

CLIMATE RESILIENT AGRICULTURE: PRACTICES FOR SMALLHOLDER FARMERS VOLUME 2 PART 8 FARMER HANDOUTS: SEPEDI

E Kruger, MC Dlamini, T Mathebula, P Ngcobo, BT Maimela & S Ntonta



**WATER
RESEARCH
COMMISSION**

TT 841/9/20



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Water Research Commission
by
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Volume 1: Climate Change Adaptation for smallholder farmers in South Africa. An implementation and decision support guide. Summary report. (WRC Report No. TT 841/1/20)

Volume 2 Part 1: Community Climate Change Adaptation facilitation: A manual for facilitation of Climate Resilient Agriculture for smallholder farmers. (WRC Report No. TT 841/2/20)

Volume 2 Part 2: Climate Resilient Agriculture. An implementation and support guide: Intensive homestead food production practices. (WRC Report No. TT 841/3/20)

Volume 2 Part 3: Climate Resilient Agriculture. An implementation and support guide: Local, group-based access to water for household food production. (WRC Report No. TT 841/4/20)

Volume 2 Part 4: Climate Resilient Agriculture. An implementation and support guide: Field cropping and livestock integration practices. (WRC Report No. TT 841/5/20)

Volume 2 Part 5: Climate Resilient Agriculture learning materials for smallholder farmers in English. (WRC Report No. TT 841/6/20)

Volume 2 Part 6: Climate Resilient Agriculture learning materials for smallholder farmers in isiXhosa. (WRC Report No. TT 841/7/20)

Volume 2 Part 7: Climate Resilient Agriculture learning materials for smallholder farmers in isiZulu. (WRC Report No. TT 841/8/20)

Volume 2 Part 8: Climate Resilient Agriculture learning materials for smallholder farmers in Sepedi. (WRC Report No. TT 841/9/20)

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Climate Resilient Agriculture: Mekgwa ya balimi potlana

1 CLIMATE RESILIENT AGRICULTURE (CRA) KE ENG?

Climate resilient agriculture e netefatša go oketsa ditšweletšwa tša temo le tšhelete, go le gare go leka o berekiša megwa ye bonolo ya temo gape lego netefatsa gore tsela ya rena ya temo ke ya maleba ebile e loketši hlago. E bolela ka go dira diphetogo o ya le ka mokgwa wo re lemago le felong la fetoga gore le kaonafatse bokgoni bja rena le bja naga gore re gone go phela ka di phetogo tse.

Kgatelelo e ka serapeng goba ka lapeng. Climate Resilient Agriculture e netefatsa go kaonafatša dibjala, diphoofolo lego hlokomela hlago gape le mobu le hlokomelo ya meetse bjalo kage di bonagatswa seswantsona sa go latela.

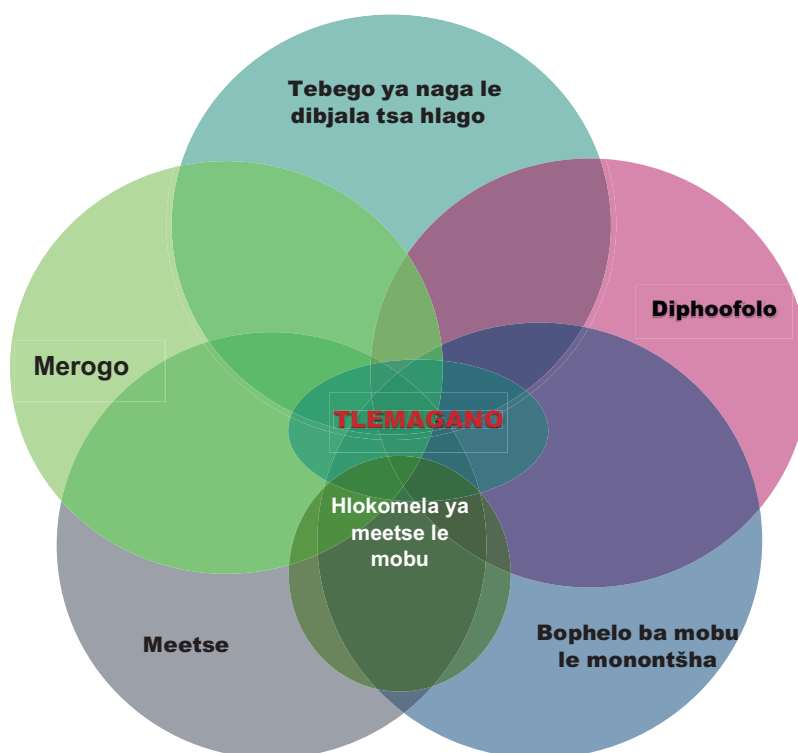


Figure 1: Household level Implementation of CRA Integrates across sectors (adapted from Arslan, 2014)

Gona le di tsela tsa temo tšeo dika re tswelago mogola. Legano ke la gore re leke ditsela tšeo dire loketšego bjalo ka batho le lefelo leo re dulago gomme re bapetse le ditsela tšeo re setšego re di berekiša gore re gone go bona phapano gape re dire kgetho ka go fetola ditsela tša rena tsa temo.

Go hlakanya mehuta ya go fapana ya temo go oketsa phetogo.

The practices are briefly described below/ Ditirišo di hlalošitšwe ka bo kopana mo fase.

Further information can be found on the following websites/Tsebo ye e ngwe eka kgwetšagala go

www.mahlathini.org

www.amanziforfood.co.za

2 DITSELA TŠEO

Ditsela tšeo redi dirišitšego go kgetha mekgwa/ditirišo tsa temo ke tse di latelago.

- Go fokotsa dkenywa tsa ka ntle
- Go oketsa phapapano ya dilo goba dibjalo
- sGo nepiša seemo sa mobu le mokgwa ya tlhago ya go aga mobu
- Go hlokomela tikologo
- Go berekiša meetse ga alego gona gabotse
- Berekang mmogo, ithuteng mmogo lebe le rulaganya dmmogo.

Mehuta ye kamoka e dirišitswe le balemi potlana ba babagwe mengwageng e meraro go iša go ye seswai ye e fetelego, ebile re a tseba gore mehuta e ya bereka. Re le lakaletsa mahlatse le mahlogonolo ka go e leketsa.

3 HLOKOMELO YA MEETŠE (HLOKOMELA MEETŠE A A LEGO GONA LE GO OKETŠA KHUMANEGO YA MEETŠE)

3.1 DIFORO TSA GO NOELETŠA MEETŠE (DIFORO TSA GO FITIŠA, DIFORO TŠA GO NOELETŠA)

Tse ke moela wa diforo (30 cm bophara le 15-30 cm go iša fase) tse di e epiwang go laola tšhipidišo ya meetse lefelong la maleba goba go kgobakanya lego dumelela meetse gore a tsenelele ka gare ga mobu waka serapeng, morago a epelwe ka mothapalalo.

Go bjala godimo ga mmoto, wa tšhela manyora/dibodišwa le gobipetša ka majwang/mahlare godimo ga mmoto le diforo ke leano le le botše.

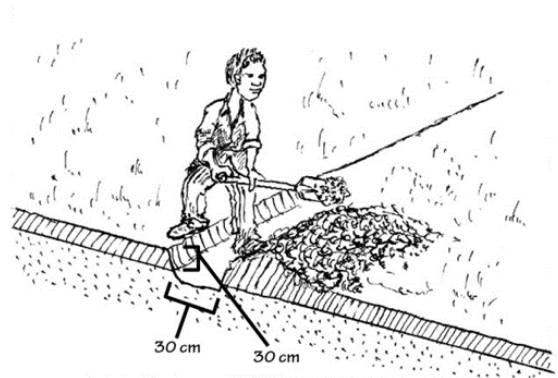
Doforo tse oketsa phihlelelo ya le go hwetšagala ga meetše mo hlokegong ya go tšewletša ga dijo.

DINYAKWA

- Pula: >150mm/ngwaga
- Thempheretšha: >5°C
- Boemo ba naga: Tshekamo engwe le engwe
- Mobu: 5-35% letsopa, botelele >15cm

DIDIRIŠWA

- Dirapa, tshemo
- <0,1ha, 0,1-1ha
- Theko yta tlase, mothopo wa kgauswi
- Go bonolo go dira le go boloka;
- mošomo o boima



Diforo tše di dikologang, di bipeditšwe ebile ba bjala merapa godimo ga mmoto.



Go epa diforotsa go dikologa (1,5-5% sekama; 30cm bopharale 30cm goya fase mobu o beya godimo ga go sekama.



