

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)

1. Pokello le tšebeliso ea metsi



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

Pokello ea metsi e ka etsoa ka mekhoha 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 flas'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.

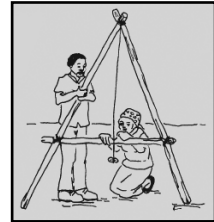
'A-frame' e sebelisoa le ho etsoa ha bobebe!



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

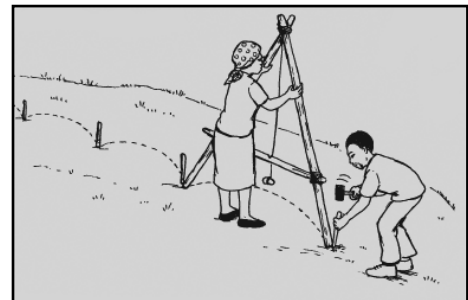


- 3 Fasa khoele lehlakoreng le kaholimo la kosene. Ntlheng engoe ea khoele u faseletsa lejoe. Phahamisa kosene, e tšehetse hore e eme e otlohlile holim'a sebaka se batelehileng hantle. Khoele le lejoe li lokela ho leketlela fatše. Etsa letšoao palong e tlamelletsoeng ho tse peli tse telele (maoto) moo khoele e thetsang teng. Tebello ke hore letšoao le tla ba bohareng ba eona palo eo.



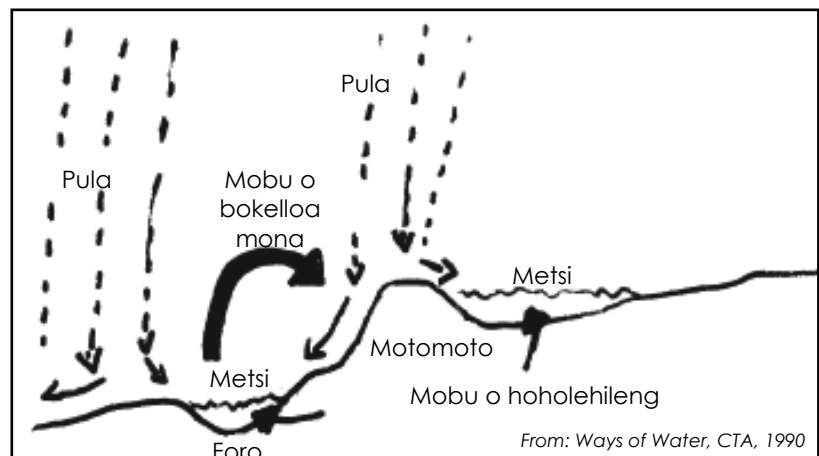
Tšebeliso ea kosene:

- 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

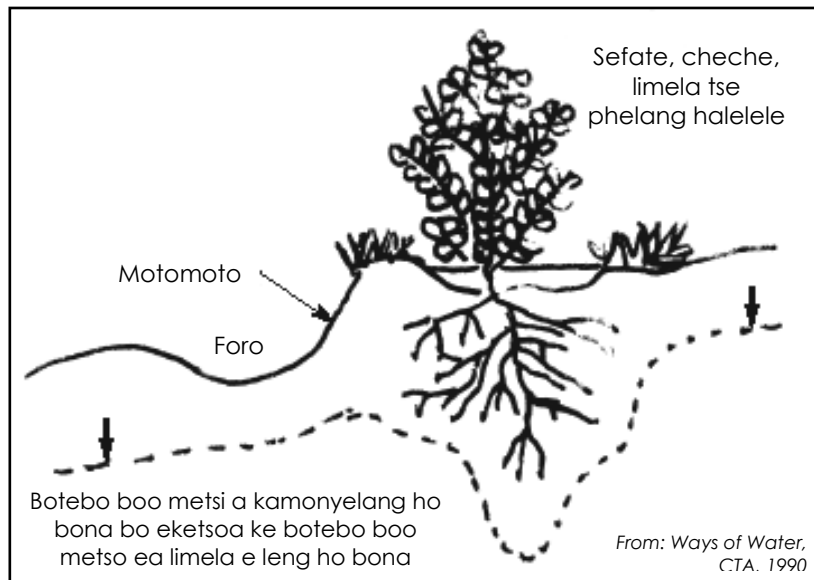
Cheka foro ea botebo ba lisenthimithara tse mashome a mararo le bophara bo lekanang sebakeng seo u se tšoaaileng. Bokella mobu lehlakoreng le kaholimo ho foro ho etsa motomoto ka ona. Metsi a pula a tla bokellana ka forong 'moho le lehlakoreng le ka moepeng la motomoto.



