoesetso o ka sebelisoa le lijalong tse lengoang	❖ Likhechana tsa seponche li lokeloa ho ntšoa selemo le selemo,

- ❖ moleng o le mong joalo ka lihoete
- ❖ U ka arola masoba a lethopong ho ea ka moo u ratang.

- 'me hona ke mosebetsi o mangata
- ❖ Ha ho bonolo ho laola metsi a tsoang moo masobeng.

Phunya masoba a mabeli ka mahlakoreng a lethopo. Kenya khoele masobeng ao e be u etsa lefito ka mahlakoreng ao a mabeli. Botle ba khoele ena ke hore haeba lesoba le ka la koaleha, u ka e hlohlora ho tlosa litšila tse koetseng lesoba leo. Hape e etsa hore metsi a tsoe butle e seng ka sekahla.



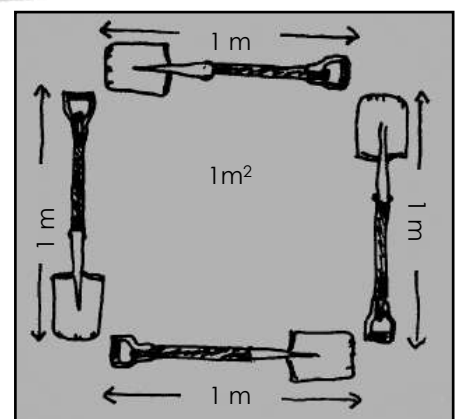
## U noesetsa ha kae

Haeba u metha pula ka sesebelisoa se methang pula, u tla sebelisa limilimithara (mm). Milimithara e le ngoe ea pula e lekana le lithara e le ngoe ea metsi mobung oa boholo bo lekanang le bolelele ba likharafu tse 'ne (square metre).

Limilimithara tse mashome a mabeli tsa metsi ka beke li lekana le li lithara tse mashome a mabeli a metsi ka beke, ao a lekanang hape le nkho e le ngoe ea metsi mobung oa boholo ba bolelele ba likharafu tse 'ne (square metre).

Ha u sebelisa monoesetso oa masobana, li lithara tse mashome a mabeli tsa metsi mobung oa boholo ba bolelele ba likharafu tse 'ne e lekana le limilimithara tse makholo a mararo a metso e mashome a mane (340ml) tsa metsi lesobeng ka ngoe ka beke.

From: Vikela, May 2003, FSG



Bonyane ba metsi ao u ka noesetsang lijalo tsa hau ka oona ke limilimithara tse mashome a mabeli ka beke. U ka noesetsa tjena selemo ho pota.

## Makhetlo ao u ka noesetsang ka oona

U ka nna oa noesetsa hanyane ka hanyane letsatsi le letsatsi, kapa oa noesats haholo feela e seng mehla eohle.

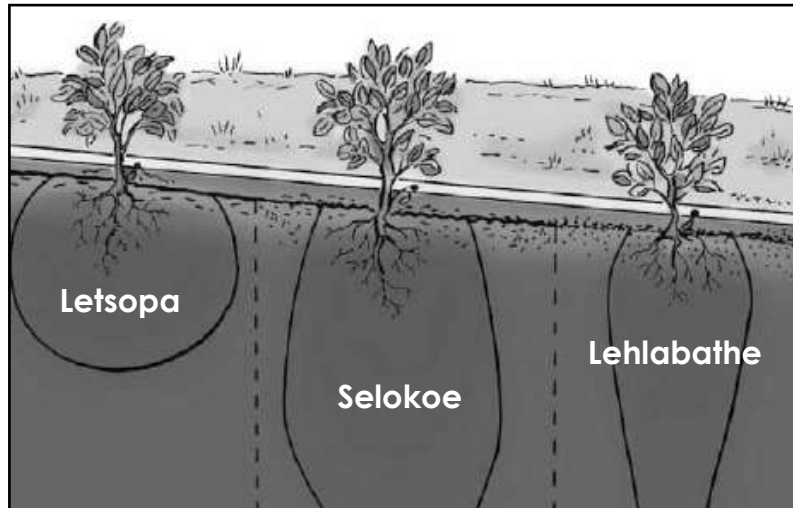
Ka tšebeliso ena ea monoesetso oa masobana, lijalo li noesetsoa ha ngoe ka letsatsi, tsatsi le leng le le leng. Maqalong a selemo, ketso ena e thusa hore mobu o lule o le

metsi. Ha lijalo li se li holile, li se li ka sebelisa metsi ana ao mobu o neng o a bolokile (Hammoho le a mang ao u tlabeng u ntse u noesetsa ka oona letsatsi le letsatsi).



### Thlokomeliso ka ho anela ha metsi mobung

Ho anela ha metsi ho bolela tsela eo metsi a tsamaeang ka teng ka mobung. Ho anela hona ho ipapisa le mofuta oa mobu le mokhoa oa monoasetso. Litšoantšo tse latelang li bontša tsela eo metsi a phallang ka teng mefuteng e fapakaneng ea mobu:



- ❖ Ha u sheba mobu ka holimo, u tla bona masobana a manyenyane a mongobo, ao mohlomong a tla be a atamelane kapa a arohane haholo.
- ❖ Ka fatše teng, masobana ana a latellana.
- ❖ U tla lokela hore u shebe na ho etsahalang ka fatše ele hore u tle u tsebe hore na metsi a tsamaea joang mobung. U ka etsa sena ka ho nka thupa ebe u e sunya mobung ho fihlela e se e sa tsamaea. E sunye haufinyane le masobana a lethopong, hape hosenyana le oona. Ka tsela ena u tla ba le khakanyo ea hore na metsi a anetse hakae ka mobung.
- ❖ Kae kae mobu o tla be o omeletse, e leng ho bontšang hore na ho thata hakae ho sebelisa monoasetso o na oa lethopo la mofuta oona bakeng sa lijalo tse jaloang moleng o le mong. Lebaka ke hobane batho ba atisa ho beha masobana a lethopo lena haufinyane le sejalo se le seng.
- ❖ Sekhahla seo metsi a tsoang ka sona masobeng a manyenyane se tla ama tsela eo metsi a tsamaeang ka eona. Mofuta oa monoasetso o sebelisang mathopo a puntsoeng masoba a maholo, joalo ka mefuta ea seponche le khoele (tseo re seng re buile ka tsona), li tšoana le mokhoa oa monoasetso o bitsoang "controlled flood irrigation" moo metsi a tlohetsoeng hore a tsoe ka bongata, hona le hore a tsoe e le marotholi.

*Lekunutu ha u noesetsa ke hore u shebe hore na ho etsahalang ka mobung!! Se ke oa potlaka ha u noesetsa, iketle!!!*

## Kaho ea serapa ka tsela e bolokang metsi

Ho bonolo hore u ahe lirapa tsa hau ka tsela eo lit la hloka metsi a manyenyane le hore hape li u bolokele metsi haholo.

### Liratsoana tse ahiloeng joalo ka lesoba la senotlolo

Re le tsibisa 'me' Malebohang Matlole le ntate Ralebohang Matlole, ba ahileng Phahameng Morija. Ntate Matlole ea feletsoeng ke mosebetsi li maeneng le mofumahali oa hae, ba lema meroho ho eja le ho e rekisa.

Melemo e meng ke ena:

- ❖ Serapa se ka tseba ho fana ka meroho selemo ho pota ka tlasa maemo a fe kapa afe
- ❖ Metsi a neng a hlatsoa lijana, liphahlo le a neng a hlapuo a ka oona, a ka sebelisoa ho noesetsa
- ❖ Seka ahoa ho lima letlapa kapa letsopa le thata.

### ***Nka aha serapa see sa lesoba la senotlolo ho kae?***

Batla sebaka se chabeloang ke letsatsi, haufinyanna le monyako oa ntlo, letlapeng, mobung o thata kapa ho lima letsopa le thata.

### ***Ke hloka eng?***

- ❖ Mobu o motle o motšo
- ❖ Majoe, moiteli, molora oa patsi, joang bo omeletseng, makhasi a omeletseng, litholo kapa matlakala afe kapa afe
- ❖ Boloukomo kapa mofuta ofe feela oa thupa kapa nete

### ***Serapa se ke se aha joang?***

Moo e tlang hoba bohare ba serapa sa hau, etsa basekete ka liphupa, eona e be boholo ba li centhithara tse mashome a mane (40cm) mahlakore oohle, le bo phahamo ba mithara le halofo (1.5m).



Mona hape ke mohlala o mong moo basekete e entsoeng ka mokotlana oa lijo tsa liphoofo



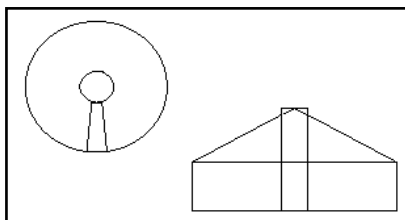
Setšoantšong sena re bona hore lesoba la serapa le a bonahala, ha mmoho le basekete e entsoeng ka lithupa eaba e tšelo a joang

Qala pele ka ho tlasa basekete ena ka lintho tse tla etsa mosuela joalo ka molora oa patsi, joang le moiteli. U hle u e flatse.

Ho tloha moo basekete e leng teng, metha bolelele ba letsoho ho pota pota. Mona ke moo lereko le tlo flogang teng. Le tšoanela ho ba boholo ba mithara le halofo ho isa ho tse peli. (1.5-2m). Boholo bona bo methoa ho tloha lehlakoreng le leng la seratsoana ho ea ho le leng. Etsa lerako la bolelele ba mithara e le ngoe le nang le tsela e eang baseketeng. Tsela ena e tlameha ho buleha li centimithara tse mashome a tšeletseng (60cm).



Haha u ntse u pota pota joalo hape u ntse u tšela mobu le moiteli, mobu le molora oa patsi, mobu le matlakala joalo joalo ho fihlela u qeta. Haha seratsoana sena ka tsela eo mobu o tla fihla ho basekete o tšekaletse. U se ke oa o etsa sephara.



(from d.hall and v.gibberd, for lrap)

Ka letsohong le letšehali ke lišoantšo tse peli tse bontšang hore na seratsoana sena se tla shebahala joang ka holimo le ka lehlakoreng

Ha u sheba seratsoana sena ka holimo, se shebahala joalo ka lesoba la senotlolo. A the ha u se sheba ka lehlakoreng e kare ntlo.

Koahela fatše ka makhasi le joang bo omeletseng bo bongata. Lula u koahetse tjena ka mehla. Koahela hape moiteli o ka baseketeng ka joang.

### ***Serapa see se bopehileng joalo ka lesoba la senotlolo ke se sebelisa joang?***

#### **1. Thlathlamiso ea lijalo**

Ke khakanyo entle hore u leme mefuta e fapakaneng ea lijalo libakeng tse sa tšoaneng selemo le selemo. Arola serapa sa hau likaroloana tse 'ne.

Karoloana ea pele ke ea lijalo tse mahaba (Ntle le sepinichi)

Ea bobeli ke ea lijalo tse etsang likotoloana le sepinichi

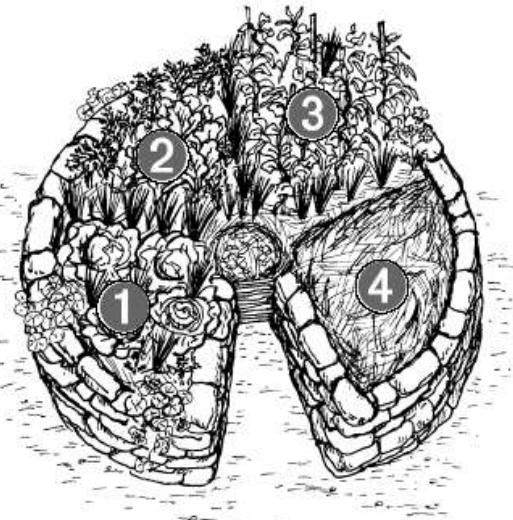
Ea boraro ke ea lijalo tse kang lierekisi, haholo mariha. Ho ka lengoa hape litapole, "egg plant", tamati, pepere, le chilisi nakong ea lehlabula. Lijalo tsena li hloka molara o mongata oa patsi hore li atlehe.

Karoloana ea ho qetela e lemelloa le kalaka ea boima ba 2kg, e koaheloe ka

moiteli le joang bo bongata.

Karoloana ena ha e jaloe letho selemo kaofela e ntano lemelloa le moiteli. Ka morao ho moo, ho ka jaloa lijalo tse mahaba.

Setšoantšo  
sena se bontša  
ka moo lijalo li  
ka  
hlahlamisoang  
ka teng



Nako eohle ha u jala, sebelisa karoloana e fapakaneng le eo u neng u e sebelisitse nakong e fetileng.

Jala anyanese ho pota pota lijalo tsa hau.

Jala litlama tse monko o bohale joalo ka "chives", "nastrutiums", le "marigolds" qetellong ea serapa sa hau.

## 2. Ho jala

Nakong eo u jalang, tlosa joang boo u tširelelitseng mobu ka bona (mulch). Etsa mola e be u oa jala. Koahela ka mobu e be u phaphatha hanyenyane. Hang ha u bona peo e mela, fokotsa joang e le hore lijalo tseo li tle li chabeloe ke letsatsi. Se ke oa tlosa joang kaofela e le hore mobu oa hau o seke oa omella.