Go lokiša mmoto wa diforo tsa go dikologa gore o tle bjale, o lokiše le go tšhela morole

3.2 MOELA WA MEDIYA O O AROGANYENG.

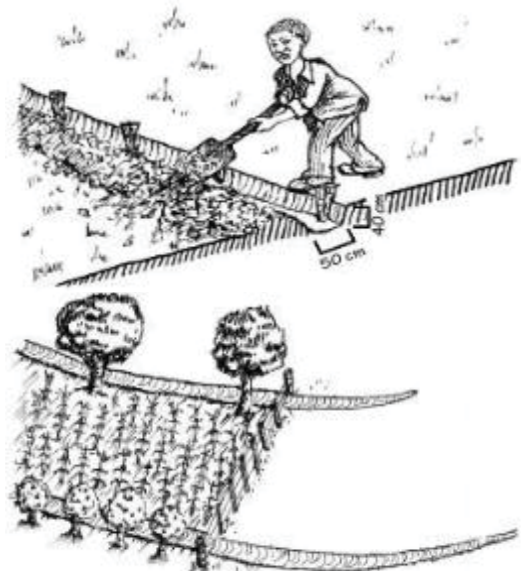
Moela ke banka ya lefase e e dirilwego gaušwi le sebopego le foro (40 cm o iša fase le 50 cm go bophara) godimo ga tshekamo. Ka godimo ga banka ya lefatshe ke ditekanyo go dumelela go bjala. Moela o gahlanetsa go kitima ga meets, ebe e phahlalatsa ebile e thusa gore meeste a tsenelele lefaseng. Ka tlwaelo, Dibjalo tša go tswana le dienywa di bjakwa fase ga mmoto wa moela, mola dibjalo tsa sehla (merogo) di bjakwa magareng ga meela.

DINYAKWA

- Pula: >150mm <1200mm/ngwaga
- Thempheratšha: >5°C
- Boemo ba naga 5%-25%
- Mobu: mehuta ka moka – Le ge mobu wa santa kgotsa wa letsopa e le boima go e hlokomela.

DIDIRIŠWA

- Dirapa, tshemo
- <0,1ha, 0,1-1ha, >2ha
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



Barulaganya moela le meela e me bedi eo e bontšhang tshipidišo ya meetše



Ge o epa moela/diforo. Mobu o tšhelwa ka lehlakoreng la go fetiwa ke le lengwe.



O ka bipetša ka mahlare kgoša jwang godimo ga di foro le merogo e o e bjadilego mo di forong le mmoto



Go lokiša mebete ka hlase ga moela

3.3 DIFORO LE MEBOTO

Diforro di epiwa godimo ga thapalalo gomme mobu wa beiwa ka godimo ga mosekamo wa lefaše mo mmotong. Go bjälwa go diragala godimo ga di mmoto kgotsa diforo gomme meets a sepela mo diforong. Go a kgonega go dirasefapano sa kgokaganyo go netefatša go nošetša ga maleba gore meetse a kgone go kgobakana ka gare ga di foro a nwelela lefašeng. Gobipetša ke mokgwa o lokileng.

DINYAKWA

- Pula: >150mm/ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 0,5%-5%
- Mobu: Mehuta ka moka

DIDIRISWA

- Dirapa/Tshemo
- <0,1ha, 0,1-1ha
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



Diforro le meboto e šomišwa ka tšhimong; keletšo gore meboto e kgokagana go tshwara meeste kamo doforong.



Serapa se sedirilweng ka go somisa mekgwa ya diforo le meboto; go bjadilwe tamati, dikherotse, le sepenitšhe. Keletšo Hlokomela mepeto mo setshwantshong pele letsogong le letona



Serapa sa diforo se go bjadilweng tamati se bipeditšwe. Gonošetša ka moela wa meetse o šomišwa diforo.



Mehlare ya dienywa eka kopanywa le mebete ko mokgwa wa go tshwana le mo senepeng

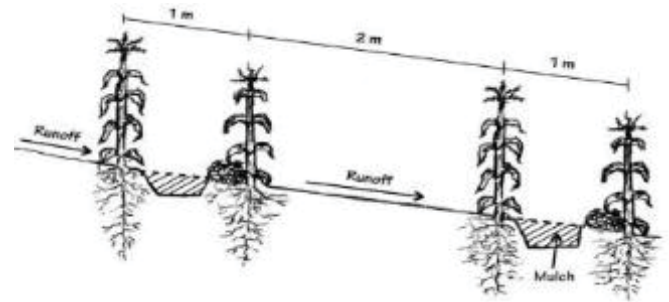
3.4 KGOKAGANYO YA MEBOTO

O ke mokgwa wa go oketsa meets a aleng gona go di bjalo ka go kgabakanya meets a pula lifelong le le sa bjawang lego kgabakanya ka diforo le meboto. Go lema go ka dirwa ka mahlakoreng a diforo mo meets a kgonang go nwelele kgotsa mo meets a nweletšeeng.

Melapo e dirwa ka go epa di foro tse di sa išego fase thoko ga thapalalo ya tshekamo ya tshemo/serapa le gorulaganya meboto mo lehlakoreng la fase la diforo. Di tswalantšha ka go go isa fase meboto ga nyane, e e rulagantsweng magareng ga diforo ka nako e tee.

REQUIREMENTS/DINYAKWA

- Pula: 400-700mm/ngwaga
- Thempheratšha: $>5^{\circ}\text{C}$
- Boemo ba naga: 0,5%-7%
- Mobu: Mobu o swanetše go tloga o sa fetoga. Mobu o mokaone ke mobu wa letsopa kgotsa mobu o o tlogang o na le monya mobung wa godimo go feta mobu wa tlase



IMPLEMENTATION/DIDIRIŠWA

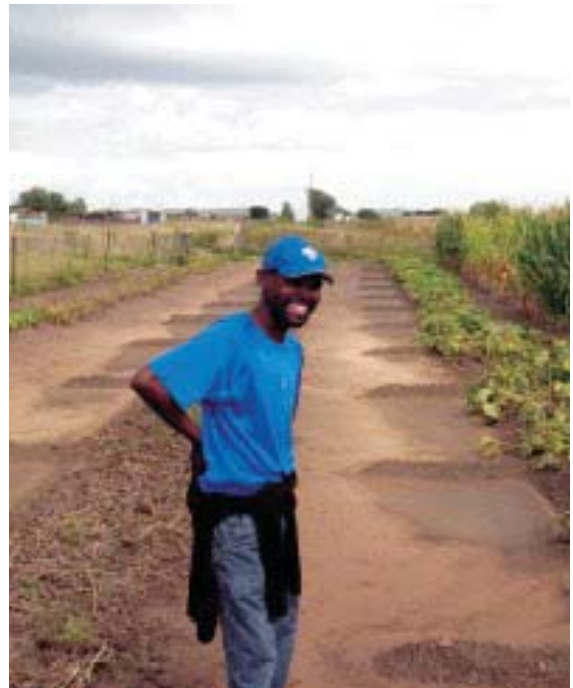
- Dirapa, tshemo
- $<0,1\text{ha}$, $0,1-1\text{ha}$
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



Diforo tse di bipilweng kamo serapeng se se adilweng ka kgokaganyo ya meboto



Meetse a kgobakantšitsweng ka gare ga foro serapeng sa magea le meboto e e kgokagantšitsweng



Tshemo e nyane e go ba adilego meboto e e kgakaganeng go bjadilwe merapa, ditapola le maheya, Free state

3.5 MELETE YA TSENELETŠA MEETSE/ GODIKOLOGA GA BANANA

Melapo epiwa mobung hleng le Ditsela tsa go sepidisa meetse (go tshwara le go fokotsa lebelo la meetse). Melapo e, e tshwanetse go tshelwa ka dibolwa tse dintšhi tse di hlakantshitsweng le mobu le dibanana kgotsa ka go bjala di bjalo tse di ratang meetse mo melapong.

Phapano ya melete e, ke gore o tee goba molapo e epiwa ka gare ga ditsela tsao laola meetse, ya tla e tlatsišwa ka dibola (tse di meetsi le morole) gore dira di bodiša. Mo go bjalwa dibanana kgotsa mehlre e mengwemo morumong.

DINYAKWA

- Pula: >350mm/ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 1,5%-25%
- Mobul: mehuta ka moka (5-30% clay) and depths (>30cm)

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- O bonolo go dira le go boloka; mošomo o boima



Melapo e menyane e ka dirwa; melapo ya epiwa, e be e tlatsiswa ka dibodudi



Banana circle e e bipeditšweng, e hlakanthsitswe le metlang

Melapo gotee le tsela/moela wa go sepidiša meets. Meboti e e kgokaganeng e dirilwe magareng ga melapo.

- **GO BIPETSA**

Mobu o a peswa ka mehuta e fapaneng ya maseledi a dimela/merogo le dibola, go boloka meetse, lego fokotsa thempheratšha ya mobu le go oketsa bophelobja mobu.

DINYAKWA

- Pula: >350mm/ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 1,5%-25%
- Mobu: Mehuta yotlhe (5-30% clay) le botelele (>30cm)

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- O bonolo go dira le go boloka; mošomo o boima



Go bipetsa ka mahlare godimo ga mepete



Go bipetsa ka Lucerne kgotsa bjang bo bo omileng, tshemo ya hlokomelo ya tsa temo



Go bipetsa ka nappier fodder/moba, stover godimo ga Mpete wa merogo



Tšhomišo ya go bipetsa ka bjang ga diforo le meboto

3.6 SHADE CLOTH TUNNELS/ NETE YA MORITI

40% yadi nete tsa moriti tsao lekana 4.2mx6m,2m o ya godimo di agiwa ka o berekiša didiriswa tse di itšego digwetšagang mo gae. Ditšhipi a dirilwe ka pphaepe e e kobilweng ka motšeko. Ditšhipi epelwa mobung go gona go beiwa godima ga ditšhipi gotla go kgona go roka nete godimo. Nete e ya kgwatliswa ka mahlakoreng kamoka.

ka gare ga nete ya moriti ke mebete ye meraro 1m x 5m yeo ele gorego o mongwe le o mongwe ona le 20L ya kgamelo ya go rothiša meetse. Mokgwa wa go bjala ka go tšwaka dibjalo o somisiwa ka gare ga nete ya moriti le go šomiša meetse a a hlokišitsweng a gona go bereka ka neteng ya moriti.