From: Ways of Water, CTA, 1990

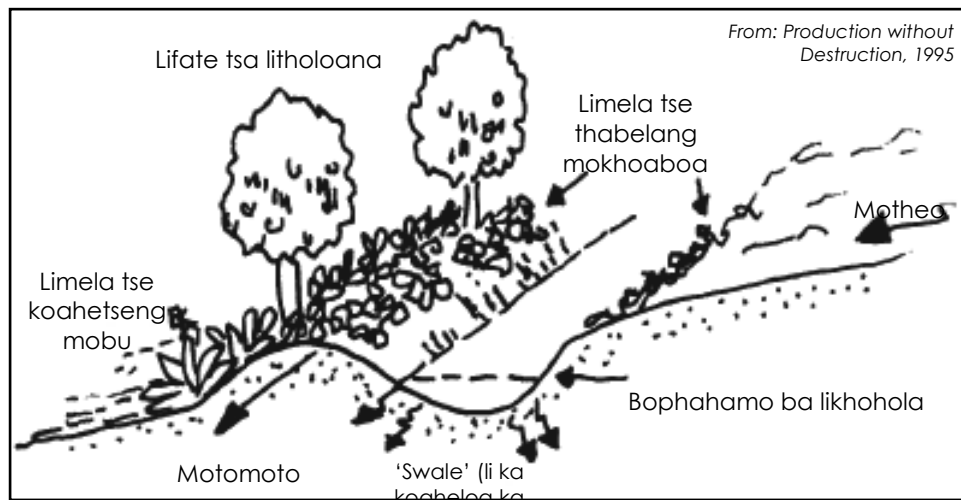
Metsi a tla monyela ho fapana le ho phalla. Ha mobu o hohotsoeng ke metsi o bokellana lehlakoreng le kaholimo la motomoto sebaka seno se tla qetella se batelehile. Leha ho le joalo hona ho tla etsahala ka mor'a matsatsi a mangata.

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 litlamma-tlama tsa li matlafatsi. Bakeng la khetheo 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'

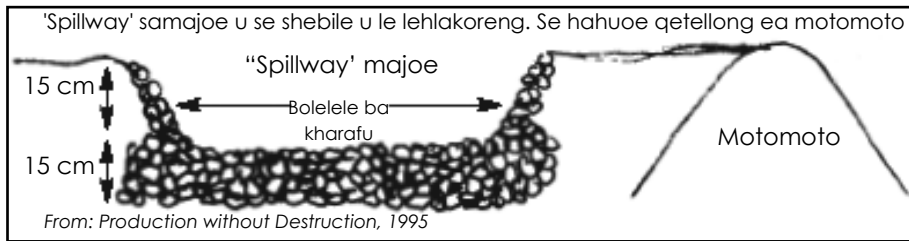
Ke mofuta oa motomoto o sa tšoaneng le mofuta o hlahositsoeng pele ka hore ho oona mobu o bokelloa



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 u ntša.