## 3. Mokhoa oa ho noesetsa serapa sena

- ❖ Metsi a neng a sebelisoa ka tlung a ka tšelo ka baseketeng ena e bohareng ba serapa. U ka tšela metsi ana ka tlasa joang bo ka baseketeng. Ho tloha moo, metsi a tla phalla ho anela serapa sohle.
- ❖ Lekhetlo le hlahlamang, tšella ho lima lijalo. Tlosa joang e be u tšella moleng, ha u qeta busetsa joang boo.
- ❖ Haeba u na le nkho kapa teramo eo u sa ebeseliseng, e behe ka serapeng e le hore u tle u tšele metsi ka ho eona, ka tsela ena u tla



Mona re bona ka moo seratsoana sena se tšekaletseng kateng, tšebeliso ea se tšireletsa mobu hammoho le monga serapa a se tšella ka nkho

tseba hore u noesetse e sa le ka meso kapa mantsibuea, e seng hara mochoso oa letsatsi.

## Malebela a mang hape

### ***Mosuela o etsoang ka sekoting***

Mosuela oona ke o e tsetsoang ka hara sekoti, e seng ka holimo joalo ka ho e nne ho etsoe. Ka tsela ena, re boloka mongobo le mosuela ka bo oona o lula o le mongobo nakoana. Mokhoa ona o boetse o boloka lisebelisoa tse hlokahalang ho koahela mosuela o entsoeng totoma.

Mekoti ena e chekoa bophara le bolelele ba mithara e le ngoe le botebo ba mithara e le ngoe. Tsela moiteli, molora oa patsi le litlam-tlama. Mahareng a sekoti, sunya thupa e be u koahela sekoti ka mokotlana oa khale oa lijo tsa liphoofolo kapa joang. Mosebetsi oa thupa ena ke ho thusa hore moea o nne o tsamae hantle ka sekoting.



Litšoantšo tsena tse peli li bontša se hlalosotsoeng ka holimo.

### ***Ho jala la mekoting***



Peo ea lijo thollo (tse kang poone, mabele, kor joalo-joalo) e jaloa ka hara mekotjana masimong.

Cheka mokoti oa botebo ba li centhimitara tse leshome le metso e mehlano hoisa ho tse mashome a mabeli (15 -20 cm), le bo phara ba li centhimitara tse mashome a mabeli a metso e mahlano (25cm). Cheka mekoti ena ho tlala tšimo u ntse u e arola li centhimitara tse mashome a robeli (80cm) likapeng. Sekoting se seng le se seng tšela moiteli,

molora oa patsi le mosuela kapa matlakala. Ha pula li fihla, jala lipeo tse 'ne(4) mokoting ka ngoe. (from Footsteps, No. 41 Dec 1999)

### ***Methipoloho/ Liratsoana tseo mobu oa tsona o tširelelitsoeng ka majoe***

Li thusa haholo ha eba u na le mobu o hoholehang ha bobebe kapa ha u batla ho phahamisa seratsoana sa hau. Li boetse li boloka mongobo ka ha majoe ana a tširelelitse mobu qetellong ea seratsoana.



Serapa sena se ahiloe motheong. Liratsoana kaofela li ahiloe methipolohong. Ka tsela ena, metsi le mobu li bolokeha



Seratsoana sena se phahamisitsoe, sa tšireletsoa ka majoe ho boloka mongobo

Litšoantšo tse bontšang se sa tsoa hlalosoa ke tsena.



### 3. Ho nwesatsa serapa hakae le neng?

Mokgwa o atileng wa tshenyo ya metsi ke ho tshela sebaka sesenyane ka metsi bophareng ba serapa sa hao ha nngwe kapa ha bedi ka letsatsi ka a mabedi. Ho a tsebahalahore batho ba etsa hona, ba hopola hore (mohlomong kaofela dijalo ditla fumana metsi a itseng) mokgwa ona ke o tlwaelehileng wa tshenyo hobane bongata ba metsi bo moyafala ka mokgwa wa phofodiboka. Hodimo ba mobu ha bo fumane metsi a lekaneng. Ka ho etsa hoo ha o etse ho loketseng mokgwa oo wa ho nwe setsa o etsa hore metso ya dijalo tsa hao ebe ka hodimo ho mobu, hoo o etsa dijalo tsa rona dipohe ha bobebe, ka hoo re tlameha hore re tshelle metsi a lekaneng ka nako le ho tshela a manyane kgafetsa. Reka leka ho tshela metsi a lekaneng ka mora matsatsi a mabedi ho lebella hore diya jwang. 'dijalo tse ngata tse mahareng o ka tshela metsi hangwe ka beke.

#### *Ho nwe setsa ho tebileng*

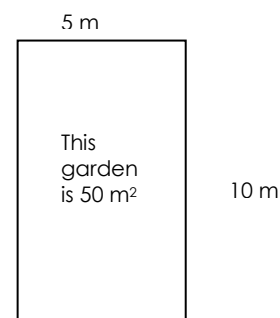
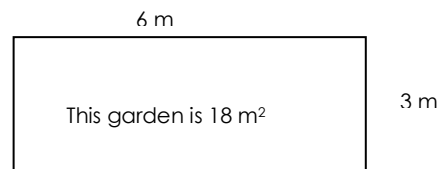
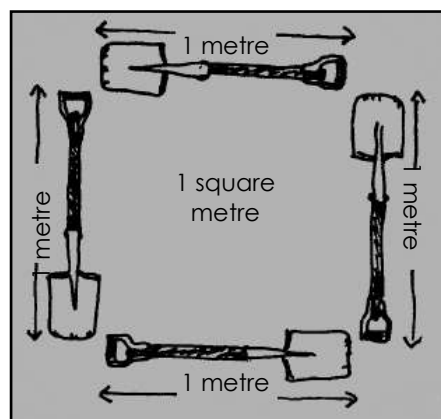
Kaofela reya tseba hore dijalo di ka se mele ntle le metsi ebang dijalo di thola metsi alekaneng di hola ka bofebo, diba le metso e tileng, kahoo o tla una molemo le metso e tileng, makala di ditholwana. Ebang dithola metsi a manyane boka hodimong ba mobu nako le nako, metso ya teng etla ota eka sekgone ho ikemela nakong ya komello.

Ho tshella ka botebo, arola serapa sa hao ka diratswana o nwe setse ka mokgwa o tebileng, tshella diratswana tsa hao makgetlo a mane hoya matsatsing supileng. Hona ho etsa hore metsi a kene ka botebo mobung. Bonyane ba ona bo ka lahleha phofoding.



Hlokomela hore ho nwe setsa ka botebo ho ka etswa haholo ebang metsi a kenella fatshe haholo metso ya dijalo e ke ke ya a fihlella, le ha hole jwalo phoso ena ha e a afa jwalo ka ho nwe setsa hanyane le ho nwe setsa ka ho sa tsepamang.

Re sebedisa ho nwe setsa ho tebileng ele hare batla hore. Metso ya dijalo tsa rona e kenelle fatshe mobung. Tshela metsi a mangata, ebang o tshela manyane ho ka ba kotsi.



Ka molao wa momwana dimela di hloka 20 mm ho moesetsa ka beke, ho hlalosa hore 20 litha ya metsi bophareng ba serapana sa hao. 20 mm ka beke elokile ho qala ho nahanela ho yona. Ka hopane dijalo tsa rona ha di hloke metsi a makalo hanle beke kamora beke.

- Ha pula ena dijalo di hloka ho nwesetsa hanyane.
- Ha dijalo di sale nyane dihloka metsi a manyane, jwalo ka ngwana di hloka metsi kgafetsa. Ngwana o hloka ho nwa metsi dihora tse pedi kapa tse tharo kamora hore a hlahe. Peo ya hao kapa sethopo se se omolle, se hlole ha mmalwa ka letsatsi qalehong.
- Ha dijalo di etsa ditholwana jwalo ka mme yahlokometse, di hloka dijo tse ngata le metsi.
- Dijalo di hloka metsi a mangata ha ho tshesa haholo. Ha ho phodile dijalo dihloka metsi a manyane.
- Hoya ho felang ha bophelo ba tsona jwalo ka leqhekwana dijalo dihloka metsi a manyane.
- Dijalo tse serapeng di fapana ka boholo le mefu ta ya teng kaofela di hloka ho nwesetsa ka ho fapana.

20mm/week is equivalent to 20litres/week which is a 20-litre bucket on 1m<sup>2</sup>.

For drip irrigation systems 20litres/1m<sup>2</sup> equates to about 340 ml of water/dripper/week.

### ***Tekano ya metsi a rona***

Mokgwa o bobebe ke ho kenya tshepe mobung dihora tse mmalwa ka mora hore o nwešetse serapa. Kamora hore metsi a kenelle hantle mobung. Tshepe ya hao e kena ha bobebe ho fihlella mobung o ommeng o ka tlase. Hona ho fana ka moelo wa hore metsi a kene ha kae fatshe. O ka nka qeto ya hore o nwešeditse ka holekaneng. Haeba o metha metsi a pula ka tekanyo ya pula o tla sebedisa mililitha 1mm lilitha e lekana le 1 litha ya metsi bophareng ba 1 m<sup>2</sup> ya mobu.

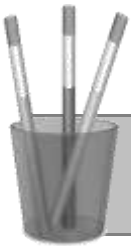
## **Malao wa bohlokwa wa ho nwesetsa**

Letsatsi ka leng, jwang, neng ho hlaolela dijalo ho etsa tshusumetso e kgolo hore o nwesetsa ka metsi a makae serapeng sa hao. Ke ena melao ya bohlokwa ba ho nwesetsa.

- ❖ Qala sehla sa hao sa ho jala ka mobu o mongobo wa botebo ba metara haholo sehle sa komello moo ho senang pula dikgweding tse mmalwa, qalong motso o mo nyane ha o fumane, metsi, empa metsi a tlaema ho fihlela dijalo di tla fihlella moo kamora ong sehle kamora hore o dife ho feta hoo o di fang hona.
- ❖ Efa dijalo tsa hao metsi a mangata hanngwe ka ho lekaneng ka beke. Ka nako eo ho tshesang o ka fokotsa ka matsatsi amararo empa tshella ka metsi a lekaneng ho etsa bonnete bahore a kenella ho fihlela fatshe mobung wa hao, e seng phofodi e ka hodimo ho 10-15 cm mobung. O ka laola hona ka ho leka ho sireletsa hore phofodi e se lahlehe. Se ka nwesetsa bohlaswa letsatsing le mongobo dimeleng tse teleng.
- ❖ Etsa ho be bobebe, nwesetsa hantle ho ha le hore o tshale marothodi a boima a thata haholo, atla eta hore mobu o kopane kapa ho tsamaisa metsi a hao hantle ntle le ho matha, ho tla hohola mobu lo a hao ho lematse metso ya

hao.

- ❖ Haola metsi a hao dimeleng tsa hao, ebang dijalo tsa hao di thola metsi a lekanang o tla thola haholo lerothodi ka nngwa, ka ho hloka karolelang dipakeng tsa dijalo tsa hao, dijalo tse fumanang metsi a mangata di sebedisa marothodi a mangata, ha tseo ditholang metsi a manyane di tla ntsha dijalo tse nyane.
- ❖ Lekanya. Hlahloba. Boloka direkoto hore o di file metsi a makae o fumane pula e kae. Hape tekanyo ya hao e fetohile ha kae ditankeng tsa metsi selemo le selemo atla fumana ho molemo. Ka kotloloho o tla fumana molemo wa metsi, le dijalo ho tswa lerothoding. Kgafetsa tjheka ka mora letsatsi hore metsi a hao a kene botebo bo bokae, mongobo o ho kae. Etsa hona ho fihlela o fihlella kutlwisiso ya hore mobu wa hao o fetoha jwang ho hlaelelong le puleng, sheba hape hore ha boka hodimo ba mobu wa hao bo se bo le hakae komellong.



## Activity 1

### Serapa se hloka metsi a makae?

#### Maikemisetso

Ho matlafatsa bohlokwa “melao ya menwanwe” hore ho hlokahale dinkgo tse kae ka beke ho dijo tsa hao tse serapeng he hore o ka thola metsi a makae puleng.

#### Ditaelo

1. Etsa bonnete ba hore o utlwisisa melao e mmedi ya menwana, e hopole.

Hona ha pula:

E bang 1 mm ya pula enele, ho bolela hore 1 litha e netse sebaka se seng le se seng ka 1m x 1m.

Molao wa monwana ke ona: Lerothodi le leleng la pula le fana ka ka 1 litre per m<sup>2</sup>.

Ho nwe setsa serapa:

Dibakeng tse ngata serapa se hloka 20 mm ka beke. Ho fana ka 20 mm ka beke o hloka ho fana ka 20 litha ya nkgo ya metsi ka beke bakeng sa sebaka sa 1m x 1m serapeng sa hao.

Melao wa monwana:

20 litha ya nkgo ya metsi ya ka beke sebakeng sa m<sup>2</sup> serapeng sa hao.