Dinete tša meriti di šwanetse mafelong ohle mo temo e kgonegang, Melete ya epiwa ebile tsa go nosetša di gona go fihlelwa.

DIDIRISWA

- Dirapa
- <0,1ha,
- Gadi bitši thata, gae battle bokgoni, goithuta le bohlahli
- Gae hloke hlokomelo thata



Nete ya moriti e e fetswang go agiwa, le kgamelo le dirothisa meetse gobjadilwe morogo



Mothaledi wa mathomo godimo go tloga ga letsogo la molema goya go letsogo la go ja: Go šomišwa thapo go mereka mogo nnete e tlobang gona; O šomiša tšhipi e ebonegelang goka dira masoba mobung; Gokoba ditšhipi o somisa tšhipi ya go kgona go koba ditšhipi o be o kgomagana ditšhipi tse pedi ka khonethara

Mothaledi wa mathomo godimo go tloga ga letsogo la molema goya go letsogo la go ja: 'Go kenya ditšhipi mekoteng; rokelela ka mo morago ga nete le monyako pele o e kenya momoleteng; Nametsa nete godimo ga ditšhipi, o e ngange; Emisa nete le ditšhipi ga botš e, le be le rokelele nete, epela nete ya fase mobung, go itšhireletša ge moya o tla.

3.7 GO BEELETŠA LE GO BOLOKA GA MEETSE A PULA

Generally, smallholders collect water in available basins, drums and JoJo tanks. This does not provide a lot of water. / K bokopana balemi potlana ba a gelela meetse mo mekorotwaneng, dituruturung le do jojong. Tsela e ga e bafe meetse a a lekaneng

Ditanka tsa go epelwa fase di kgona go kgobaketsa meetse a alekanego. Ditanka tse di tšea meetse a pula ao a tšwelelago mebileng goba mafelong ao tswara meetse a mantši, diboloka 25 000-40 000l, meets a a lekaneng serapa se se kana ka 100-200m² a šomišwa dikgwedi dile 4-6.



Mekgwa e e šomišiwang kamo gae go boloka meets nageng ya Limpopo; 210 L mokorotwane, 1000 L ya Jo-Jo tanks, dišwara meets a manyane.

Melete e megolo e šwanetse o epiwa gore di tanka di kgone go agiwa, oo ka šomiša samente, ditena le go plastera

DINYAKWA

- Pula: >450mm/ngwaga
- Thempheratsha: >5°C
- Boemo ba naga: 1,5%-25%
- Mobu: Mehuta yohle (5-30% clay), and botelele (>30cm)

DIDIRIŠWA

- Dirapa
- <0,1ha, 0,1-1ha, .2ha
- Ditshelete le di diriswa tse ntshi dia hlokego gore o kgone o aga tanka.
- Botsebi le bokgoni dia hlokega (thekgo lego eletšwa dihlokega pele go ba tsibi)
- Ga o lokiši ga ntshi. Dibakete goba pompo dia hlokega gore o gone go ntsha meetse. O swanetsi o hloša mobu kgafetsagafetsa.



Tanka ya semente tle ditena ya agiwa



Mohlala wa tanka ya ka fase ga le fase (18m³) ka setswalo se segonang go tloswa(Acornhoek)



Moreo wa seretse wa tanka ya tlase ga lefase 25 000l go fokotša seretse se sebolokilweng le meetse



Tanka e feletšego ya ditena e e rulwetšego go sireletšega. Le foro ya go sepidisa meetse tankeng

3.8 GO BEELETŠA LE GO BOLOKA GA MEETSE A PULA LE DI TANKA TSA JO-JO

Ditanka tša JoJo (Ka mehla 2500L-5000L) dika šomišwa go kgobaketsa meetse ga otšwa godimo ga ntlo. Go bohlokwa go netefatsa gore gosomisiwe di pompi le ledi khataše tša maleba.

Go ka kgonega go šomiša ditanka tsa jojo tšeo di epetswego mobung ka tshepo ya go boloka meets a a fologang mo tshekamong ya naga. Mo meetse aka tšhelwa ka matlakgogedi go tloga tanking ga a tlhoke pompi kgotsa kgamelo.

Gona le dikgetho tsa go diriša ditanka tsa jojo ka fase ga mobu, efela mo seemong se di nyaka go kgwatlišwa. Tsela ye e bonolo kudu o feta o ke agela tanka ya gago.

Month	Average Monthly rainfall (mm)	Roof area (m ²)	Runoff coefficient	Runoff volume (litres)
Jan	115	43.6	0.9	4513
Feb	123	43.6	0.9	4827
Mar	109	43.6	0.9	4277
Apr	78	43.6	0.9	3061
May	61	43.6	0.9	2394
Jun	35	43.6	0.9	1373
Jul	30	43.6	0.9	1177
Aug	35	43.6	0.9	1373
Sep	55	43.6	0.9	2158
Oct	60	43.6	0.9	2354
Nov	80	43.6	0.9	3139
Dec	95	43.6	0.9	3728
TOTAL	876			34374

tafola yao bontsha meetse a aga bolokwago ka malapeng



Di pompi tsa go goga meets ka di tankeng tsa mobung



Di katase ledi monatlana wa phaepe di bohlokwa ge o diriša di tanka tsa jojo



Ditanka tsa jojo tseo di epetswego go kgobaketsa meets tšhekamong ya lefase



Ditanka tsa jojo di epetswe go boloka meets lafase ga mobu

3.9 MATAMO A MANYANE

Matamo a manyane aka epiwa mobung wa go gona go tswara meetse (letsopa la gona gotshwara go feta 25%).Matamo ana le mokgwa wa go fela meetse ebile ga a tšei nako a hletsi efela afa mobu meets, mme o gona go fa meets go profaele ya mobung mo nageng. Gantsi matamo a epiwa mafelong a goba le didiba gore di gone o tlatša matamo kgafetsagafetsa, goba lefelong leo le tletsego meetse.

Go a kgonega go kgoparetsa matamo ka plastiki efela ge ona le lebaka la gore aka dula a tletše meetse ka gore plastiki e gona go hlagala kapela ka baka la letšatši.

Gape wa kgonega go tswalela matamo ka semente sa letsopa go a tswalela, ge fela gona le gonego ya gore matamo a dule a htetsi meetse ka nako tse dintšhi.



Mehlala e meraro ya matamo a manyane epilweng mobung o o tlo swarang meetse ->25% mobung wa letsopa. Letsogong la moja ke letamo le legolo le letshelwang meetse ke methopo ya godimo. Letamo la ka gare letshelwa meetse ke phaepe ya matlakgogedi go tswa nokeng.



Letamo le lennyane leo agilweng ka semente sa letsopa le tshetšwe meetse. Ela hloko seemo sa lebota, le tshekamo ya lebota la letamo, go dumelela go setampa semente sa letsopa mo mahlakoreng a letamo



/letamo le lennyane leo epilwego ka serapeng sa motseng wa setšhaba e fepwa ke meetse awo a elelang go tswa pateng a ageleditšwe ka polastiki

4 TLHOKOMELO YA MOBU (FOKOTSA YA KGOGOLEGO YA MOBU, GO NONTŠHA MOBU)

4.1 MERAKO YA MATLAPA

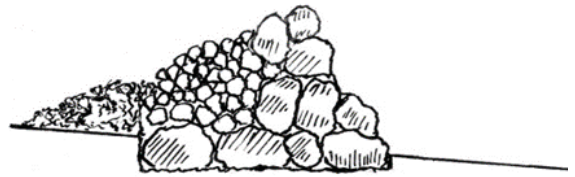
Merako ya matlapa e a gwa godimo ga mothapalalo go laola tšhepidišo ya meetse lego beakanyetša bonyane go aga mobu le o o nonnago ka morago ga morako. Matlapa a epelwa forong tse nyane mme Matlapa a magolo a pakiwa go ya ka tshekamo ya lefaše go tloga go matlapa a ma nyanne go phema go thubega ga morako wa matlapa lego dumelela meetse gore a sepele ga nyane mo morakong. Go bjala go ka dirwa ka fase ga morako mo go emang meetse, kgotša godimo ga morako mo mobu wa go nona o tla o emang gona.

DINYAKWA

- Pula: >150mm/Ngwaga
- Thempheretšha: >5°C
- Boemo ba naga : 0,5%-5%
- Mobu: mehuta ya mobu – Matlapa a gwetšagala bonolo

DIDIRISWA

- Dirapa, tshemo
- <0,1ha, 0,1-1ha, >2ha
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



.Merako ya matlapa e a gwa godimao ga mothapalalo ebile e kadirwa ka sekala sengwe le sengwe.