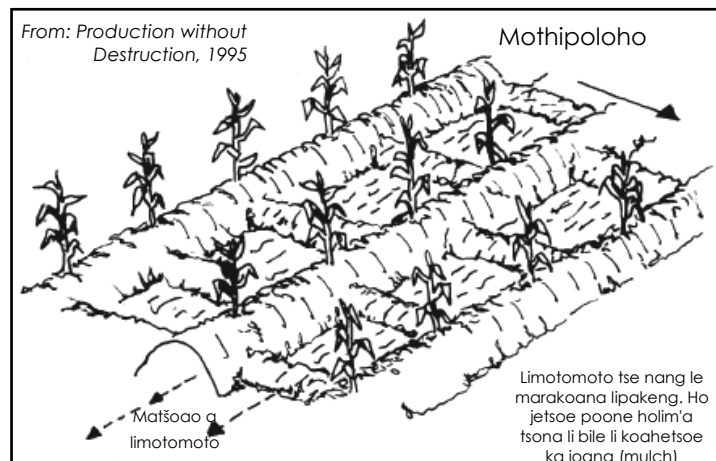
Mefuta e 'meli ea limotomoto e hlahositsoeng kaholimo e lokela ho ba bophahamo bo ke keng ba lumella metsi ho phalla kaholimo. Ho qoba boemo bona u lokela ho haha 'spillway' ka majoe hore ha metsi a le mangata a tšolohe le hona teng a nto phallela tlase ho mothipoloho.



Limotomoto tse nang le marakoana lipakeng

Marakoana a hahoa lipakeng tsa limotomoto. Marakoana a laola phallo ea metsi haholo nakong ea lipula tsa litloebebele. 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.

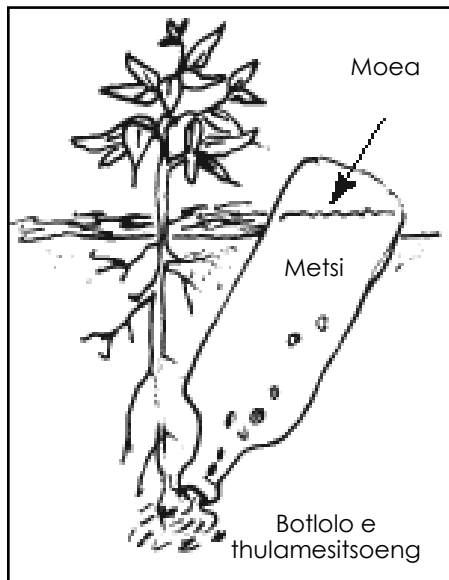


Tšebeliso ea metsi ka hloko

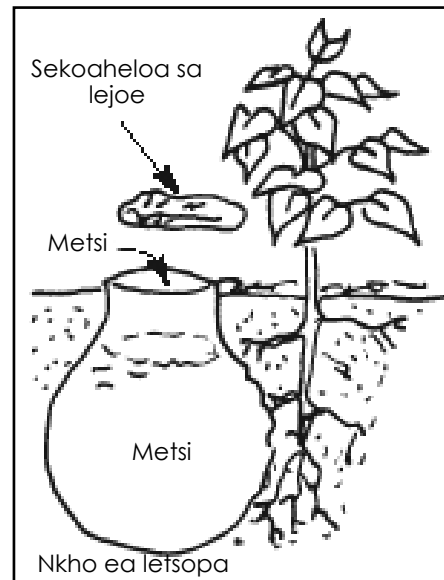
Karolo ena e hlalosa mekhoha ea ho phetaka tšebeliso ea metsi bakeng la serapeng.

- ❖ **Greywater:** Ke metsi ao uena le ba lelapa la hau le a sebelisitseng bakeng la ho itlhatsoa '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 tšebeliso ea metsi ka hloko.

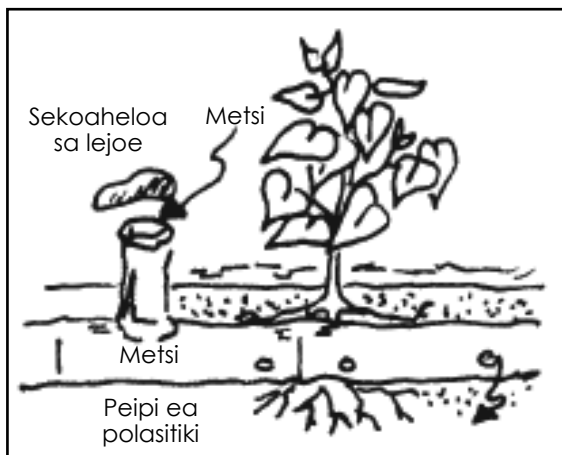
Mekhoa ea ho tšella e fokotsang tšenyho ea metsi