2. Sebedisa molao wa monwana hore ho hlokeha metsi a ma kae ka beka serapeng sa hao ha o jetse dirapana tse leshoma tsa bophara be 1m x 6m.
3. Ho hlokeha dinkgo tse kae ka letsatsi ha molemi a nwe setsa matsatsi a tshelletseng ka beke?
4. Molemi o tlameha ho arola dinkgo tseo a tlang ho di sebedisa ka letsatsi?

Dikarabo:

2. Dinkgo tse 60 buckets (20 litha boholo) ka beke.
3. Dinkgo tse 10 buckets ka letsatsi tseo e ntseng ele 200 litha ya dromo kao letsatsi.
4. Ee lehanyenyane. Ee seratshana se ka thola hahyenyane hapeho ka baka komello ka pelenyana, kaofela ke mosebetsi o thata hape metsi a senyeha. Ho bohloka ho arola seratswa dikalo tse tshelletseng, nwe setsa sele seng hanngwe ka letsatsi mwe setsa karolo enngwe letsatsi le latelang, nakong e tshesang nwe setsa dikarolo tsenne tsa diratswana tsa hao ka letsatsi, eketsa palo ya hao ya dinkgo ka letsatsi ebang ho hlokeha.

How big is your garden? (Remember to just consider the beds. You don't need to include the paths in your measurement)	How many litres per week do you need to water your garden?	How many 20 litre buckets per week does your garden require?
10 m <sup>2</sup>	200 litres per week	10 buckets per week
20 m <sup>2</sup>	400 litres per week	20 buckets per week
30 m <sup>2</sup>	600 litres per week	30 buckets per week
40 m <sup>2</sup>	800 litres per week	40 buckets per week
50 m <sup>2</sup>	1000 litres per week	50 buckets per week
60 m <sup>2</sup>	1200 litres per week	60 buckets per week

## Taola ya ho boloka metsi

Ke mokgwa o lokileng wa ho qala sehla se ommeng ka tanka a tletseng metsi a pula, ka ho nwe setsa ka botebo mobung wa hao. Mokgwa wa yona efapana sehle se omileng le se mongobo.

### ***Mokgwa watokiso sehle se omileng***

Mariha ha ho sena pula, dijalo di mmalwa, kanako enngwe ha hona pula, empa dijalo ha di mele, hoo ka etsang hore diqetelle di shwele pele re dija.

### **Mokgwa wa sehla seomilele: Qala e tletse efella esena letho.**

1. Ho qala sehla sa komello ka dibethe tsa terentshe dibe mono obo ditanka di tlale metsi o tlo leka metsi a mangata ditankeng ho fihlela mariha a tswa. O tlo qeta sehla seo tanka ya ese ele haufi le ho fela metsi.
2. Ebang o kgathatseha hore metsi a ka fela pele ho sehla, jala sebakeng se senyane serapeng sa hao nakong ya komello.
3. Nahana hore o tlo nka matsatsi a makae ka beke o lokisa serapa sa hao. Arola serapa ka ho lekana hore o se nwe setse le tsatsi ka leng. Mohlala ebang o hopotse ho lokisa ha hlano ka beke arola serapa sa hao ha hlano.
4. Hlaola karolo ele nngwe ya serapa ka letsatsi, se ke wa leka ho fa karolo enngwe le enngwe metsi hanyenyane letsatsi ka leng, ntle le peo ka sethopo sa hao tse

hloka ho nweletswa hanyane kapa hanngwe ka le tsatsi, ho fihlela metso e tiya le ho kena ka botebo, le ho ka emela maemo afe kapa afe.

5. Sheba metsi a makae ka tankeng, nahana hore pula e ka nako e kae pele ena, nqola tsena letsatsi ka leng. Marheng a latelang o tle o kgone ho kgola molemo selemong seo.
6. Ebang o bona hore o tla fellwa ke metsi, nka qeto ya hore dijalo tse bohlokwa ke dife ho wena, boloka metsi a setseng bakeng sa tsona, ho bohlokwa ho lahlehelwa ke dirapana tse mmalwa hona le sebetsa ka thata hona le ho lahlehelwa ke ntho enngwe le engwe dirapeng tsa hao, hopola hore mefuta e meng ya dijalo e ka hloka metsi a manyane mohlala khabene e batla metsi amanyane ho feta sepinisha tlhokehong ya metsi o ka nahang ho boloka sepinishatlhokehong ya metsi o ka nahang ho boloka sepinishe tse mmalwa, o be o jala khabeshe e ngata.

### ***Mokgwa wa tokiso sehleng se mongobo***

Lehlaluleng ho tlwaelehile hore pula engata, ka lemo tse ding ho ka ba le komello, mathata a boima ha hona le komello nako e telele ka nako e eba sehla seo pula enang ka sona. Moha ke moo metsi a bolokuweng a tlang ho thusa dijalo tsa hao. Ho thata hore o ka lekanya hore o ka lebella tse pula e ntle kapa empe selemong seo. Ka ho re tlameha hoba le maqheka.

### **Mokgwa wa sehla se mongobose qala hose letho ho qetelle ho tletse.**

1. (Letshwaola 2-5 le sebetsa mona)
2. Ho bohlokwa ho boloka serapa sa hao sele mongobo ha o jala, tanka ya metsi etlabe ele haufi le ho fela, e bang o sebedisitse metsi hantle kanako ela ya komello, empa di ka tlala kapele ka pula tse mmalwa tsa pele.
3. Lekanya maemo a hao a ho nweletsa katekanyo ya pula e nany, Ka hoo se ka nweletsa ho se bohlokwa. Hopola ho etsa dipalo pala tsa diratswana tse ka hodimo.
4. Kanako eo ho tshesang e bile ho omelletse o hloka ho hweletsa haholo, empa ha jwale ditanka tsa hao di tletse ho hloka hore o sebedise metsi a teng, ho sebetsang le maemo a komello di tle di tsebe ho tlala hape. Ditanka tsa hao ditlameha ho tlatswa ke pula habedi hlabula. Ha mariha a qala di tlameha hore di be de tletse.

## 4. Tokiso le polokeho ya tanka



Bobedi bokatlase le bo kahodimo ba tanka ya pakeletso ya metsi ke poloko ya hao lapeng. Ho ka ba molemo ho wena honka boikarabelo ba tanka ho netefatsa tokiso, tlhwekiso, polokeho le tshireletso mollong. E bang ho kgathalla tanka ka ho phethahetseng.

### Roof Tanks

Tanka e emeng marulelong e tlameha ho hlwekiswa hang ka selemo. Ditanka tsohle dikentswe dileri, ho bobebe ho kena le ho tswa ka hara tsona.

O ka pakela majwe kapa wa poleistera katlasa. Pompo ele ho fokotsa kgoholeho ya mobu, le ho balehela seretse ka jaretsng. O ka etsa hoo ele ho etsa setshelo sa metsihore se seke sa ba ka tlasa kगतello ya metsi, lerothodi ka leng la metsi le bohlokwa, hona ho etsa hore metsi ao ase eme pela ntlo ya hao, metsi aemeng ka etsa ho thelle fatehe kapa ho nkge, menwang le mafu a fapaneng.



Stones help to decrease splash erosion

## Gutters

Dikgitire di thameha ho tlamehwa haufi-ufi le marulelo ho etsa bonnete ba hore metsi a tswang marulelong a mathe ka kotloroho ntle le ho tsholohela ka thoko kapa ho rothela fatshe ebang dikgitiri di lokoloha kamora nako ho ka hlokahala hore ho tiiswe diterata tse tshwereng dikgitiri, ho kaba bohlokwa hore ontshe dikgitire ebang o belaela hore ho ka lehlwa le boima. Boima ba lehlwa bo ka etsa hore kgitiri e kobehe ka ho phethahetseng.



Dikgitire di tlameha ho beha haufi le makenke ho amohela bongaka ba metsi a se wele fatshe.

Dikgitire di tlameha ho lekolwa hore ha di rothise metsi ha. E bang di rothisa metsi marothodi ao a ka thibelwa ka silikone. O ka reka silikone ka tshelete e kaalo ka diranta tse mashome a mabedi ho amang a mabenkele a jwale ka spares shopo le ya rekisa thepa ya ho aha. O tlameha ho hlwekisa kgitiri ya hao jwaleka ha ho hlokeha. Ele hoetsa hore metsi a tswang marulelong a hlweke ka naka tsa pula, ho bohlokwa ho hlwekisa dikgitiri hang ka kgwedi.

## Underground Tanks

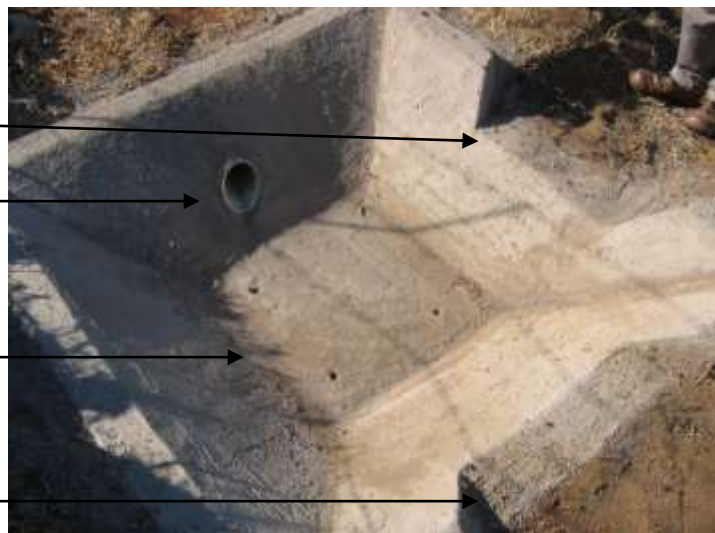
Tanka ya hao ya potseletso ya metsi e ka tlasa mobu e ukgethile e entswe ka polasitiki. Sili trep e etseditswe hore pokeletso ya metsi ho ya ka tankeng le hore ha ditanka ditletse dgone ho qhala metsi. Hopola hore metsi a kenang pokeletsong ya elitanka tse fatshe ha a hlweka hore aka anwa. Your underground rainwater harvesting tanks are a unique design using plastic tanks.

Taolo ya metsi ha a tietse ka tankeng

Peipi e laolang metsi hoyo tankeng

Bokofatshe bo amohelong metsi hore ditshilo di se kane

Seboka sa ho omohela metsi sa silt trap



Silt trap e amohela pokeditso ya metsi hoyo tankeng.



Hlwekisa silitrep kamora dipula tse ding le tse ding, hlokomela hore meedi e isang metsi ka silitrepeng entse ele sebopehong. Kamora dipula o tlameha ho hlwekisa bokantle ba dibolo tsa ditshepe tse kahara diphaphe tse yang kaditankeng.

Ho kaba molemo haholo ho tshireletsa ditanka tsa hao tse ka tlasa mobu dikgomong, e bang ho na lejang bo ka jewang ke dikgomo pela tanka, kenya fense ho potoloha elitanka, kapa ho hong ho ka tshireletsang, ebang kgomo e kgolo e ka hata tanka eka senya haholo.

Ho kaba molemo ho sireletsa ditanka mollong, ho ka bohlokwa ha jwang bo pela tanka bo tloswa o siye sebaka sa dimetara tse tharo ho potoloha le tanka hona ho ka etsa hore o matlafatse polokeho ya ditanka ha hona le bothata. Ntsha sekwahelo sa tanka efatshe o hlokomele hore se selemale kapa ho tshwatleha, velf e sa kguthenge behe pela bokatlase kapa bo kahodimo tena bavelf e kgutheng. Ebehe pela bo ka fatshe ba tanka ka tlasa lemati l tanka.

Tanka ya ha e thatla le dinotlolo e le ho etsa bonnete ba tshireletso baneng ba ka ba tlang ho bula ditanka ho tlohaahlokomela ho notlela tanka sireletsa senotloko se seruse o ka etsa hona ka tlotsa senotlolo ka oli ya ho pheha, kapa kwahela ka polasitiki, o tlotse ha n yane ka poresetiki hodima lesoba la senotlolo.

Hoya ka bokantle ba jarete ya hao, o ka etsa hore jarete ya hao e shebahale hantle. Ele ho boloka mobu wa hao kgoholehong. Moo holeng bohlokwa ho ntlafatsatokoloho.

Hona ho ka etsa hore o sebediso nako e nyane hore o batalatse hore o sebediso nako e nyane hore o batalatse makukuno ho potoloha tanka, hopola hore hona ho bohlokwa hore laole metsi a hao ho pololoha le ditanka ele hore ho sebe le metsi a emeng ka hodimo ho ditanka tsa hao.