Setšhwantšho še še bontšhang matlapa a a agilweng kagare ga foro mogo matlapa a magolo a beelwetšwe go ya ka tshekamo ya morako



Matlapa a manyane a šomisitšwe go dira morako wa matlapa go fokotsa kgogolego ya mobu mo tseleng le goiša meetse kamo serapeng



Brinjal e gašhitšwe mo go kgobokaneng mobu wago nona gdimo ga morako



Bananas planted below a substantial stone line Dibanana di bej

4.2 MATAMO A GO LEKOLA

Letamo la go lekola ke le nyane, ka nako engwe kela nakwana, letamo le a giwa thoko ga morako wag sepediša ya meetse e e fokotsang kgogolego ya mobu, ka go fokotsa lebelo la meetse go dumelela dibidišwa tsa seretse. Didirišwa tše dintšhi tše fapaneng di ka šomišwa, mobu, mašwika, dikgong le merogo. Maswika kgotša di dirišwa tše dingwe di a gelelwa di tšawlelwa mo tšhekamong ya morako go fokotsa kgogolego ya mobu le lebelo la meetse. Dipelo sebopego se senyane sa meraraya mobu o o noneng go fepa dibjalo.

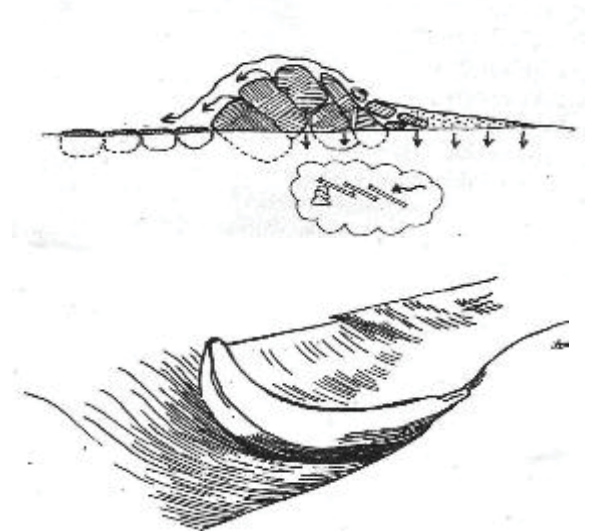
Matamo a go lekola a dirwa gantshi go kgaoletsa morako wa tshepidišo ya meeste mogo meetse a fetang gona ga pula ena, mara ga elele ša ruri. Matamo a kgona go agwa lifelong le le senyang mobu go dira dikoti. A kgona go dira go tsela e eme ga botše. Go šomišwa maswika a ma sesame, faše o epa 30cm-60cm bophara go lekanela boima ba 5-9kg. Maswika a manyane a ya godimo gore thetho e kgone go ba 15cm-22cm molagare. Malokelelo a matamo a ka agiwa go tloga seretheng goya monwaneng., mogo tekanyo ya merara e tletšeng ditšhila le seretse kwa morago ga letamo goya faše ga letamo la godimo

DINYAKWA

- Pula >150mm/ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 1,5%-25%
- Mobu: Mehuta ka moka – mo matlapa le maswikaa gwetšagalang bonolo

DIDIRISWA

- Dirapa
- <0,1ha, 0,1ha-1ha>2ha
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



Dikoti di a bopega tshimong



Epa morako wa go tshwara maswika mo letamomg.



Mohlala wa le tamo la go lekolaka le le fidileng le thetho ka mofase ga leboto le sebopego sa banana.



Thoma kago paka le tamo lago lekola. Thom aka maswikaa magole.

4.3 MERARA

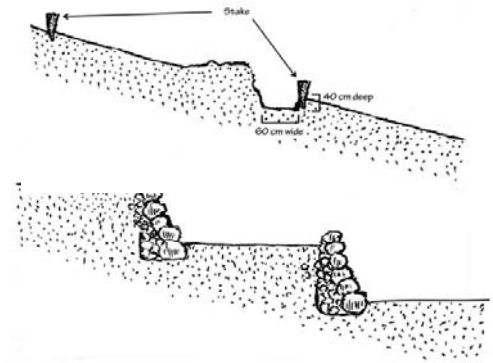
Merara ke tekanyo ya foro ya mobu e e a gilweng mo mokerong wa tshekamo e tshegile ke maswika le matlapa, kgotsa ka ditaere tsa kgale. Merara e dira lefelo le leikadilego lago bjala go lokisa tshekamoe e namelelago thata gore dibjalo dikgone go gola. Lelokelelola merara le dira megaton e e fokotsang lebelo la meetse, leoketsa goneolela ga meetse mobung, e thus aka go fokotša kgogolego ya mobu. Merara e a gwa tshekamong ya lefase e namelelelang.

DINYAKWA

- Pula: >350mm/ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 10%-40%%
- Mobu: Mehuta ka moka – mo matlapa le maswikaa gwetšagalang bonolo

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



Merara ya matlapa go bjala tshimong



Pontšho ya tshekamo mo merara ya tsimo e dirilweng go gaša maheya (~20% tshekamo)

Slope		Distance between terraces (meters)
Percent	Ratio	
10%	1:10	8.0
15%	1:6.7	5.3
20%	1:5	4.0
25%	1:4	3.2
30%	1:3.3	2.7
35%	1:2.8	2.3
40%	1:2.5	2.0



Merara e ka agwa ka ditaere tsa kgale nageng tse disenang matlapa



Pontšho ya serapa godimo ga tekanyo ya merara o o namelelang. (40% tshekamo)

4.4 DIBODISWA TSE KAOFADITŠWENG

Go kaonefatša monontsho mobung go bohlokwa ka tsela tse fapaneng. Mekgwa e e kadirišwang:

- Tsenya morole; morole o o kaonefadišweng ka go latwa serapeng sa diruiwa, mo go dirilweng khomposite ka di phate, dibodiswa, mahlare e be go khupetswa ka polasitiki, e tlogelwa matsatsi ale 5-7'
- Tsenya khomposite; llaga ya digwatlha tsa go oma, tse meetse, morole le mobu o nošetše
- Masalela a di bjalo; (go tswa go bjang, dinawa le mabele) le
- Botelele/letlakala la go bipetša

Go kereya mothopo wa dibodiswa o gidimo le dijo tsa mobu tsa go tshwana le Naetrotsene le Carbon go bohlokwa. Maseledi a di bjalo tse dingwe le morole di na le dijo tsa go tshwana le potassium le silicone

DINYAKWA

- Pula: >150mm
<1200mm/Ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 5%-25%
- Mobu: Mehuta ka moka –lege mobu was anta kgotsa wa letsopa o boima go hlokomela

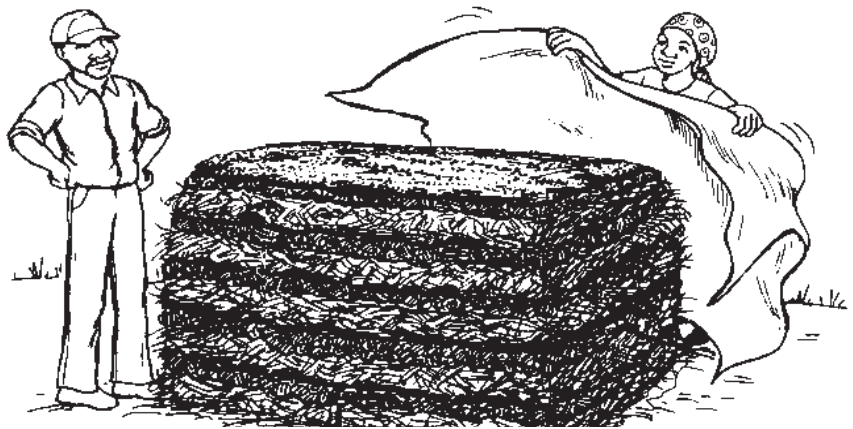
Kg/Ton	Cow	Horse	Goat	Sheep	Pig	Chicken	Rabbit	Purchased compost
N (Nitrogen)	5	6	14	7	5	13	18	5
P (Phosphorous)	2	3	2	3	4	11	13	2
K (Potassium)	3	6	6	4	6	20	6	8

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima, o bonolo go hlokomela



Lesaka la dipodi le a dilwe ka bjang go dira morole o ononeng



Dibodiša di a geletswe goya godimo ka mahlare a omileng le a meetse, morole le mobu, e nošetšwe ga botše le go khopetšwa



Comfrey, Masalela a bjang le maheya le hlakahlakanyo ya dibjalo tsa go khupetsašmobund a s go tshwana le sonoplolomo, leotša miDichos beans

4.5 GO BJALA GA DINAWA LE DIBJALO TSA GO NONTSHA MOBU

Dinawa di bohlokwa, di lokiša Naetrtšene moyeng lego lokiša monontsho wa mobu le goitekanela ga mobu go tla go fepa dibjalo tse di mo gaufi le tse do latelang. Dika bjalwa le dibjalo tse dingwe kgotsa wa dikolosa le dibjalo tse dingwe.

Mohlala wa dibjalo tsa go nontsha mobu tsa selemo, dinawa, ditloo marapo, ditloo, Dolichos (Lab-Lab), Velvet beans (Mucuna), Jack bean, mung beans, chickpeas, lentils, Lucerne and Sun hemp. Mohlala wa dinawa tsa mariga ke peas, broad beans, clover

Dibjalo tsa go nontsha mobu di bjalwa go tla go epelwa mobung pele dika thoma go bloma go tlatsa dijo tsa mobu tsa go tshwana le naetrotšene mobung gotla go šomišwa ke dibjalo tse dilatelang. Dibjalo tsa go nontsha mobu ke dinawa, ditloo marapo, dotloo, Korong, bjang (black oats le fodder rye), mosetata.