From: *Production without Destruction*, 1995



From: *Production without Destruction*, 1995



U ka sebelisa peipi e nang le masoba e paqamisitsoeng ka flas'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 lebota

From: *Introduction to Permaculture*

Mokhoa oa bobele 2:

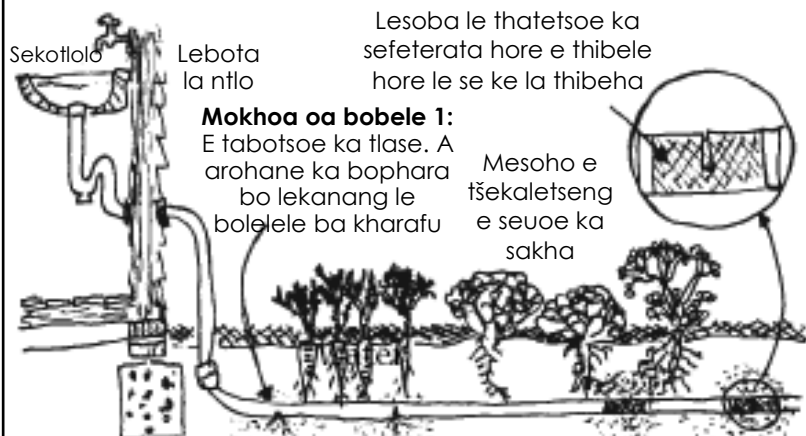
E tabotsoe ka holimo. A arohane ka bophara bo lekanang le bolelele ba kharafu

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 seuo e ka sakha



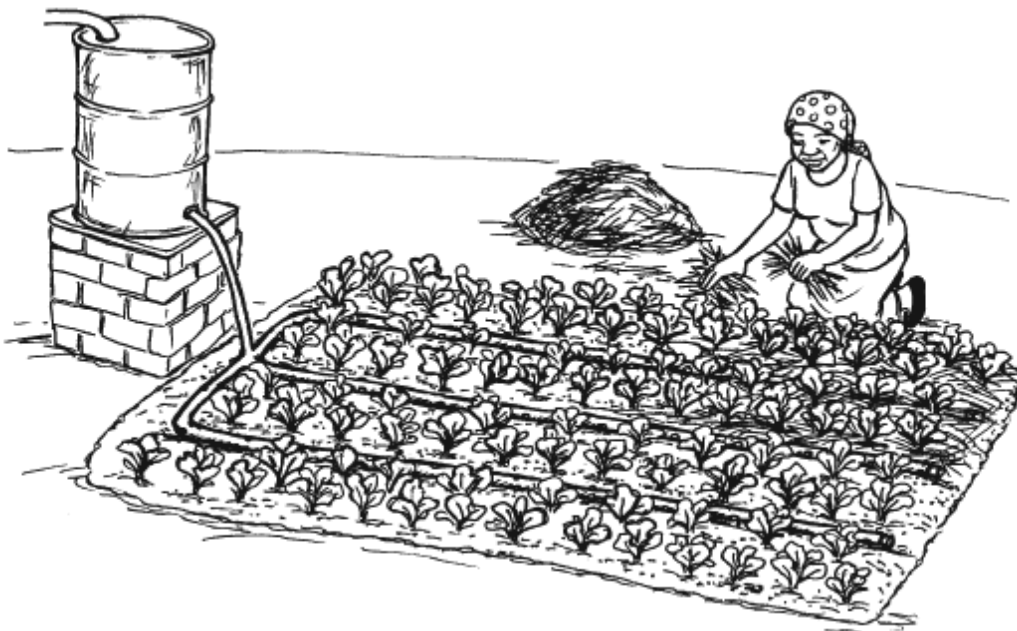
Tlhokomeliso: U se ke ua sebelisa mokhoa ona mobung o letsopa le lengata

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 tse 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.