You should clean debris out of the strainer in your silt trap after each storm

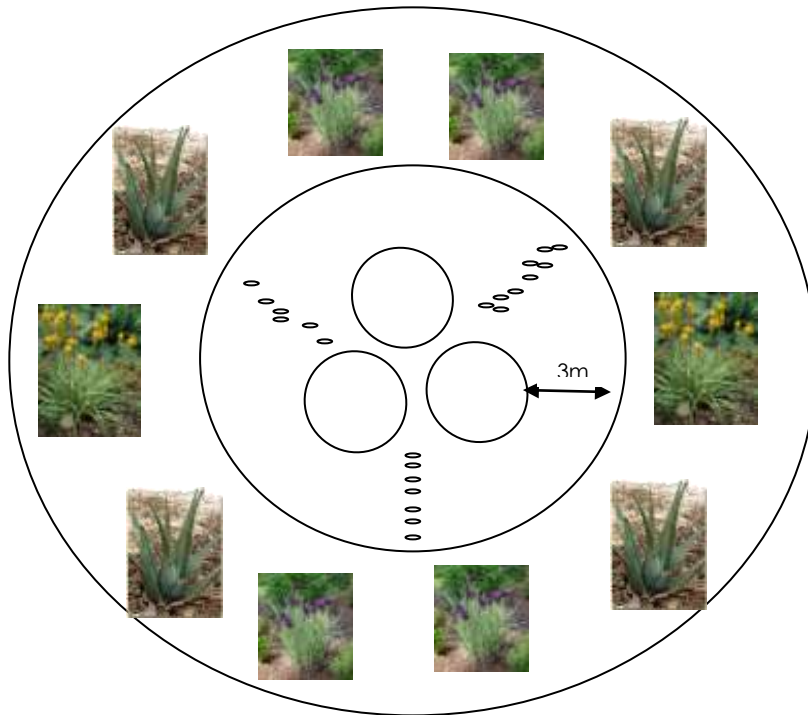


This was a storage area at a JoJo factory. Notice the circles where the tanks once stood.



Be careful not to damage the non-return valve at the bottom of your tanks when you are cleaning them.





In this yard, the tanks are surrounded by 3 metres of bare ground for fire protection. Three stone lines help to keep the soil around the tanks shaped to move water away. In the outer circle, aloes, irises, and bulbinella also help to retain the shape of the land as well as add extra fire protection.

## Hand Pump

Tanka ya hao e fatshe e kentswa pompo ya polasitiki e sebediswang ka letsoho, mokgwa ona o ikgethi leng o etsa hore ho be bobebe ho pompa metsi ho enngwe le enngwe ya ditanka tsa jojo hore o a tshele kahara lebekere la ho nwe setsa.

Ho bohlokwa ho boloka peipi entsho ka hara tanka ele hore ho se kene dinthwana tse itseng. Netefatsa hore bana ba tseba bohlokwa ba hose kenye dithupa kapa ditshila ka hara tanka. Hobane ditshila tse di ka dula ka hara tsa etsa tshenyo pompong.

Hlokomela hore seretse se etsang setshwantsho ele ho sireletsa kgoholeho ya mobu. Pakela majwe moo metsi atlang ho otlala teng. Sena seka o thusa ho boloka sebopehosa mobu ho potloha tanka.



Ntate Tladi shows how to use the pipe pump.

# *Resource Material for Homestead Food Gardeners*

## Chapter 6: Handouts (seSotho)

- |           |   |
|-----------|---|
| Handout 1 | Ntlafatso ea mobu (Improving your soil)                   |
| Handout 2 | Ho koahelamobu hore u se lahleheloe ke mongobo (Mulching) |
| Handout 3 | Mokeli-keli Oa Mononts'a (Brews for plant nutrition)      |
| Handout 4 | Thlahiso ea sethopo (Seedling production)                 |

# 1. Ntlafatso ea mobu

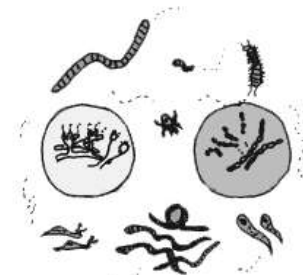


## Mobu o nang le bophelo

Mobu o matlafetseng ke o phelang. Ke mobu o nang le li kokoanyana tse ngata tse o ntlafatsang. Ke mobu o tebiling, o seng thata, o bile o bonolo ho o cheka, ona le moea le metsi.

Mobu o nang le bophelo ke motsoako oa lintho tse ngata joalo ka:

- ❖ Lehlabathenyana, "silt" le letsopa, tseo e leng mefuta ea mobu.
- ❖ Lintho tse putileng joalo ka makhasi, joang le moiteli.
- ❖ Lintho tse sa puting joalo ka majoe.
- ❖ Matsoai a kang "potassium".
- ❖ Moea le metsi.
- ❖ Likokoanyana tse nyenyane tse phelang mobung tseo ho seng bonolo ho li bona ka mahlo ka lebaka la bonyanyane ba tsona. Li ntlafatsa mobu ka ho ja makhasi/ mahaba, joang le tse ling. Ke likokoanyana tse kang manyoha ka mefuta ea tsona le tse ling.



*From: Lessons from Nature*

## Mefuta ea mobu

Mobu o etsoa ha liminerale tse fumanoang haholo-holo majoeng li thueha/ likumeha hanyane ka hanyane ka lilemo tse telele. Ka nako ena e telele, majoe ana a thueha/ kumeha ho fihlela eba makoete a manyenyane. Makoete ana a thuuoa ke lipula, meea le letsatsi. Kamorao ho liketsahalo tsena, re ba le ho bitsoang ka hore ke mobu moo re ka tsebang ho lema, lijalo li hole le likokoanyana tsa mobu li phele ka teng. Joalo ka batho, lijalo li ke ke tsa phela ntle le metsi, moea le lijo.

Mobu kaofela ke motsoako oa lehlabathe, "silt" le letsopa. Hore na mobu o tseba ho tsoara metsi nako e kae, ho ea ka hore na mobu o jolao o na le lehlabathe, letsopa kapa "silt" e kae. Mehla ea mefuta ea mobu ke: mobu o lehlabathe (sandy soil), mobu oo karolo boholo eleng lehlabathe 'me ho boetse ho ena le selokoe (sandy loam) selokoe, (loam) mobu o letsopa ebile o kopane le selokoe (clay loam) le letsopa (clay).

Lehlabathe le etsa mobu oo metsi a fetang feela. Mobu o bitsoang "silt" ke mobu o senang lehlabathe le lengata. Mobu ona o tsoara metsi le lijo tsa lijalo hantle ho feta lehlabathe le khorofa, le ha hole joalo, o tsamaea ha bobebe le metsi.

Letsoa ke karolo ea mobu e khoramelang. Le tsoara metsi joalo ka ha eka ke seponche. Mobu o nepahetseng ke selokoe, hobane o na le likaroloana tse le kanang tsa lehlabathe, "silt" le letsopa.

### Libopeho tsa mobu:

Mobu o lehlabathe	
Tse ntle ka mobu ona	Tse seng ntle haholo ka mobu ona
<ul style="list-style-type: none"> <li>❖ Ho bonolo ho o sebetša</li> <li>❖ Futhumala kapele hang ha mariha a tsoa</li> <li>❖ O motle bakeng sa lijalo tse holelang ka mobung</li> <li>❖ Moea le metsi li kena ha bonolo</li> </ul>	<ul style="list-style-type: none"> <li>❖ O oma ka pele</li> <li>❖ Ha o boloke manoni a mobu haholo</li> <li>❖ Ha o tsoare metsi hantle</li> </ul>
Selokoe (Motsoako oa lehlabathe le letsopa)	
Tse ntle ka mobu ona	Tse seng ntle haholo ka mobu ona
<ul style="list-style-type: none"> <li>❖ Tsoara metsi hantle</li> <li>❖ Motle sebakeng sa lijalo tse holelang ka mobung</li> <li>❖ Ona le liputisua tse ntlafatsang mobu</li> </ul>	<ul style="list-style-type: none"> <li>❖ Mobu ona o thata ha o omme</li> </ul>
Letsoa	
Tse ntle ka mobu ona	Tse seng ntle haholo ka mobu ona
<ul style="list-style-type: none"> <li>❖ Tsoara metsi hantle nako e telele</li> <li>❖ Tsoara manoni a mobu hantle nako e telele</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ha ho bonolo ho o sebetša hobane o boima</li> <li>❖ Lieha ho futhumala kamora mariha</li> <li>❖ Oa khoramela ha o le metsi</li> </ul>

❖ Ha o omme o thata.


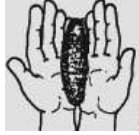



## Mokhoa oa ho tseba mofuta oa mobu


Ho bohlokoa ho tseba hore na mobu oo u nang le oona ke oa mofuta o fe. Ka tsela e na u tla tseba hore na u etse joang hore mobu oa hau o sebe thata o lule o qhalakane ka nako tsohle. Mobu o qhalakaneng e bile o se thata o tšoara metsi le moea haholo, e leng tse hlokoang ke sejalo hore se hole.

Hore mobu oa hau o qhalakane (E bang ke o lehlabathe, selokoe kapa letsopa), u lokela ho lula u ntse u tšela moiteli, mosuela hape u ntse u o koaela (mulch) ka litlamatlama kapa joang. U se ke oa tsamaea holima moo ho jetsoeng teng haholo ha mobu o le metsi.

Mobu o nang le lehlabathe le lengata, o lokela ho tšelo liputisoa (organic matter), e le ho nyolla ho tšoara metsi hoa oona, hammoho le ho tšoara lijo tsa sejalo. Mobu o letsopa oona o lokeloa ho tšelo liputisoa e le hore o tsebe ho tšoara moea le ho lokolla lijo tsohle tsa sejalo tse ka bang teng moo mobung.

Mefuta eohle ea mobu e hloka liputisoa e le ho nyolla manoni a mobu.

Chebahalo ea mobu	Mobu o utloahala joang ka letsohong	Ha mobu o bopiloe joalo ka boroso		Mobu O:
O lehlabathe le lengata	O khorofa haholo	Ha o bopehe		Lehlabathe le lengata
O lehlabathe	Khorofa	O oa bopeha, feela ha o kobehe		Lehlabathe
Halofa ke lehlabathe ha engoe e le mobu o boreleli	Khorofa	O oa bopeha, ebile o ka kobeha hanyenyane		Mobu o kopantseng lehlabathe le selokoe
Boholo ba mobu o boreleli	Lehlabathenyana le teng, o boreleli empa ha se letsopa	O oa bopeha ebile o ka kobeha halofo		Selokoe kapa selokoe se kopantseng le "silt"
Boholo ba mobu bo boreleli	Lehlabathenyana le teng, o boreleli, ebile ke letsopa	O ka kobeha ho feta halofo		Letsopa le kopaneng le selokoe kapa lehlabathe le kopaneng le letsopa

Mobu o boreleli	O boreleli ebile o letsopa	Boroso e ka kobeha hore e tse lebeli/lesale		Letsopa
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## Matsoai a mobu

Lintho tsohle tse phelang li bopiloe ka lerole la lefatse. Lijalo tsona lina le matsoai a latelang: "Hydrogen", "oxygen", "carbon", "nitrogen", "phosphorous", "potassium", "magnesium", "sulphur" le "calcium".

Lijalo li hloka mefuta e meraro ea matsoai:

- ❖ **Nitrogen (N)** – Ba keng sa mahaba a phetseng hantle le kholo ea lehlaka;
- ❖ **Phosphorus (P)** – Ba keng sa methapo e phetseng hantle;
- ❖ **Potassium (K)** – Ba keng sa sejalo se phetseng hantle ka kakaretso, hammoho le ho thunya le ho beha ha sejalo.

Lithlaku tsena NPK li bitsoa matšoao a lik'hemikale (chemical symbols). Ha u reka monontša u tla fumana hangata ho sebelisitsoe ona e seng mabitso ka botlalo.

Boraro ba mefuta ena ea lijo tsa lijalo e ka holimo, e fumanoa mosueleng kapa moiteling. U ka boela oa eketsa lijo tsena ka ho koala mobu ka makhapetla a lijalo tse kang lierekisi, semela se bitsoang "comfrey", le ka ho tšela mokeli-keli.

Hona le mekhoha e fapakaneng e ka sebelisoang ho ntlafatsa matsoai (fertility) a mobu eo u tlang ho e bontšoa.

## Nitrogen

### U tla tseba joang haeba mobu oa hau o hloka ho ekeletsoa nitrogen?

U tla tseba hore lijalo tsa hau li hloka nitrogen ha mahaba/makhapetla a tsona a fetola 'mala a eba masehla, a sa be matala joalo ka ha ho tšoanela.

### U ka eketsa nitrogen joang mobung oa hau?

Nitrogen e fumanoa mefuteng e mengata ea moiteli (oa likhomo, linku, lipoli, likhoocho, likolobe le li mmutlanyane). Le ha hole joalo, nitrogen e ngata haholo moiteling oa likhoocho le lipoli. Moiteli o lokela hore o be o omme pele o ka tšelo serapeng. Ha o le metsi, o matla haholo ebe

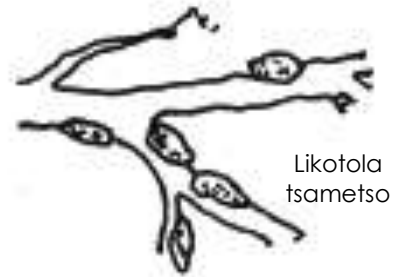


Likotolana metsong ea semela tse n kang letsoai nitrogen

o chesa lijalo tsa hau.