DINYAKWA

- Pula: >150mm <1200mm/Ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 5%-25%
- Mobu: Mehuta ka moka –lege mobu was anta kgotsa wa letsopa o boima go hlokomela

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima



Dinawa le maheya dibjadilwe kamoka, hlakahlkanyo ya dibjalo



Dolichos (lab-Lab) dinawa dibjadilwe go dira morole go bipetsa mobu le go dikolosa ga dibjalo



Dibjalo tse di nontshang mobu; saia oats, selemo fodder rye le fodder radish



Broad beans, Amaranthus, Lucerne and red clover

4.6 MELETE E MEGOLO

Ke melete ya serapeng e e hloakang maatla go epiwa le go phušetšwa ka di dirišwa tše go di kgonang go bola go dira khomphoste

- Meto o epiwa go fihla go 60-80 cm go ya faše, metara e le ngwe bophara le 1-10m botelele.
- O tlatšwa ka di gwatlha, morole, mahlare a a omileng, mahlare a meetse le mobu.
- Tlhatlagano ya ditshipi fašele meetse, kgotsa diphata.
- Molara wa marapo le kalaka di lokelwa moleteng go o ketša monontsho
- Marapo, Mogopa le mafofa o lokelwa moleteng go gwetša dijo tsa mobu e leng p
- Molara o lokelwa go gwetša dijo tsa mobu e leng K
- Mpete o a gilwe go ya godimo, gwa bjälwa le go bipetswa

DINYAKWA

- Pula: >350mm/Ngwaga
- Thempheratšha: >5°C
- Boemo ba naga: 0,5%-5%
- Mobu: Mehuta ka moka

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima, o bonolo go hlokomela



Molete o epiwa 60-80cm goya faše. Ala ditshipi fase le diphate moleteng.



Tsenya digwatlha tsa go tshwana le mahlare a leheya, mahlare, le jwang



Tshela morole le mobu wa godimo. Tsheletša o thome fase ka setepe se selatelang.



Gedi legonadi bodiswa tsa go tshwana le mehlare a dibjalo matlakala a ka tshelwa morago ga go tshela mahlare a go oma



Melete e meholo e a gelwa Mokero mothokong le molapo mpeteng go kgona go bjala peu le dimelana

4.7 MELETE E E FOKOLANG

Melete e e fokolang bonolo go feta melete ya mitara o lo monge goya faše. E epiwa go fitlha go 30cm ya tlašwa ka hlakanyo ya dibodišwa, morole le mahklare a a meetse. Go be go tlatšwa ka mobu le go bjala.

Melete e e fokolang e šomišwa gantshi ge go dirwa doforo, tse di fago moela o mošesane o o nang le mobu o o noneng – e šoma bonolo dirapeng tse kgolo le mašimong. Go melete, go bipetša go botlhokwa, go tshwana le hlakahlakanyo ya dibjalo le go dikološa ga dibjalo. Melete e fetša 3-8 e soma pele a ka tšošološwa.

DINYAKWA

- Pula: >350mm/Ngwaga
- Thempheratšha: >5°C
- Boemo ba naga : 0,5%-5%
- Mobul: Mehuta ka moka

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima, o bonolo go hlokomela



Go epa molete wa gofokola 30cm bophara le 15cm go ya faše mokerong tšhemong



Thoma go tlakatša molete ka morole, digwatlha tse meetse le tse di omileng



Serapa le melete e e fokolang and melete e megolo, hlakahlakanyo ya dibjalo le go bipetša ka digwatlha

4.8 ECO-CIRCLES

E ke engwe ya melete e e dikologang, e pwa go lekanela le molomo wa sepete, o tšhela digwatlha kgotša khomposete le dibodišwa. Dinošetšwa ka lebotlolo la dilitara tše pedi lego le dirilweng masobane mathokong, la bjälwa mogare ga molete yo o dikologang.

Mpete wa go dikologa o loketse dirapa tse nyane ebile o tsenya lego o ketsa go tšenelela ga medu mobunng, di bodišwa, le go tšhela digwatlha le hlokomelo ya go nošetša.

DINYAKWA

- Pula: >350mm/Ngwaga
- Thempheratšha: >5°C
- Boemo ba naga : 0,5%-5%
- Mobul: Mehuta ka moka

DIDIRISWA

- Dirapa
- <0,1ha,
- Theko ya tlase; mothopo wa kgaušwi
- Mošomo o boima, o bonolo go hlokomela



Go epa molote wa godikiloga, 1-1,5m bophara mme 30cm gotsenelela le 15cm mobu o tlhakantshitsweng le morole pele o ka busetswa moleteng



Molete wa godikiloga o fedilwe, o a gelwetswe ka matlapa.. Aletere ya maoto a maroro e somositswe go bjala dibjalo tsa go tshwana le le ditamati le tloa



Molete wa go dikologa, o bipeditswe, lebotlolo la dilitara tse pedi mo gare go bjadilwe mesunkwane.

4.9 GO TSHELA MANYORO LE KALAKA KA GO LATISHA FELA FAO GO LEGO DIMELA

Manyoro a tshelwa goya ka taelo ya dipoelo tsa go nona ga mobu, a tshelwa kgauswi le dimela tseo di golago go ena le go gasha/falatsa lefelo ka moka. Se se boloka shomisho ya manyoro gape se thusha ka go tshela manyoro fela fao a hlokagalago, ka kararetso se kaunafatsa tshomisho ya ona. Kalaka e ka tshelwa ka dikgotlotswaneng goba ka meraladi ka godimo ga mobu goba e ka ribegetswe pele gage go thomiwa go lema ka mokgwa wa thlago (conservation agriculture CA) – Kalaka yona e fokotsa go hlolega ga letswai ka mobung, le go netefetsa gore letswai le phela le le tlase ka mobung

DINYAKWA

- Pula ya ka godimo ga dimilimitara tsa ka godimo gat se makgolonne-masomehlano ka ngwaga: (>450mm/year)
- Dithemperatshara tsa ditikirisi tsa ka godimo ga tse thlano (5°C)
- Go theogela ga lefelo ga diperesente tsa magareng ga teefegelwanahlano goya go tse lesome (1.5 – 10%)
- Mobung wa mehuta kamoka – goya ka taelo ya go tshelwa ga manyoro

TIRAGATSO

- Ka serapaneng le ka mashemong a magolo
- Lefelong la bonnyane bja seripa se tee go tse lesome sa ekere goya go diekere tse pedi (<0,1ha, 0,1-1ha, >2ha)
- Go bitsa masheleng a magareng; go fokotsa tshomisho ya didirishwa tsa go hwetshwa ka ntle/ kgole ka go shomisha manyoro ka go seketsa.
- Go hlokega matsogo a go lebana



Go ribegetswe kalaka pele gage go thomiwa go lema ka mokgwa wa thlaho



Go tshelwa kalaka ka godimo fao go bjaltwago diponkisi



Go tshelwa kalaka ka sekgotlotswaneng go shomishwa sekhurumelo sa lepotlelo bjolo ka seelo



Manyoro a bewa disentimitara tse pedi ka tlase le ka godimo ga fao peu e lego gona



Go shomishwa mogoma go ntsha peu le manyoro ka nako e tee



Manyoro a elwa ka lehwana

4.10 DIKGOTLOTSWANA TSA GO BJALELA (ZAI PIT)

DiZai pit, ke melete/mekoti goba dikgotlotswana tsa go bjalela, mabakeng a mantshi di ba le bogolo bja gorarela ga disentimitara tse masomepedi goya go tse masomenne (20 – 40) le goya tlase ga disentimitara tse lesome goya go tse masomepedi (10 – 20). Dikgotlotswana tsa go bjalela di swara meetse a pula, le meetse oa a eelago ebile di shireletsa dipeu le podishwa gore di se gogolege. Dikgotlotswana di thusha gape go beela dimela meetse le difepammele tsa dimela ka bo kgauswi. Melete/mekoti e epiwa sehleleng sa marega. Mobu wo o epilwego o shomishwa go dira metotolwana gorarela seripa sa nkgokolo ya sekgotlotswana, go kaunafatsa go swara le go boloka meetse ga molete. Ka morago ga go epa molete, podishwa e a tshelwa, ka kakaretse go eletswa gore go tshelwe podishwa ya dikilokereme tse lefela-fegelwana-tshela ka moleteng, gomme, ka morago ga pula ya mathomo, podishwa e khupetswa ka lleyara ya mobu gomme peu ya bjalela/bewa bogareng ga molete.