U ka fumana thepa eo u ka e sebelisang bakeng la 'drip irrigation' khoebong e latelang: **Maluti Irrigation in Maseru, Tel: 588 31394.**

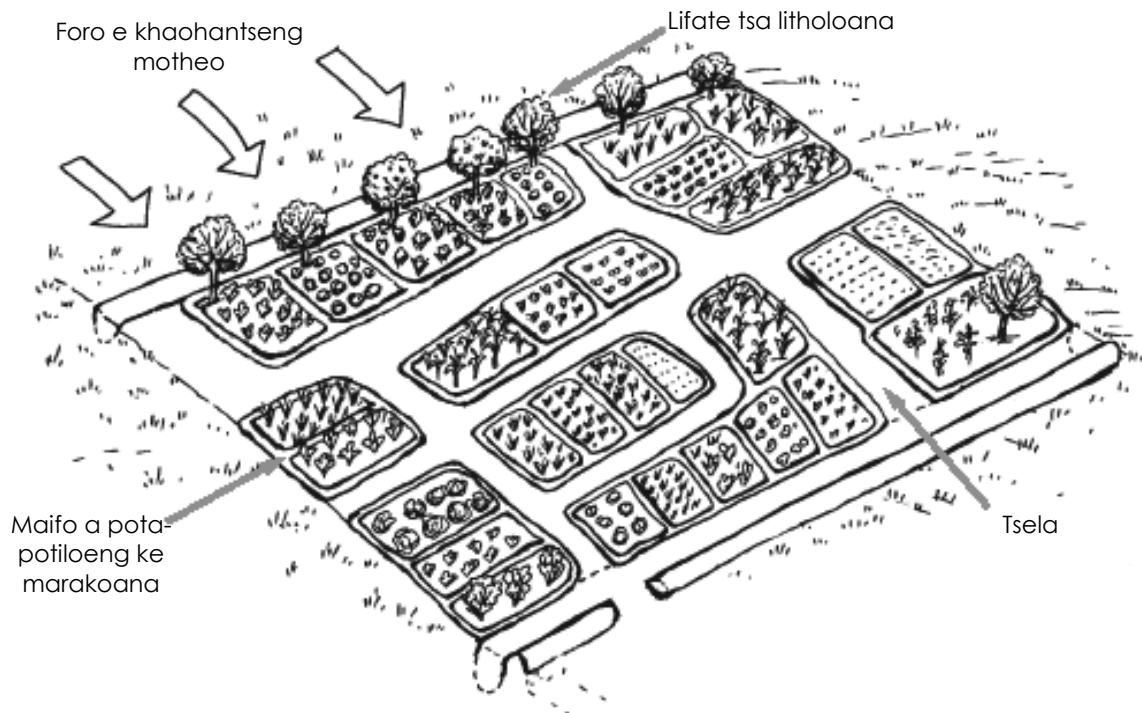


Mokhoa o mong oa tšebeliso ea metsi ka hloko ntle ho lipeipi le tanka ke ona:

- ❖ 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 chekuoeng 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.