## Nitrogen e fumaneha lijalong tse behang ka mekotlana

Nitrogen e boetse e fumanoa ho mofuta oa lijalo o bitsoang "Legumes". Tsona ke lijalo tse etsang likotoloana metsong ea tsona, 'me likotoloana tsena ke tsona tse nkang nitrogen moeeng hore sejalo setle se e sebelise. Hona le likokoanyana tse nyenyane tse kang baketheria (bacteria) tse fumanoang methapong ea sejalo tse thusang ka ho nka nitrogen bakeng sa sejalo.



Akokonyana e bitsaong bacteria e teng likotoleng tsa metso e boloka letsoai nitrogen le tsoang moeeng ka mobung, e be e le lokolla hang ha semela se shoa

Ha methapo ea sejalo e shoa, nitrogen e tsoela mobung e be e sebelisoa ke lijalo tse ling tse haufinyane le seo se shoeleng.

Mehlala ea li "legume" tseo re ka lilemang ke:

- ❖ Makotomane
- ❖ Lierekisi
- ❖ Linaoa (Le tsa soya)
- ❖ Makotomane a sitsoang "Bambara"

Ho ntse ho ena le lijalo tse ling tse sa tloaelehang le lifate tse nyenyane tse thusang ho nka nitrogen. Mehlala ea tsona ke "chick peas", "mung beans", "lentils", li "legume" tse ling le tsona li kanna tsa lengoa le ha feela li ke ke tsa sebelisoa e le lijo tse hlokoang ke sejalo. Tsona ke tse kang; lesere, "clover", "hairy vetch" le "lupins". Li fana ka nitrogen e ngata mobung ho feta lijalo tse jeoang. Lijalo li kanna tsa lengoa lipakeng tsa li "legume" tsena.

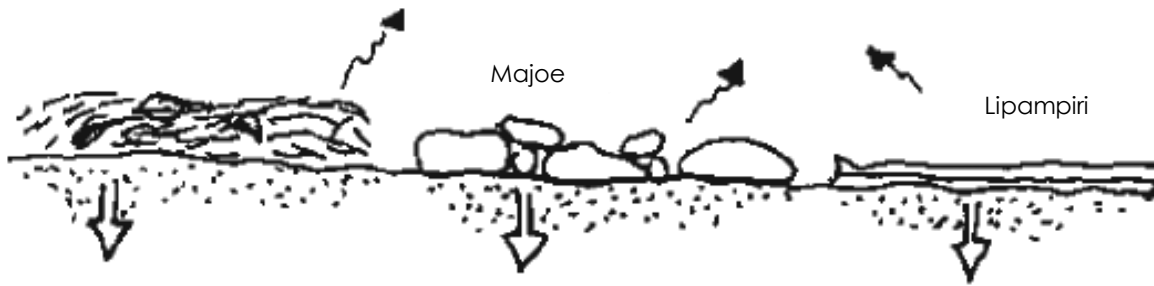


From: Food from the Veld, 1982.

Mahaba a li "legume" a ka sebelisoa ho koahela mobu (mulch) e le ho o tšireletsa letsatsing le lengata. Ketso ena e tla eketsa nitrogen mobung.

**Li fokotsa tahleho eamongobo mobung**

From: Production without Destruction,  
Natural Farming Network, Zimbabwe



## Phosphorous

### U tla tseba joang ha mobu oa hau o hloka phosphorus?

U tla tseba hore lijalo tsa hau li hloka phosphorous ha lisa hole ka pele joalo ka ha li tšoanela. Mahaba le oona a tla qala ho bontša bofubelu kapa bo pinkinyana ba sa tloaelehang haholoholo qetellong ea oona. Ha eba lijalo tsa hau li sa hole hantle li le nyenyane, le ha u tšetse mosuela, hona ho bontša hore ehlile lijalo tseo li na le khaello e kholo ea phosphorous. Hona ho ka etsahala haeba mobu o ena le bolila bo bongata. Re tla qaqisa tsena haholoanyane ha morao.

### Phosphorous e eketsoa joang mobung?

Boholo ba mobu Lesotho ha bona phosphorous. Ho batla hole thatanyana ho ekatsa phosphorous mobung ka tsela ea ho e kopanya le lijalo le mobu hobane boholo ba lintho tse nang le phosphorous li se bonolo ho sebetsana le tsona. Lintho tse joalo ke; mosese, masapo, moriri, masiba le mali. Hangata lintho tsena li kenyelletsoa ha ho etsoa mosuela.

Ntho e bitsoang ka hore ke "Natural Rock Phosphate" kapa setene sa phosphate e ka kopangoa e le joalo le mobu, empa le eona ha e fumanehe ha bonolo.

Phosphorous a ka fumanoa hape masapong a sitsoeng (bone meal). E ka rekoa moo ho rekisoang li sebelisoa tsa temo, feela e theko e phahameng. Mokhoa o mong oa ho kopanya phosphorous ke ho besa masapo lihoranyana li se kae. Ha a se a chele, u ka tseba hoa a sila ha bonolo. Ha a se a le phofo, u ka a fafatsa serapeng sa hau kapa holima mosuela (compost).





Moiteli oa likhomo tse fulelang sebakeng seo phosphorous e fokolang le oona o ke kebe oa ba le phosphorous e ngata. U ka eketsa phosphorous ka ho reka monontša. E tloaelehileng e bitsoa ka hore ke "superphosphate". Engoe ke DAP (Di-ammonium Phosphate) le eona u ka e sebelisa.

## Potassium

### U tla tseba joang ha mobu oa hau o hloka Potassium?

U tla tseba hore lijalo tsa hau li hloka potassium ha lirobeha ha bobebe le mahaba a e ba sootho ho ea qetellong a bile a omella. Ha li tholoana li sa behe hantle, u ka sola bosieo ba potassium. Matšoa a mang oona ha a bonahale ha bobebe. Le ha hole joalo a mang a oona ke bosehlanyana ho pota-pota methapo ea lehaba (hona ho kanna hoa bakoa ke lefu le itseng, joale ho ba thata ho tseba hantle hore na ho o eleng hona hantle ke hofe).

### Potassium e eketsoa joang mobung?

Lihlahisoa tse ntle tsa potassium ke moiteli oa likhooho le molora o ntseng o le mocha oa patsi. U seke oa sebelisa molora oa mashala kaha o kotsi mobung le lijalong. Sehlahisoa se seng sa potassium ke sejalo se bitsoang "Comfrey". Sejalo sena se na le makhasi a maholo a boea. 'me se mela moo ho leng metsi. Makhasi a sona a na le potassium e ngata. Makhasi ana a ka boela a sebelisoa ho kaohela mobu (mulch) serapeng kapa e le mokeli-keli sebakeng sa lijalo. (Re tla shebana le lijo tse metsi hamorao).



Liminerale (matsoai) tse ling tse hlokahalang hanyenyane joalo ka "magnesium", "zinc" le "iron", li fumanoa mefuteng e mengata ea moiteli le mosuela.

## Mobu o bolila

### Mobu o bolila ke o joang?

Liminerale le lijo tse hlokoang ke sejalo hore se hole li qhebelisoa ke metsi a teng mobung. Ketso ena e batla e tšoana le ha letsoai kapa tsoekere e qhebiliha ka metsing a khalaseng.

Mobu o bolila o batla o tšoana le metsi a kopantsoeng le vinegar. Libakeng tseo pula e leng ngata haholo, tse ling tsa liminerale li ka tsamaea le metsi, ebe joale mobu o sala o le bolila.

Ha mobu o le bolila haholo, tse ling tsa liminerale le lijo tsa sejalo li tla qhibiliha ka pele haholo hoo lijalo li tla sitoa ho li sebelisa. Athe tseling tsa liminerale tsona li ke ke tsa qhibiliha ho hang, e be hape lijalo ha li tsebe ho lisebelisa. Phosphorous ke engoe ea liminerale tsoe sejalo se ke keng sa e sebelisa ha mobu o le bolila, le haeba e le teng mobung.

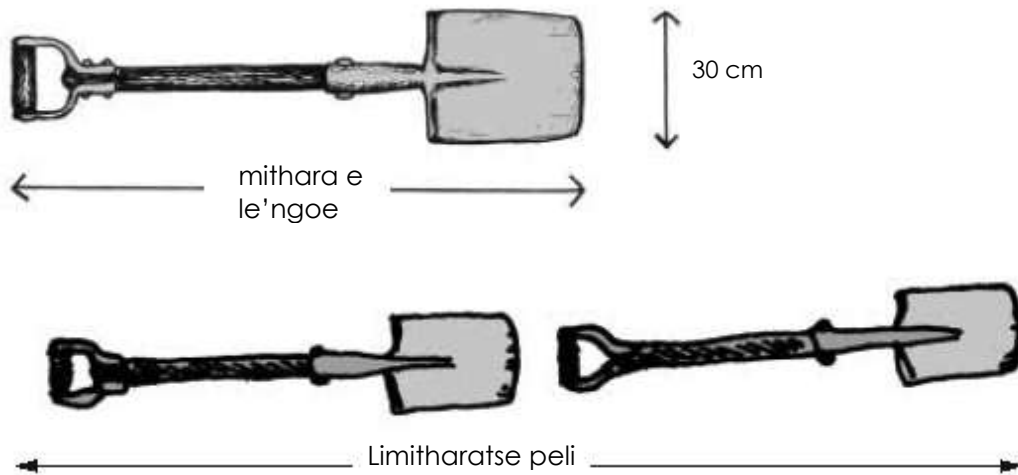
### U tla tseba joang ha mobu oa hau o le bolila?

U tla tseba sena ha u bona lijalo tsa hau li sa hole feela u ntse u tšela mosuela kapa moiteli, e bile u ntse u li tšella. U tla bona lijalo li sa hole li le nyenyane. Hona ke bothata bo tloaelehileng.

### U tla fenyha bothata boo ba mobu o bolila joang?

U ka bofenya ka ho tšela kalaka mobung. Kalaka ke phofshoana e tšeu ka 'mala, u ka e reka mabenkeleng.

E tšoaneloa ho chekelloa, bonyane botebo bo lekanang le metso/methapo ea sejalo sa hau. Bakeng sa meroho, e ba lipakeng tsa 30 – 60 cm. Hona ke bolelele ba hloho ea kharafu kapa tse peli. U lokela ho tšela k'hilokrama e lengoe (1 kg) ea kalaka ho leoto bophara le leoto bolelele (square metre). 1 kg ea kalaka e lekana le kharafu e tletseng. E hle e tlatsoe haholo.



Empa bakesang sa lijo tsa masimong joalo ka poone le mabele, tse nang le metso e tebileng, cheka licentimitara tse mashome a tseletseng (60cm) hoisa ho mithara e lengoe (1 m). Mithara e lengoe e lekana le bolelele ba kharafu.

Hangata kalaka e tšelo a khoeli tse peli hoisa ho tse tharo (2 - 3) pele ho jaloa kaha e sebetsa butle ka mobung. Ha u ka oa tšela kalaka ka nako eo u jalang ka eona, u tla tseba feela ho bona phapang selemong se hlahlamang ha u jala hape.

# Mekhoa e meng ea ho ntlafatsa manoni a mobu oa hau

## Moiteli

Mefuta e mengata ea moiteli oa liphoofole e ka sebelisoa. Eona ke oa likhomo, linku, lipoli, likolobe le likhoocho.

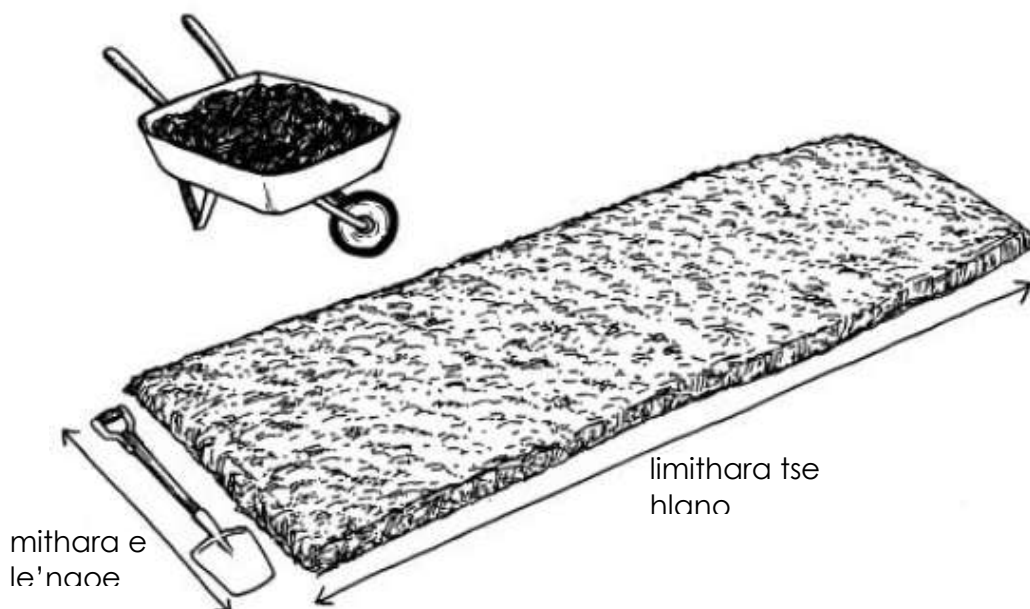
## Tšebeliso ea moiteli

Moiteli o ka sebelisoang ke o tsoang sakeng o kopaneng le lehlaka le mosese. Bokeletsa moiteli ona bonyane ha ngoe ka beke ebe u koahela ka joang kapa polasitiki.