DINYAKWA

- Pula ya dimilimitara tsa ka godimo ga tse makgolo-tharo-masome- hlano ka ngwaga(: >350mm/year)
- ditemperatshara dikirisi tsa ka godimo ga tse thlano (>5°C)
- Go theogela ga lefelo ga diperesente tsa magareng ga teefegelwanahlano goya go tse masomepedihlano (1.5 – 25%)
- Mobu : mehuta ka moka (letsopa la 5-30%), (le goya tlase gwa ka godimo ga 30cm)

TIRAGATSO

- Ka serapaneng le ka mashemong a magolo
- Lefelong la bonnyane bja seripa se tee go tse lesome sa ekere goya go ekere e tee (0,1ha- 1ha, >1ha)
- Go bitsa masheleng a tlase, didirishwa di hwetsega ka bo kgauswi
- E dirwa le go hlocomelega bonolo; go hlokega matsogo a go lebana



Melete ya go bjalela(Zai pits) kua Kenya, go bjetswe lehea morago gwa khupetswa ka bjang, go eketsa go swara ga monola le go nona ga



Dikgotlotswana/melete ya go bjalela (Zai pits) e epilwe fao mobu o gogolegilego, didirishwa tsa podishwa di beilwe ka bo kgauswi (Go tshwaChris Reij), 20100



Lehea le bjetswe ka meleteng kua Kenya (go tswa go Inadesforum.net)

4.11 GO LEMA KA MOKGWA WA THLAGO (CONSERVATION AGRICULTURE)

Mokgwa wa go lema ka mashemong go shomishwa dikokwane tse di latelago:

- Go se rumule/tshikinye mobu kudu; gose ribegetse ga mobu, go bulwe fela meletana ya go bjalela, dikgotlotswana le meraladi/ metseletsejana
- Khupetsa mobu; mashaledi a dimela goba dithlaka di shiwa godimo ga mobu bjale ka pupetsa, dimela (tseo di phelago) di tlogelwa ka tshemong lebaka le letelele kamo go kgonegago gore di kgone go fa/ dira morithi
- Dimela tsa go fapafapana: go lema dimela tsa go fapana lefolong le tee, go fetolafetola dimela le go akaretsa dimela tsa go tswakana tsa sehla sa marega le selemo tsa go khupetsa mobu.

Mokgwa wa go bjala wa thlago o kaunafatsa maphelo a mobu le go nona ga mobu, tsweletso ya dimela le go swara meetse ga mobu. Go fokotsa go elela ga meetse le kgogolego ya mobu gape le themperetshara ya mobu. Go fokotsa go palega le go kitelega ga mobu.



DINYAKWA

- Pula ya dimilimitara tsa ka godimo ga tse makgolo tharo masome hlano ka ngwaga(>350mm/year)
- Dithemperatshara tsa ditikirisi tsa ka godimo ga tse thlano (5°C)
- Go theogela ga lefelo ga diperesente tsa magareng ga teefegelwanahlano goya go tse lesomehlano (1.5 – 15%)
- Mobu: mehuta ka moka (letsopa la diperesente tse hlano goya go tse masome tharo hlano(5%-35%))



TIRAGATSO

- Ka serapaneng le ka mashemong a magolo
- Lefelong la bonnyane bja seripa se tee go tse lesome sa ekere goya go diekere tse pedi (<0,1ha, 0,1-1ha, >2ha)
- Go bitsa masheleng a godingwana (Peu, Manyoro, ditshefi tsa go dirwa ka didirishwa tsa thlaro), dipholantara, didirishwa di hwetsega ka bo kgauswi
- Go hlokega matsogo a go lebana

KOKWANE YA MATHOMO: Go petula/rumula mobu go go fokoditswego/ gwa tlase



Metseletsejana le dikgotlotswana tsa go dirwa ka matsogo, go shomishwa mogoma/letsepe le pholantara ya MBLI – ntle lego petula mobu



Mogoma wa go goga ke terekere wa go lema o sa petule



Go shomishwa pholantara ya lebili ya Haraka – pholantara ya e kgona go bjala dipeto tsa mehutahuta, empa ga e kgone go bjala ebile e bea le mayoro ka nako e tee



Go shomishwa pholantara ya Knappick – ya go gogwa ka dipholo

KOKWANE YA BOBEDI: Go khupetsa mobu



Mobu o khupetsegile gabotse ka mashaledi a dimela



Go khupetswa ga mobu, tshemong ya go lengwa ka mokgwa wa thlago



Moela wa leraga (195mm)

Tshemo ya go lengwa ka mokgwa wa thlago, ya goba le mashaledi a dimela. Moela wa meetse o tlase ebile o hlwekile



Moela wa go hlweka (42mm)

Tshemo ya go lengwa ka go petula mobu, molela wa meetse wa leraga ebile ke o mogolo

KOKWANA YA BORARO: Go hlakahlakanya dimela



Tshemo ya lehea la go hlakana le dinawa - go shomoshitswe metseletsele e mebedi, le go bjalela kgauswi le kgauswi



Tshemo ya lehea la go hlakana le dinawa - go shomoshitswe metseletsele e mebedi, le go bjalela kgauswi le kgauswi



Dimela tsa sehla sa selemo tsa go khupetsa mobu; sonoropolomo, leotsa le Sun hemp



Dikolokoto (Lab-Lab bean (dolichos)),

4.12 GO BJALA KA MOKWAGA WA MESEGO (STRIP CROPPING)

mokgwa wa go bjala woo tsebjago ka gore ke Strip cropping ke mokgwa wa go lema fao dimela tsa go fapana di bjalwago ka mesego go thibela kgogolego ya mobu le go thusa dimela gore di kgone go tsea difapammela ga bonolo mobung. Go bjala ka mesego go swanetse gorapana le go theogela ga lefelo.

Dimela di kgethwa goya ka go hlakantsha tsa medu ya botelele bja go fapana le dinyakwa tsa difepammele tsa dimela. Ke kakanyo e botse gore mesego e bjalwe ka dimela tsa meholo ya go fapana. Go bjala ka mokgwa wa go hlakantsha mehlare le dimela, bjale ka disakwane (Pigeon Pea), Moringa, Sasepeia seseben le Lukhina bjale le bjale, go shoma botse. Mabjang a go swana bethiba(vetiver), bjang bja swiri (lemon grass) le bjang bja furu le ona a ka shomishwa, gape le rootse-smutefinka (Rhodes-Smutsfinger) (Digitaria)mix, Paspalum notatum le Tall Fescue.

DNYAKWA

- Pula ya dimilimitara tsa ka godimo ga tse makgolo tharo masome hlano ka ngwaga(: >350mm/year)
- Dithemperatshara tsa ditikirisi tsa ka godimo ga tse thlano (5°C)
- Go theogela ga lefelo ga diperesente tsa magareng ga teefegelwanahlano goya go tse lesomehlano (1.5 – 15%)
- Mobu: mehuta ka moka (letsopa la diperesente tse hlano goya go tse masome tharo hlano(5%-35%)

TIRAGATSO

- Ka serapaneng le ka mashemong a magolo
- Lefelong la bonnyane bja seripa se tee go tse lesome sa ekere goya go diekere tse pedi (<0,1ha, 0,1-1ha, >2ha)
- Go bitsa masheleng a tlase (Peu le didirishwa tsa ka gae/kgautswi)
- Go hlokega matsogo a go lebana



Mesego ya lehea le lesirele(Lucerne) goba lesepetesa (Lespedeza)
Dimela tsa sehla sa marega tsa go khupetsa mobu; saia/black oats, forage , leroro le fodder radish



Go bjala ka mesego ga lehea le Paspalum le Digitaria



Mosego wa bjang fao go theogelago go bjetswego lehea



Go bjala ma mesego ga disakwane le leheaDipholantara tsa go fapana; Mbli(hoe-type hand),Haraka (Wheel), Matracca (jab) le animal drawn planters, (Knapik- ka tlase)

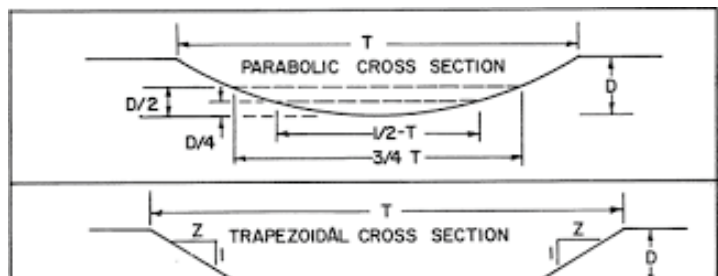
4.13 DITSEJANA TSA GO BJALWA BJANG TSA GO NTSHA MEETSE KA TSHEMONG

Ditsejana tsa go bjalwa bjang tsa go ntsha meetse ka tshemong ke tse phaphathi/di bopara, ga di ye tlase di agegile bjalo ka piring, gore ditlo ntsha meetse ka tshemong ka ntle ga go hlola kgogolego ya mobu. Ditsejana tse di shomishwa go arosha moela wa godimo/go fetelela go tswa mo go bjetswego dimela go ya go mafelo a go bolokega bjale ka dinoka goba makoribeng a dinoka.