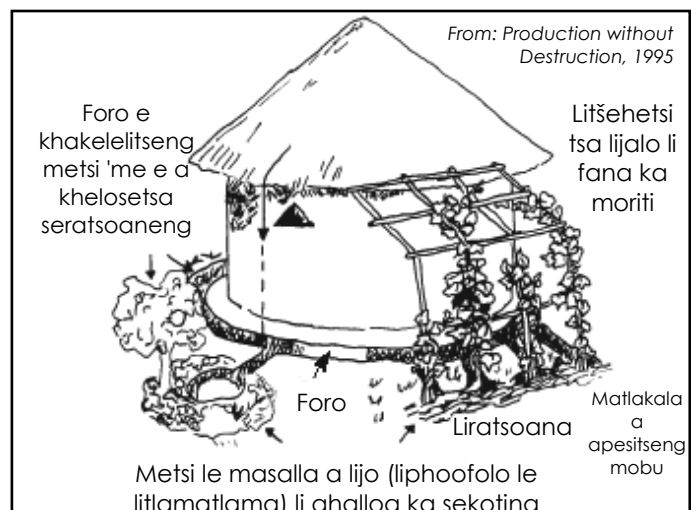


Pokello ea metsi a phallang liphuleng kapa marulelong

❖ Metsi a tsoangmarulelong

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

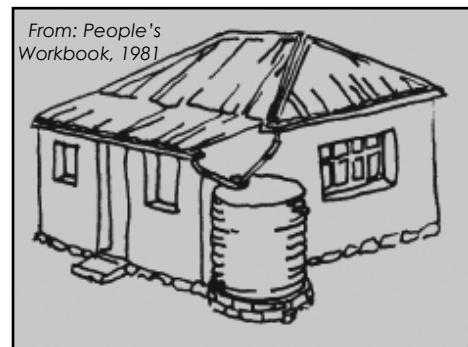
- Ho bohlokoa ho etsa foronyana ho potoloha le ntlo hore e khakeletse metsi a theohang marulelong. Metsi ano a ka khelosea seratsoaneng se haueng ka sebopeho sa tlhako ea pere. U ka bala sehloho sena 'Ho haha lirapa' bakeng la tlhaloso ea mokhoa oa ho haha seratsoana se joalo.



- o 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: Lilitlithara tse likete li leshome

Tse hloka halang: 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 (bohlo ba masoba e be 50 mm; botenya ba eona e be 1 mm; bolelele e be 16 m; bophara e be 1 m)

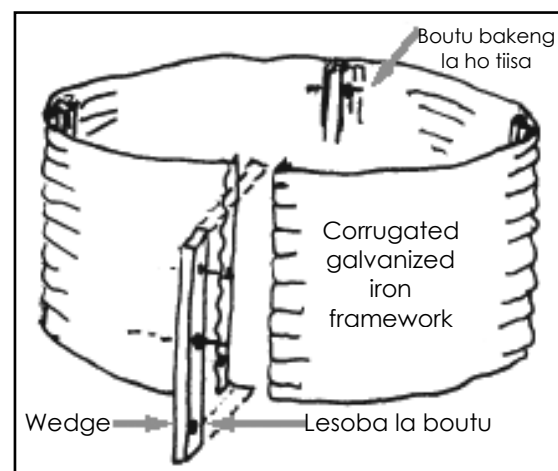
Peipi ea tšepe (botenya e be 20 mm; bolelele e be 1 m)

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.

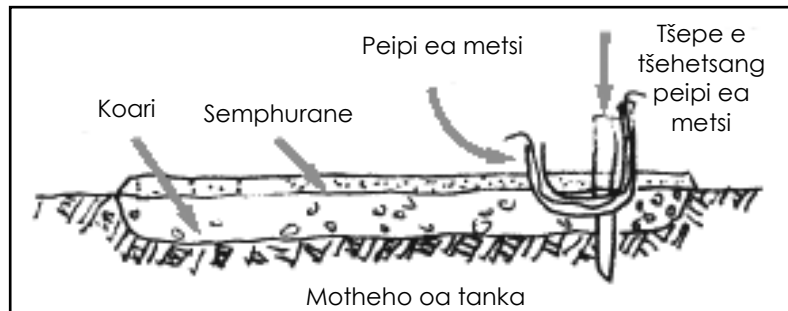
Foromo: U hloka foromo e tiileng e tla u thusa ho haha tanka ea samente. Mofuta oa foromo oo u ka u sebelisang ka bobebe le ka katleho ke o entsoeng ka mofuta oa masenke a rulelang matlo. U ka sebelisa masenke a leshome le metso e tšeletseng. Bolelele ba le leng e be likharafu tse peli. U tla hloka 'steel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