### Moiteli o ka kopangoa le mobu ka mekhoe e fapaneng:

- ❖ U ka o sebelisa ha u jala sethopo ka ho kopanya liatla tse peli hoisa ho tse tharo tsa moiteli ka hara mekotjana eo u tlong ho lema sethopo ka teng.
- ❖ Moiteli hape o kanna oa lengoelloa serapeng ho ntlafatsa manoni a mobu. Sebelisa kiribae e lengoe e tletseng bakeng sa serapa sa boholo ba mithara e lengoe ho tse hlano-1m x 5 m(kharafu e lengoe ho tse hlano).



- ❖ Moiteli o ka sebelisoa hape le ho leifo. Leifo lena le chekoa botebo bo ka etsang licentimithara tse mashome a mararo (30cm), e leng bolelele bo ka etsang hlooho ea kharafu. Ha u qeta ho le cheka, tšela moiteli o ntseng o le mocha oa botebo ba licentimithara tse leshome (10cm) (e batlang e lekana le bophara ba feisi). Kamorao ho moo, tšela joang, lehola, ebe u koahela ka mobu ola o ileng oa u ntšha ka hona ka sekoting sena. Pele u jala, u kanna oa kopanya tsena tsohle le mosuela. Setšoantšo sena se ka holimo se bitsoa "hotbed" hobane ha moiteli o ntse o puta, o ntse o futhumala 'me o ntšha mocheso. Ketso ena e etsa hore mobu o chese, 'me hona ho nepahetse haholo libakeng tseo mariha a batang haholo.
- ❖ Moiteli o ka aloa serapeng, ka tsela ena o ntse o boetse o eketsa lijo tse hlokoang ke sejalo.
- ❖ Moiteli o ka tšelo sebakeng seo ho entsoeng mosuela ho etsa hore e hle ebe MOSUELA OA SEBELE.

## Mosuela

Mosuela ke motsaoko oa litlama tse metsi le tse ommeng le moiteli, tse ileng tsa puta 'moho hore li qetelle e le lijo tse matlafatsang tse hlokoang ke sejalo. Mosuela o boetse o thusa mobu hore o tsebe ho tšoara metsi hantle le ho tšireletsa lijalo mafung.

### Tse ntle ka mosuela

- ❖ Mosuela ke lijo tse hlokoang ke sejalo tse seng li le malala a laotsoe, tse sa hlokeneng hore li sebetsoe ke likokoanyana tsa mobu pele.
- ❖ Mosuela ha o bake lehola le lengata, joalo ka moiteli o mong oa liphoofole.
- ❖ U kaba le lijo tse ntle u sa sebelise chelete e ngata ho reka menontša.

### Tse seng ntle haholo ka mosuela

- ❖ Mosuela o hloka nako e ngata ho o etsa le ho o sebelisa.
- ❖ Boleng ba mosuela bo ipapisitse le hore na o entsoe joang le hona ka eng. Haeba o sa etsoa ka nepo, o ke ke oa eba lijo tse ntle tse hlokoang ke sejalo.
- ❖ Ha ho bolono ho fumana masalla a bolileng kapa a ntseng a le macha a lijalo kapa liphoofole tse shoeleng a (organic material) hlokalalang ho etsa mosuela.

## Ke eng eo u e hlokanang ho haha bethe ea mosuela?

### *U hloka ho bokelletsa tse latelang:*

- ❖ Lithlaka kapa masalla ohle a lijalo tse ling. Tsona ha li atlameha hoba le peo, empa ha ho tsotellehe hore na li metsi kapa li omme.
- ❖ Makhapetla a k'habeche le lehola (le le metsi kapa le omme), li se kebe tsa ba le peo.

- ❖ Moiteli
- ❖ Molora oa patsi

Lintho tse ling tse ka sebelisoang ho etsa mosuela e kaba lijo tse setseng ka kichining, metsi a hlatsoang lijana, lithole, liphoofolo tse shoeleng, masapo, boea, manaka le masiba. Ho bohlokoa hore u tsoake mosuela oa hau le sefate se bitsoang "comfrey".

LINTHO TSE SA TŠELOENG MOSUELENG: Polasitiki, likhalase, tšepe, patsi, libeteri tsa khale, eng kapa eng e ke keng ea puta hore e qetelle e le karolo ea mobu.



## Sebaka sa ho etsa bethe ea mosuela

- ❖ Moo ho tšireletsehileng letsatsing, feela e seng haufi haholo le sefate.
- ❖ Moo ho tšireletshileng moeeng o mongata.
- ❖ Moo ho senang maqhutsu.
- ❖ Haufi le serapa le metsi.
- ❖ Moo liphoofolo li ke keng tsa fihlela habonolo (haholo kolobe, likhoho le lipoli).

## Mokhoa oa ho etsa bethe ea mosuela

### *Mokhoa oa pele:*

Khetha sebaka seo u tlang ho se sebelisa, ebe u se phethola/lema ka mohoma oa letsoho kapa ka foroko (digging fork). Sebaka sena se lokela hoba boholo ba mithara e lengoe ka tse peli (1 x 2 m), e leng bolelele ba kharafu tse peli le bophara ba e



lengoe.

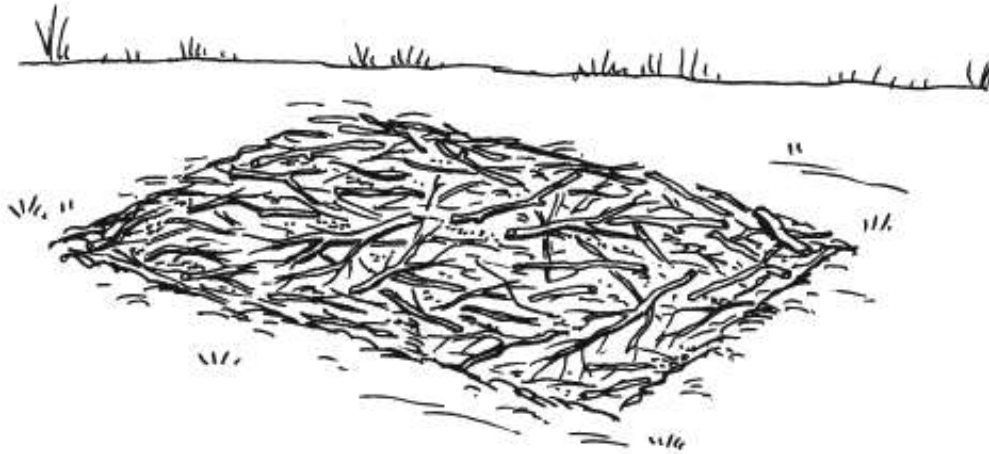
### ***Mokhoa oa bobeli:***

Khabela lithlaka, makhapetla/joang, lehola hore li be likaroloana/ liphisi tse nyenyane. Kopanyelatsa le comfrey le makhapetla a k'habeche. Tsena li lokela ho khaoloa bolelele ba licentimithara tse leshome (10 cm). Ka tsela ena li tla puta kapele.



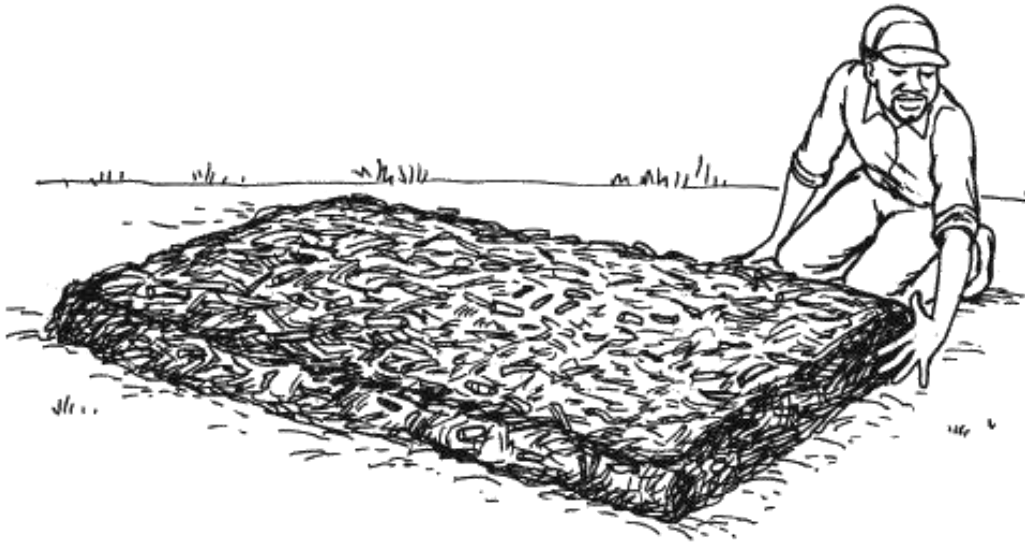
### ***Mokhoa oa boraro:***

Ala makala a manyenyane a lifate holima mobu o u qetang ho u phethola.



### ***Mokhoa oa bone:***

Koahela ka motsoako ola oa litlama-tlama, botebo bo ka e tsang licentimithara tse mashome a mararo (30 cm), e lekana le botebo ba seatla. Haeba u na le lintho tse tsoang ka kichining, li kopanyeletse hona joale.



***Mokhoa oa bohloano:***

Tšela moiteli ka holimo ho tsena kaofela, o be botebo ba licentimithara tse 'ne (4 cm) / bophara ba menoana e 'meli.



***Mokhoa oa botšelela:***

Tšela mobu holima moiteli, botebo ba licentimithara tse peli (2 cm). Bophara ba monoana.



***Mokhoa oa bosupa:***



Fafatsa molora oa patsi holima mobu (haeba u sebelisa kalaka, phofshoana e entsoeng ka masapo a sitsoeng, u ka hla oa li tšela hona joale).



***Mokhoa oa borobeli:***

Tšella ho fihlela metsi a monyela fatše.

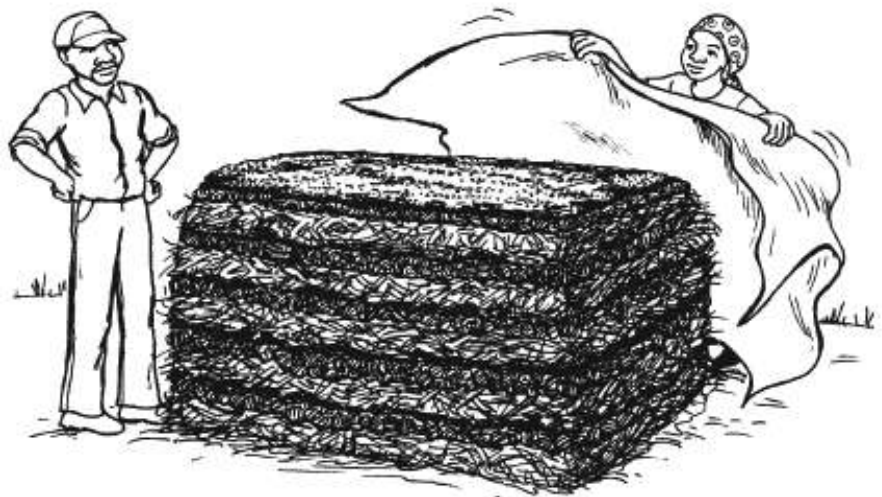
***Mokhoa oa borobong:***

Tsoela pele ho haha bethe u ntse u pheta mekhoe e ka holimo ho fihlela bethe e khutla sefubeng sa hau.



***Mokhoa oa leshome:***

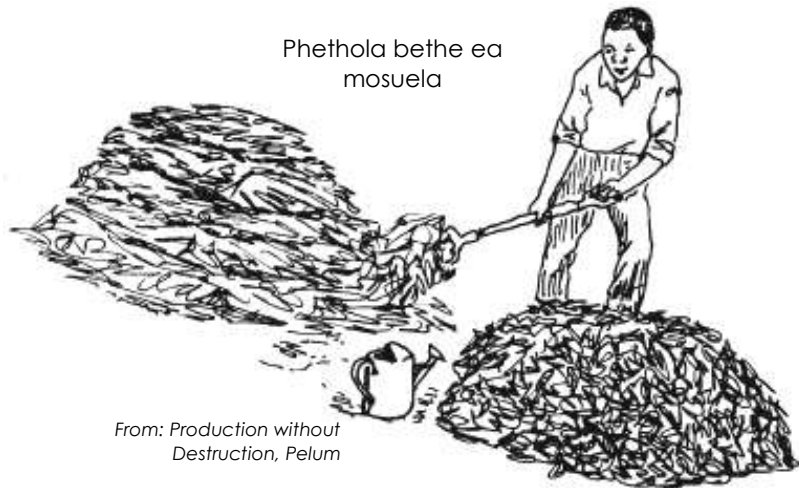
Koahela bethe ea hau ka lehlaka le lengata, joang kapa polasitiki. Hona ho thusa hore metsi le mocheso li se lahlehe le hore li pute kapele. E thusa hape le hore liphoofolo li se ke tsa tanakella moo li be li qetelletse li e sentse.