- Go alelwa/khupetswa ka dimela/dimelana mo ditsejaneng tse, go fokotsa lebelo la meetse ao a elago gomme gwa shireletsa bogodimo bja tsejana kgahlano le maatla go gogola a moela.
- Go bjala mabjang a go hloga ka kutu le a goya go ile bjale ka Paspalum, Fescue, Kikuyu le couch go kaone go phala go bjala mabjang a botelele bja goya godimo a ngwaga ka ngwaga
- Dira gore tsejana ya go sepetsa moela ge o e lebelela ka lehlakoreng la goripaganya ka pele go tswa ka godimo e lebelelege bjalo ka theraoisidiale (trapezoidal) goba pharapoliki (parabolic), le ka mohla o tee, e seke ya ba le lebopo la V, o dire le bonnete bja gore tsejana e ba le goya tlase ga disentimitara tsa magareng ga masometharo goya go tse masomenne (30 – 40), go theogela ga mathoko a yona, le ka mohla o tee, go seke gwaba ka godimo ga seripa se tee go tse nne (1 in 4)

DNYAKWA

- Pula ya ka godimo ga dimilimitara tsa ka godimo gat se makgolonne-masomehlano ka ngwaga: (>450mm/year)
- Dithemperatshara tsa ditikirisi tsa ka godimo ga tse thlano (5°C)
- Go theogela ga lefelo ga diperesente tsa magareng ga teefegelwanahlano goya go tse masomepedihlano (1.5 – 25%)
- Mobu : mehuta ka moka (letsopa la 5-30%), (le goya tlase gwa ka godimo ga 30cm)



Parabolic or trapezoidal ke mabopo a maleba a ditsejana tsa go sepetsa meetse. hlokomela dipanka disepela moo go sa ishego tlase. (Michigan state University, (MSU Extension 2015)

TIRAGATSO

- Ka mashemong a magolo
- Lefelong la bonnyane bja seripa se tee go tse lesome sa ekere goya go ekere e tee (0,1ha-1ha, >1ha)
- Go bitsa masheleng a tlase, didirishwa di hwetsega ka bo kgauswi E dirwa le go hlokomelega



Go la nnyele: kgogolego e hlotswe ke moela go tswa tshemong ya korong (MSU Extension, 2015)



Lefelo lona lela lena le bjang tsejaneng ya go sepetse meetse mengwaga e malwa ka morago, (MSU Extension, 2015)



Paspalum (Bahia Grass) ke kakanyo ya maleba go shomoshwa ka gare ga ditsejana, le ge e sa kgotlelele komelelo



Bjang ba Tall Fescue eba bjo botala sehla sa mareqa kamoka



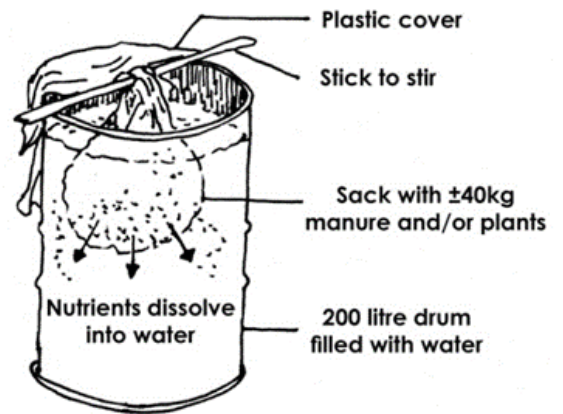
Couch grass (Elymus repens), e tsebja bjalo ka ngwang ka tshemong efela e gola gabotse le fao mobu o sa nonago ebile e fa tshireletso ye botse go ditsejana tsa go sepetse meetse

5 HLOKOMELO YA DIMELA (MEKGWA YA GO BJALA; MAPHELO A DIMELA; GO DIRA/TSWELE TSA TONE; TSWELETSO YA DIENYWA)

5.1 MOROLE WA SEELA/MEETSE

Merole ya seela ke merole gaba diteye go tswa mahlareng a dimela goba merole ya diphoofolo yeo e tlogetswego go bela ya fetsa ya timolwa ka meetse pele ga ge eshomoshwa go noshetsa dimela goba mobu wa go rarela dimela, se se direlwa go oketsa goba go kaonafatsa go nona ga mobu. Merole ya seela e thusa dimela gore di kgone go ikemela kgahlanong le malwetsi le dikhunkhwane ka go oketsa difepammele le diphoofolwana tseo di sa bonwego ka mahlo tseo di phelago mobung,

Didirishwa tsa go tlwaelega tsa go dira morole wa seela ke merole ya diphoofolo/diruiwa (emeswa, yeo e sanago le moroto) bjale ka wa dikgomo, dipudi, dipere, dinku le dikgogo maeba le tsa bo tsona / goba dikarolo tsa dimela bjalo ka matlakala, ngwang wa botala bjoo bo tebilego (go hwetsa Nitrogen) kutu ya mohlare wa panana (Go hwetsa potassium le phosphate), Mahlakantsha (comfrey) le botshatshabogope (stinging nettle) (go hwetsa bobedi bjo, silicon le difepammele tsa go thusa dimela kgahlano le malwetsi). Diteye goba dibidishwa tse, di timulwa ka meetse ka tsela yee latelago pele gage di shomishwa 1:4. Litara e tee ya teye/ sebidishwa e tshelwa litara tse nne tsa meetse,



from: Production without Destruction

TIRAGATSO

- Ka dirapaneng
- Lefelo la bogolo bja heketere/ekere e tee go ya tlase (<0,1ha),
- Go bitsa masheleng a tlase, didirishwa di hwetsega ka bo kgauswi, ga se moshomo woo mogolo
- E direga moroba, ka pela



Go ripiwa kutu ya mohlare wa panana go dira teye ya morole wa seela/ meetse



Go ripelelwa ngwang go dira teye ya morole wa seela



Morole wa diruiwa o shomishitswe go dira morole wa seela; morole wa dikgogo, dipudi le dikgomo e shoma gabose – ga golo ge e sale e meswa



Sebjana sa go direla morole wa seela, se swanetse go tswalela go thibela go moyafala ga meetse

5.2 THLAKATHLAKANYO YA DIMELA

Thlakathlakanyo ya dimela ka serapaneng, e dirwa ka go tswakanya dimela tse kgolo le tse nnyane, go fetolafetola dimela, le go bjala dimela tseo di ratago go gola mmogo. Maikemishetso ke go ba le mehuta yeo e fapanego ya dimela tsa mehola ya go fapana (go akaretswa tsa go dira meriana, tsa go raka dikhunkhwane le tsa mehola e mentshi) tsweletsong ya merogo le dienywa ngwaga ka moka. Se se dirwa go netefatsa goba gona ga dijo tsa phepo, go kaonafatsa go thibela dikhunkhwane, malwetsi, ngwang le go fokotsa thlokego ya dijo ka baka la go hwa ga dimela.

Kgetho ya dimela e ithekgile godimo ga tse di latelago:

- Gore o kgone go buna dijo tseo di ka shomishwago ka gae go tswa ka serapaneng ngwaga ka moka. Se se ra gore go tseparela/hlokomela dimela/merogo yeo e ka bunwago lebaka le letelele, bjale ka ya matlakala a matala, lethise ya matlakala le nyala ya mosega o hloga le go se tseparegele go dimela tsa go swana le khabeshe le dinyala tsa segwere tseo di letwago lebaka le letelele di sa tswelitse dijo.
- Dimela tsa go huma ka vitamin ya A; bjale ka merego ya matlakala a bo tala bja bo tebileng (bjale ka sepeneshe, mokgaripa, raepe le kheile), dikherotse, merogo ya setso e metala (bjale ka thepe le matlakala a mphodi/ dithaka) le dihepo (bjale ka phasili).
- Dimela tsa go raka dikhunkwane bjale ka khorinda, kaliki, le dihepo tse dingwe go swana le rousemeri (rosemary) le thyme.
- Dimela tsa medu ya dinkokoma le megoro ya go huma ka diphoroteine bjale ka dinawa, diponkisi le dithenepo (turnips).
- Dimela tsa go gola ngwaga kamoka tsa mehola ya go fapana bjale ka wormwood, lemongrass, bulbinella le mahlakantsha (comfrey).
- Matsoba a go swana le sepatsana (marigolds) le calendula.

Ka go fitishisha, tlhlokomelo e bewa go go se beye dimela tsa legoro le tee mmogo mo mpeteng o tee, se se dirwa go fokotsa go phatlalala ga ,malwetsi, le pakishamo ya dijo go tswa mobung. Ka fao ditamati, dipirintsele (brinjals), matapola le phepha (pherefere ya go se babe) ga di bjalwe mmogo, dimela tsa legoro le tee tseo di bitswago brassicas bjale ka khabetshe (cabbage), porokholi (broccoli), kholifolawa (cauliflower) le Kheile (kale), goba dimela tsa legoro le go bitswa (chards) bjale ke sepenetshe le peteruti le tsona ga di bjalwe mmogo.

Go fetolafetola dimela go dirwa go fetola dimela tsa go hloka phepo ya godimo (go tswa mohung) bjale ka khabetshe, ka tsa go hloka phepo ya tlase bjale ka sepenetshe le lletshisi, goba ka mokgwa wa go tlwaelega wa go fetolafetola wa matlakala/mahlare – medu/medi – dimela tsa dinkokoma ka medung – dienywa.

Dikhalentara tsa go lema di dirwa go lebeleetswe go swanela ga lefelo (go lema semela seo se itsego) le maemo a leratadima. Ka tlase ke khalentara ya go lema yeo e dirilwego le batseakarolo go tswa Limpopo (yeo e itemogelago marega a go ruthela le selemo sa go fisha. KwaZulu-Natal le Eastern Cape fao marega a lego magareng goya go gotonya, dikhalentara tsa go tlwaelega di sa shomishega.