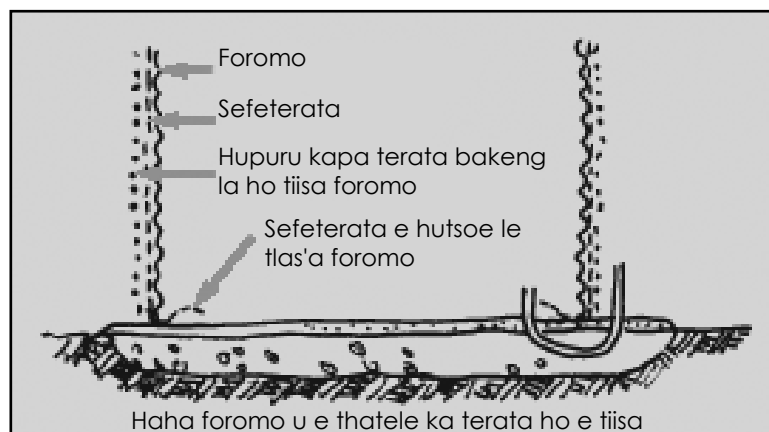
Foromo bakeng la ho haha tanka ea samente

Ketso ena e bebofatsa hore u arole foromo.

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 kharafu e kobehileng ka mokhoa oa hore karolo e hlapeletseng 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.

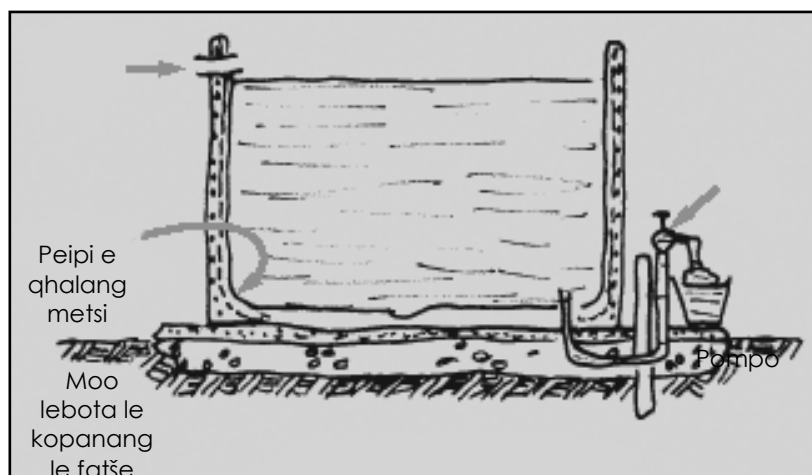


Mabota: U faseletsa thepa eohle ho bopa foromo e be u e beha holim'a motheho o tiileng hantle. Potisa sefeterata kantle ho foromo. E faseletse hore e fie. Potetsa karolo ea sefeterata tlas'a foromo e le hore u tle u e lilelle nakong eo u tšelang fatše kahar'a tanka. Potisa terata ka holimo ho sefeterata. 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 khothaletsa 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 lebota '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.



An example of a tank built from stone and cement

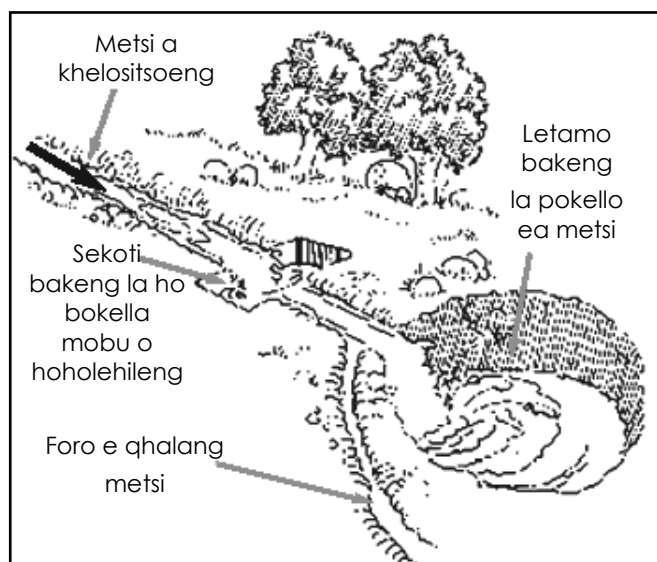


Likhakeletsi tsa lesenke kapa polasitiki li ka sebelisoa ho khakeletsa metsi ho tsoa ntlong ea joang. Leha ho le joalo metsi a joalo ha a lokele ho nooa ka lebaka la litšila.