Ho bohlokoa hore u lule u ntse u phethola bethe ena ea mosuela beke tse ling le tse ling tse peli. Haeba mosuela o omeletse, u tšelle. Ha u latela tsena tsohle hantle, mosuela oa hau o tlabe o lokile ka morao ho libeke tse tšeletseng haele hlabula kapa libeke tse robeli ho isa ho tse robong haele mariha.

Libaka tseo ho batang

haholo ebile li ratoa ke lehloa, bethe e lokela ho koaheloa haholo, eseng joalo, ha hona letho le tla etsahala, ka mantsoe a mang e ke ke ea puta.



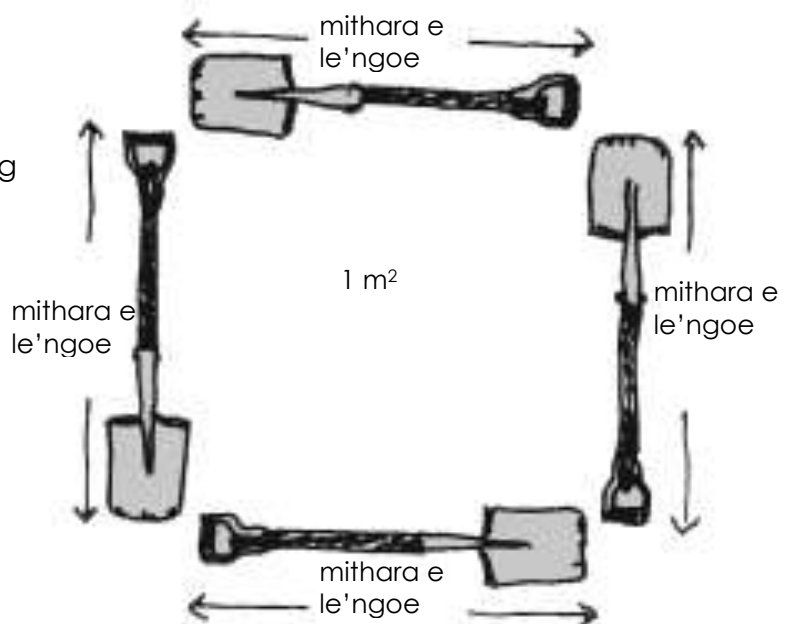
## Mosuela o loketse hore o sebelisoe ha o le joang?

Ha mosuela o ntse o thunya, ho bontša hore o ntse o puta KA MATLA/HAHOLO.

Mosuela o tlabe o lokile haeba o se o fetotse 'mala o le motšonyana e ka mobu o mongobo. Hape mosuela oa 'nete ha o na monkho (haeba o ena le monkho e bile o le mofuthu HA SE MOSUELA HOHANG!).

## Tšebeliso ea mosuela

- ❖ Jala sethopo se seng le se seng ka mosuela o ka e tsang liatla tse peli hoisa ho tse tharo.
- ❖ Lemella mosuela tjena: Phethola mobu botebo ba hlooho ea kharafu, e tsa bonnete ba hore ha o na makoete. Hasanya kharafu tse nne (4) tse tletseng tsa mosuela sebakeng sa leoto bophara le leoto bolelele (1 square metre). U le melle hanyenyane e be u oa jala.
- ❖ U ka sebelisa mosuela ho koahela mobu (mulch) ka ho o hasanya serapeng sa hau.



From: Vikela, May 2003, FSG



## Liteko

### Liteko tsa hobona hore na mobu oa hau o Na le kalaka le phosphate e lekanengu

Tekong/ patlisisong ena u tla lokela ho sebelisa lirapa tse 'ne (4) tse lekanang. Lirapa tsena li lokela ho lekana le mithara e lengoe mahlakore kaofela (mithara e lekana le bolelele ba kharafu). E tsa bonnete ba hore lirapa tseo li tšoahe ka lithupa hore u se ferekane ha u ntse u tsoela pele ka teko.

#### **Serapa sa 1:**

Lema serapa ka tsela e tloaelehileng e be oa se jala

#### **Serapa sa 2:**

Le sona se leme joalo ka sa pele, ebe u tšela likhaba tse kholo tse tletseng tsa "superphosphate". E tšele hore e anele serapa kaofela, ebe u oa e phetholela. Jala ka tsela e tloaelehileng.

#### **Serapa sa 3:**

Lema serapa ka tsela e tloaelehileng, ebe u tšela lekolokoti/botlolo e lakanang le ea jeme e tletseng kalaka. Le eona e tšele hore e lekane serapa kaofela, ebe oa e phetholela. Jala ka tsela e tloaelehileng.

#### **Serapa sa 4:**

Lema serapa ka tsela e tloaelehileng, ebe u tšela likhaba tse peli tse kholo tse tletseng tsa "superphosphate" le lekolokoti le le leng le leholo la kalaka. Li tšele hore li anele serapa ebe oa li phetholela. Jala ka tsela e tloaelehileng. Sena ke setšoantšo se bontšang hore na teko/patlisiso ea hau e tšoanela ho shebahala joang.

Joale u tšoanela ho lula u ntse u lekola teko/patlisiso ea hau. Beke engoe le e ngoe u shebe le ho ngola fatše hore na ke lik'habeche life tse ntle hofeta tse ling. Hape u shebe hore na li hola joang, 'mala oa tsona ( hore na litala kappa litšehlana) le bophelo ba tsona ka kakaretso (hore na li shebahala li phetse kapa li na le mafu ). Mohlala oa ho ngola liphetho tsa hau ke o latelang. U ka etsa melana (table) e be kahare ho eona u ngoala liphetho tsa hau, ho tloha bekeng ea boraro.

Lirapa tse tekong/patlisisong	Tse sa kenang tekong <b>1</b>	Phosphate <b>2</b>	Kalaka <b>3</b>	Kalaka le Phosphate <b>4</b>
Serapa se lengoeng kh'abeche e le mohlala				

	<b>Serapa 1</b> Se seng tekong patlisisong	<b>Serapa 2</b> Phosphate	<b>Serapa 3</b> Kalaka	<b>Serapa 4</b> Kalaka le Phosphate
Beke 1	Kh'abeche e shebahala hantle	Kh'abeche e shebahala hantle	Kh'abeche e shebahala hantle	Kh'abeche e shebahala hantle

Beke 2	Kh'abeche e ntse e hola feela e se e ena le bosehlanyana. Empa ha ena mafu.	Kh'abeche e ntse e hola, haena bosehla, hape haena mafu.	Kh'abeche e ntse e hola hantle. Hape haena mafu.	Kh'abeche e ntse e hola hantle hape haena mafu, e se lile e le motala se lile bo lefifi.
Beke 3				
Beke 4				
Beke 5				
Beke 6 etc				
Liphetho tsa ho qetela. Kholo:				
'mala:				
Bophelo:				
Nomoro ea li kh'abeche tse shebahalang hantle				

Ha re khutleleng morao sehlohong se sa tsoa feta se neng se bua ka liteko tse e tsoang ke sehoai. U ka sebelisa moralo o tšoanang ho bona hore na teko ea kalaka le phosphorous li tla u thusa joang ho ntlafatsa mobu oa hau.

Moralo o ka sebelisong tekong ea meroho e fokolang ka palo	
Bothata ke bofe?	Kh'abeche ea ka ha e hole hantle, le ha ke se ke tsetse mosuela kappa fethalisara/manyolo.
Bothata boo nka bo fenya joang?	Ke tla tsela kalaka le phosphorous ho bona hore na ho tla ba le phapang.
Hobaneng ha ke sebelisa mokhoa oo?	Mohlomong mobu oa ka o hloka ho tseloa phosphorus, kalaka kapa bobeli ba tsona.
Mokhoa oo ke tla o leka joang?	Ke tla tsela kalaka polotong e ngoe, ke tsele phosphorous ho e ngoe, ho ea boraro ke tla li tsela li le peli. Ke tla siea poloto e ngoe ea bone (4) ke sa e tsela letho e le hobona hore na ehlile kalaka le phosphorous li etsa phethoho li kh'abecheng tsa ka.
Ke tla fumana likarabo joang? Ke tla be ke shebile eng?	Ke tla sheba mahaba a kh'abeche hobona hore e fela a le matala joalo kaha a tsoanela. Ke tla sheba hape hore na lik'abeche tsa ka li feela li phetse hantle li sena mafu.

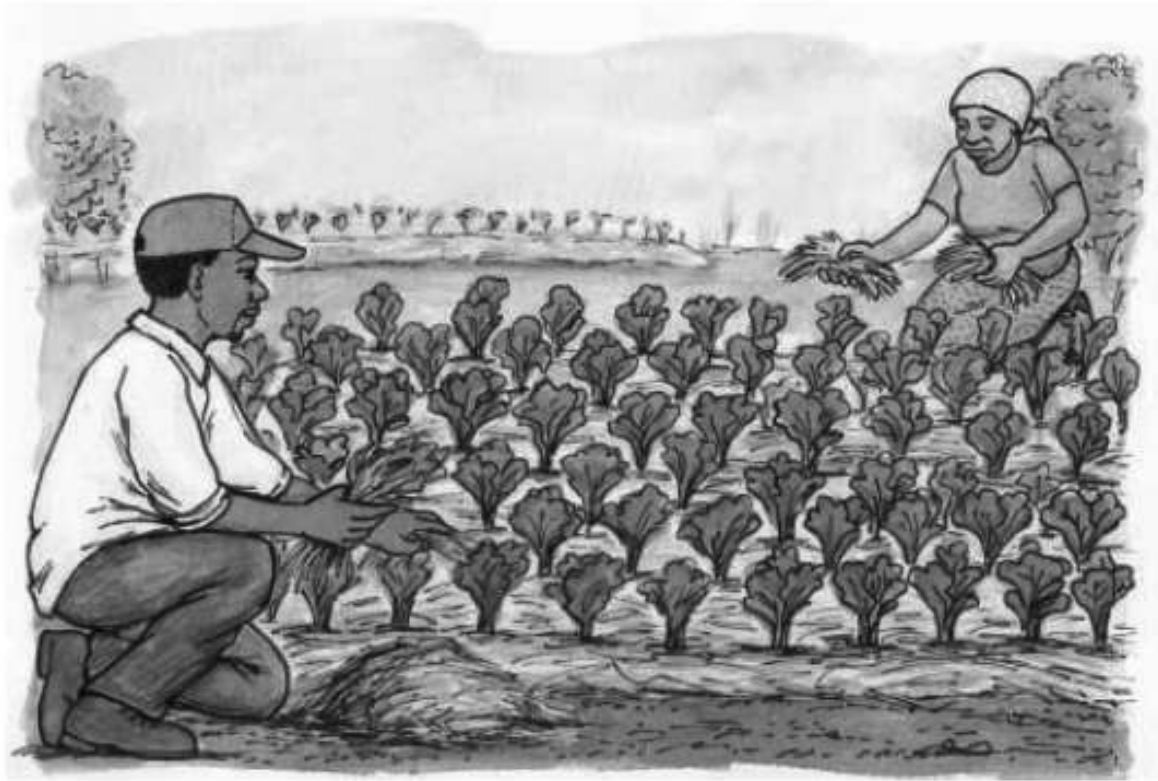
Mokhoa o mong oa ho fumana likarabo ke ofe?	Ke tla metha ho hola ha likh'abeche tsa ka ke sebelisa khoele.
Ke tla sebelisa eng ho bona hore na likarabo tsa ka li nepahetse?	Likh'abeche tse holang hantle haholo, li le tala, lisena bosehla bo bongata, ebile li shebahala li phetse hantle ho feta tseling, e tlaba tsona tse ntle hofeta.
Ke tla bapisa joang teko e le mokhoa o ke tloaetseng ho o sebelisa tsebetsonh e ea ka ke le sehoai?	Ke tla tseba hore polotong eo ke fumaneng liphetho tse ntle/ tse khotsofatsang, ke lokela ho sebelisa ntho eno mobung oa ka. Mohlala, sebelisa kalaka le phosphorous 'moho, ke tla lokela ke ho li tsela mobung/ lipolotong tsohle tsa ka.

Le ha ho le joalo, kahara bukana ena ho na le mekhoe e mengata e khothaletsoang ho ntlafatsa mobu oa hau. U ka etsa teko ka mokhoa ofe kapa ofe ho bona hore na lijalo tsa hau li tla atleha na ha u e sebelisa.

U ka etsa hlahlobo ea hobona hore na mobu o u nang le oona ke oa mofuta ofe, ebe u tšela mosuela.