❖ 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'.

o Tanka tse hahueng ka mobung

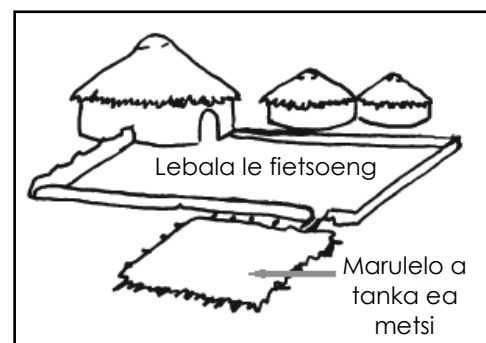
U ka khelosa metsi a phallang lebaleng kapel'a ntlo kapa leralleng hore u a bokelle ka tankeng e ka mobung. U ka haha lebota le lenyane bakeng la ho a khelosetsa ka tankeng.



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 mekhoha 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.

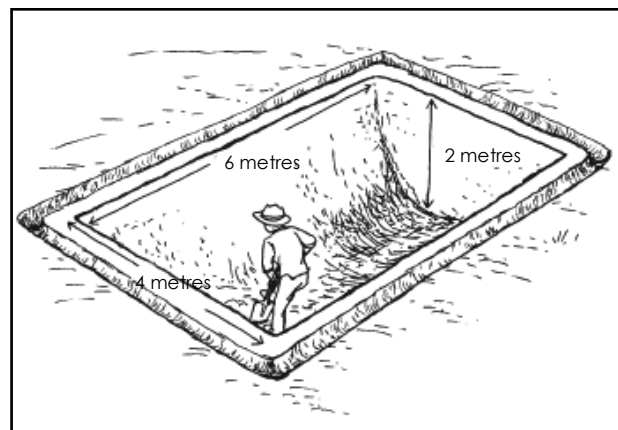
Cheka sekoti se mahlakore a boholo bo latelang:

Bolelele: likharafu tse tšeleletseng,

Bophara: likharafu tse 'ne,

Botebo: likharafu tse peli.

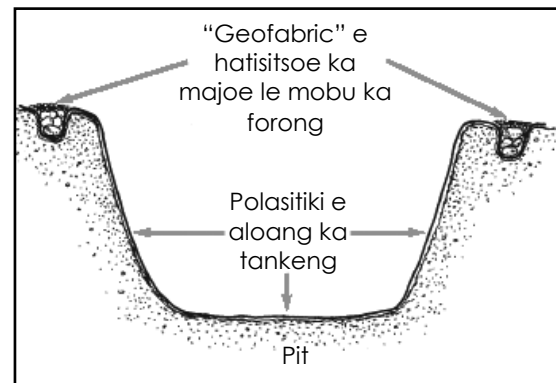
Mabota ha a lokela ho otloloha. U lokela hore u a cheke ka mokhoa oa hore a thulame. Lebota le lokela hore le be boreleli.



Cheka foro ho potapota sekoti. E lokela ho ba botebo ba lisenthimithara tse

mashome a mararo. U tla hatisa lipolasetiki ka mobu hore o e tšoare hore e tiee.

Ala polasetiki (geofabric) ka sekoting. Etsa bonnete ba hore karolo ea polasetiki e bolelele ba kharafu bo ka forong e potapotileng sekoti. Hatisa karolo ea polasetiki e ka forong ka majoe le mobu. Ka ho etsa joalo polasetiki e ke ke ea huleha ha e utloa boima ba metsi ka tankeng. Tanka ea boholo bona e hloka 'geofabric' ea boholo ba 90 m².



Penta polasetiki 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 lilithara 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,
South Africa.
Phone: 011 - 452 5310

Sealant:

Tosas; Spartan factory in
Johannesburg South Africa
Phone: 011 - 902 1905