- ❖ U ka eketsa monontša o bitsoang nitrogen ka ho tšela moiteli.
- ❖ U ka eketsa nitrogen ka ho lema li legumes
- ❖ U ka eketsa phosphorous (Ha u e reka e bitsoa superphosphorous).
- ❖ U ka eketsa monontša o bitsoang potassium ka ho tšela moiteli oa likhooho.
- ❖ U ka eketsa potassium ka ho tšela molora o mocha oa patsi.
- ❖ U ka eketsa kalaka , hore e felise bolila ba mobu.
- ❖ U ka eketsa moiteli.
- ❖ U ka eketsa mosuela.
- ❖ U ka eketsa mokeli-keli oa comfrey kapa oa liphoofolo.
- ❖ U ka koahela (Mulch) mobu u sebelisa makhasi a "legumes". Bakeng sa e ngoe le e ngoe ea likhothaletso tse ka holimo, u ka etsa teko ho bona hore na ke efe etla sebetsa ho feta tse ling. Hopola ho ngola liphetho tsa liteko tsohle tseo u li etsang, e le hore u tle u ikhopotse lilemong tse tlang ha ho hlokeha. Ha u bolokile kapa u ngotse liphetho tsa hau, u tla tseba hore u li arolelane le baahisane hammoho le motse kaofela le hore le bona ba tle ba arolelane tsa bona le oena.

## 2. Ho koahelamobu hore u se lahleheloe ke mongobo



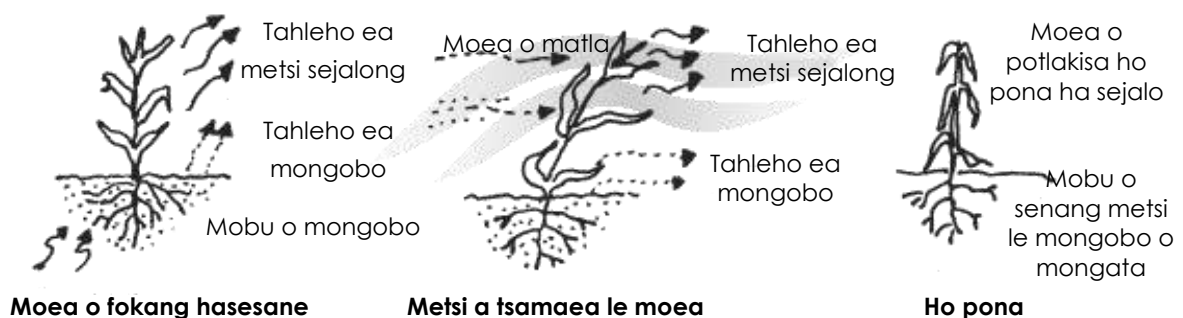
Ho koahela mobu ho bolela ho ala eng kapa eng e tla etsa hore mobu o lule o le mongobo o bile o pholile sebakeng sa lijalo. Hona ho futhumetsa mobu nakong ea mariha.

### Mobu o koaheloa hobaneng?

Ho koahela mobu hona le melemo e 'meli (2):

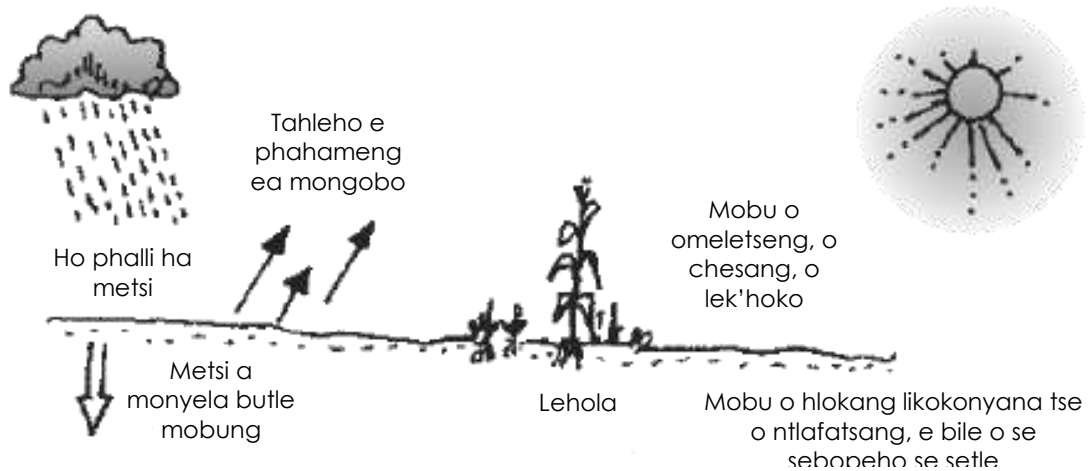
- ❖ Ke ho boloka metsi. Ho thibela mocheso oa letsatsi le moea ho nka mongobo, 'me ka tsela e joalo, lijalo li ke ke tsa noesetsoa khafetsa hobane metsi a sa lahlehe kapele, ho tloha lijalong ka botsona le mobung.

**Seo lebatama la letsatsi le moea o fakang ka matla li se etsang mobung o hlobotseng**



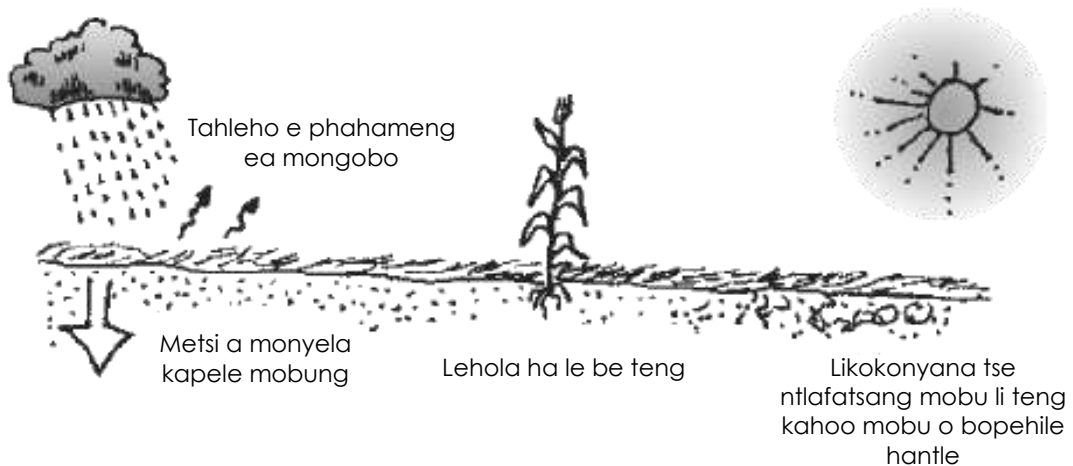
- ❖ Ho koahela mobu ho etsa hore mofuthu le mohatsela oa mobu e be o lekaneng. Ho boetse ho thusa hore mobu o seke oa chesa kapa oa phola haholo, ele hore lijalo li tle li hole hantle.

### Mobu o lepala-paleng



### Mobu o koahetsoeng

From: Production without Destruction. Natural Farming Network, Zimbabwe

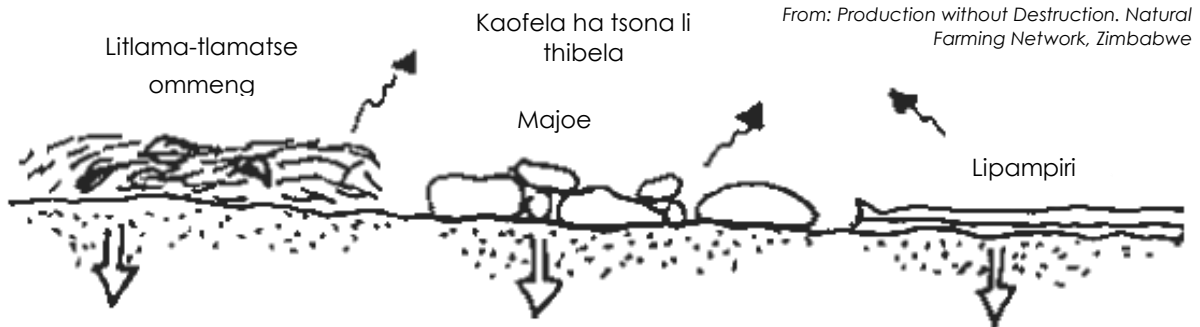


### Linthla tse ling mabapi le ho koahela mobu

Mathatanyana	Tse molemo
<ul style="list-style-type: none"> <li>❖ Ha ho bonolo ho fumana lisebelisoa sebakeng sa ho koahela mobu</li> <li>❖ Ka nako engoe, ho koahela leifo la lihoete ho ka etsa hore lihoete tseo li liehe ho hlaha</li> <li>❖ Batho ba bang ba bona moo ho koahetsoeng ho le bohlasoa</li> <li>❖ Ho koahela mobu ho ka baka likhofu</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ho thusa hore mobu o se lahleheloe ke matsoai</li> <li>❖ Ho fokotsa lehola</li> <li>❖ Ho atisa likokonyana tse ntlafatsang mobu</li> <li>❖ Ho thibela mobu hoba le Lek'hoko le qetellang le le thatha</li> <li>❖ Ho bola hoa lisebelisoa ho eketsa matsoai mobung</li> <li>❖ Ho sireletsa mobu khahlanong le marotholi a pula le ho jaleha hoa mafu a fumanehang mobung</li> <li>❖ Ho fana ka bolokolohi bakh?lo ea methapo ka</li> </ul>

mobung. Hona ho etsa hore methapo e fumane litlhoko tsohle ka mobung

## U ka sebelisa eng ho koahelamobu?



From: Production without Destruction. Natural Farming Network, Zimbabwe

### Hangata ho sebelisoa tse latelang:

- ❖ Lithlaka, makhasi, makhapetla, joala-joalo. U SEKE oa lisebelisa haeba li bonahala li ena le matšoao a mafu, hobane li tla tšoaetsa lijalo tsa hau, le mafu ao a tla kena mobung
- ❖ Leholo le ommeng
- ❖ Joang. Etsa bonnete ba hore o sebelisa joang bo ommeng, hobane ha bo le metsi, bo tla monya matsoai a mobung ebe lijalo ha li fumane letho.
- ❖ Majoe a sephara. Majoe oona a koahela feela ha a fane ka matsoai. A loketse lijalo tse seng li le kholo le lifate tsa litholoana.
- ❖ Likoranta. Li fana ka tšireletso hape li eketsa matsoai mobung. Fafatsa koranta ka metsi pele u koahela mobu ka eona hore e se fefoloe ke moea.
- ❖ Sebelisa joang bo ommeng kapa manyolo a seng a putile.
- ❖ Makhasi a tlhotlholehileng lifateng.
- ❖ Mohlomo oa khale.
- ❖ Polasitiki e ntšo.

## Re koahela joang?

- ❖ Khaola lisebelisoa tsa hau, haholo joang le litlama-tlama hore libe bolelele ba seatla kapa licentimitara tse leshome ho isa ho tse mashome a mabeli
- ❖ Koahela mobu ha sesane moo sethopo se hlangoeng se le seng kappa ha lijalo li sale nyenyane. Koahela ka botebo bo ka etsang bophara ba monoana
- ❖ Bakeng sa lijalo tse kholo, koahela haholo. U ka lekanya ka



Seatla =  
10 – 20 cm



Monoana =  
1.5 cm



Menoana e'meli =



bophara ba menoana e 'meli ho isa ho e mararo (3-4 cm)

- ❖ Bakeng sa lifate, koahela haholo ho feta. Lekanya ka seatla kapa ho feta. (10-20 cm)

Ha sesebelisoa, mohlala joang, se putile, eketsa se seng hape. U tla makatsoa ke ka moo bo putang kapele ka teng. Ho kanna ha etsahala hore joang kapa se sebelisoa se seng feela se eketsoe bonyane hangoe selemong kapa hangoe khoeling tse ling le tse ling tse tharo. Libakeng tseo ho batang haholo mariha, khothaletso ke hore se sebelisoa se koahetseng mobu se tlosoe hang ha serame se lala. Lebaka ke hobane se sebelisoa seo se tla etsa hore serame se lala le ho feta.



## Liteko

Hopola ho etsa teko ea ntho e 'ngoe le e 'ngoe eo u qalang ho e sebelisa.

### Lethathamo la teko

- ❖ Bothata ke bofe?
- ❖ Tharollo e kaba e fe?
- ❖ Hobaneng ha ekaba tharollo ea bothata boo?
- ❖ Mokhoa oo ke tla o leka joang?
- ❖ Ke tla fumana likarabo joang? Ke tla be ke shebile eng?
- ❖ Mokhoa oa ho bekha litholoana tsa mosebetsi oo ke o fe?
- ❖ Ke tla bapisa joang teko ee le mokhoa oo ke tloaetseng ho o sebelisa bohooing ba ka?
- ❖ Bontša moralo oa hau oo u tla o latela tšimong?

### Lipotso tsoe u ka ipotsang tsona tekong ea ho koahela mobu

- ❖ Na u koahetse lijalo tsohle tsa hau kapa che?
- ❖ Na lijalo tse neng li koahetsoe li bile kholo le hona ho atleha ho feta tse neng li sa koaheloa?

- ❖ Na u sebelisitse metsi a fokolang lijalong tse neng li koahetsoe?
- ❖ U sebelisitse eng ho koahela mobu? E bile molemo? Kamoso u tla sebelisa eng ho koahela mobu?