When can I plant vegetables?										Too hot to plant!		
	Mrch	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Baby marrows												
Basil												
Beetroot												
Brinjal												
Cabbage												
Carrots												
Chilli												
Green beans												
Green pepper												
Kale and other morogo e.g. amaranthus												
Lettuce												
Leeks, spring onions												
Mustard spinach												
Onions												
Parsley												
Peas												
Tomatoes												

TIRAGATSO

- Ka dirapaneng, ka mashemong a magolo
- Lefelo la bonnyane bja seripa se tee go tse lesome go sa heketare goya go bogolo bja diekere tse pedi (<0,1ha, 0,1-1ha, >2ha)
- Go bitsa masheleng a tlase (peu le dimela), didiritshwa di hwetsega ka bo kgauswi
- Go moroba go dira



Mrs Mcanyana (Gobizembe) – porokholi, Chinese cabbage, sepenetshe, khorienta le sepatsanamarigolds



MagdelinaMalepe (Sedawa), sepatsana (marigolds), thyme, parsley, sepenetshe le kheil(kale)



Christina Thobejane (Sedawa) – lehea, matanta, tamati, kheile(kale) le sepatsana(marigolds)



Mpetana ya go epiwa wa go bjalwa ka hlakahlakantsha di hepe with a mixture of herbs – fenele, khorienta, phasili le kaliki



Phumelele Hlongwane (Ezibomvini) – peterute, mokgwaripa, nyala ya mosega o hloga le phasili

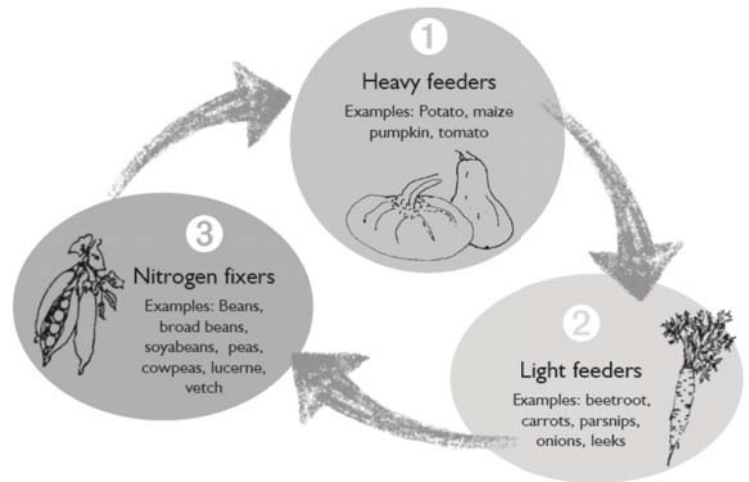


Alex Makgopa (Sedawa)- nyala ya mosega o hloga, sepenetshe, kherotse le sepatsana

5.3 GO FETOLAFETOLA DIMELA

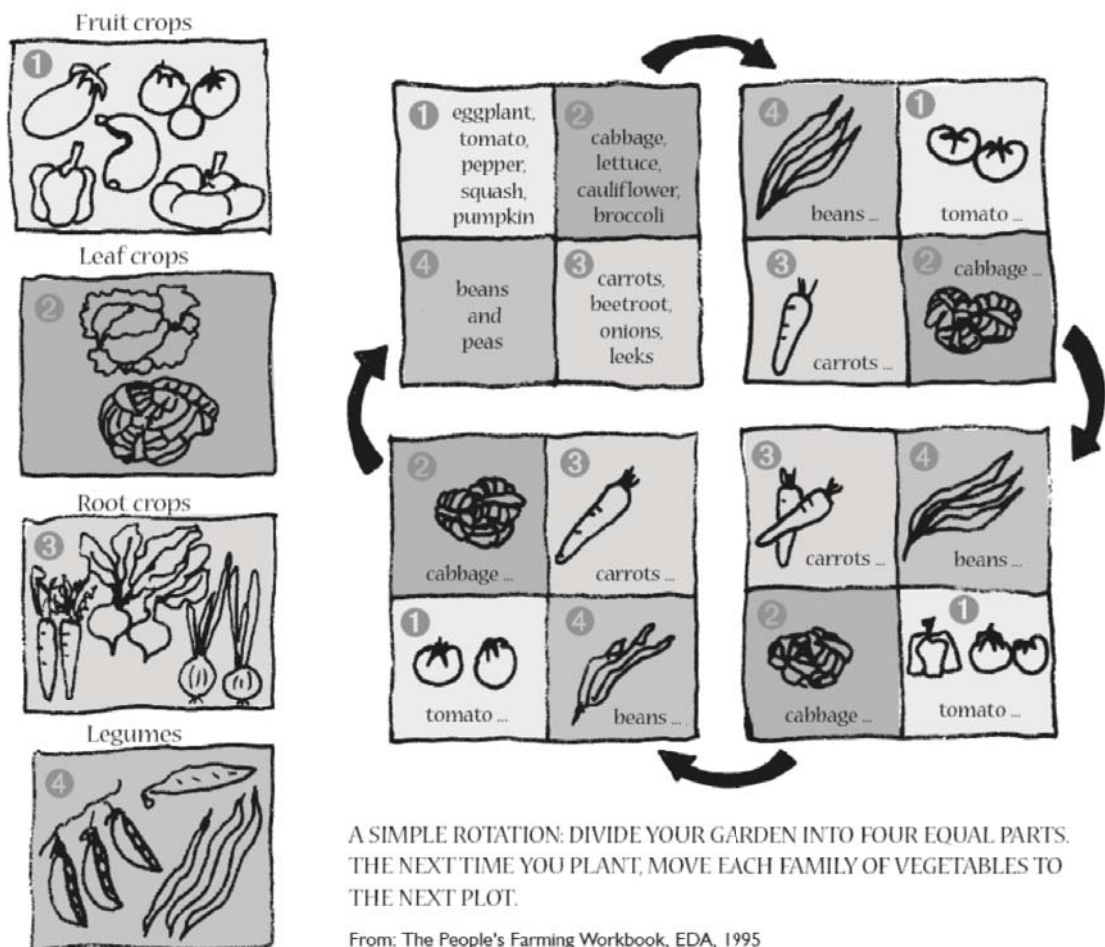
Go fetolafetola dimela ke tsela ye bohlokwa ya go hlokomela dirapana le mashemo a magolo. Go fetolafetola dimela go fokotsa dikhunkhwane le malwetsi gwa aga mobu le tikologo, gwa laola le go tswa ga dijo tsa dimela mobung mola go kaonafatsa maphelo a mobu.

Shoma ka go fetolafetola dimela ga bonnyane bja mengwaga e meraro (3) ka mashemong a magolo. Mohlala, ke lehea (semela sa go hloka phepo ya godimo) se fetolwa ka motswako wa dimela tsa go khupetsa mobu (bjale ka sanehempe, leotsa le sonoropolomo (dimela tsa go hloka phepo ya tlase) tsona tsa fetolwa ka dimela tsa dinkokoma ka medung (bjale ka diponkisi, dinawa le dikolokoto)



Shoma ka dihla tse tharo goya go tse nne (3-4) tsa go fetolafetola dimela ka

serapeng sa go tsweletsa merogo. Mokgwa o tee ke go latelela tatelano yeo e latelago ka morago ga go epa molete/motseletsele wa tshela podishwa (compost): Dienywa, Mahlare/matlakala, Medu, dimela tsa dinkokoma ka medung, medu ya dinkokoma



5.4 MOKGWA WA THLAGO WA GO LAOLA DIKHUNKHWANE LE MALWETSI

mokgwa wa thlago wa go laola dikhukhwane le malwetsi ka gare ga sisitimi ya ka gae ya go tsweletsa dijo e agilwe ka thlakathlakantso ya ditsela goba ditsejana tse nne tseo di latelago,

- kaonafatso ya go nona ga mobu, maphelo a mobu, go swara meetse ga mobu, dimela tseo di phetsego gabotse, go shomiwa ka kakanyo ya gore dimela tseo di babjang/lwalago di ganelelwa ke malwetsi le dikhunkhwane
- Go hlakahlakantsha dimela le seemo sa serapana; go fokotsa bontshi bja dikhunkwane le malwetsi ao a hwetswago fao go lengwago dimela tsa mohuta o tee, go fokotsa le kgonagalo ya phetetsano le go fetelwa ga bedi ka go tlosa dimela tseo di lwalago (ka thlokomelo) le go tlosa digola tsa dikhunkhwane. Le ka go hlohleletsa go ba gona ga diphofotswana tsa go iphepa ka dikhunkhwane (bjale ka mekgaritswane) le dinosi tseo e lego mekgwa ya thlago ya go fedisha dikhunkhwane tseo di tlwaelegilego ka dirapaneng.
- Go bjala dimela tsa mehola e mentshi; bobedi tsa sehla ka sehla goba tsa goya goile, go akaretsa dimela tsa go ba le ditlabele tsa go laola dikhunkhwane le malwetsi. Tsona di akaretsa; go fa mohlala:
 - Matsoba/mapolomo a go swana le sepatsana (marigolds) le khalendula (calendula)
 - Dihepo (herbs) tsa go swana le laventa (lavender), Rousemeri (rosemary), Khorienda (coriander) phasili (parsley), thaeme (thyme), fenele (fennel), peisele (basil), rokete (rocket), bjang bya swiri (lemon grass) lekaliki ya mahlare (garlic chives);
 - Dimela tsa go dira meriana go swana le wemowote (wormwood) pulepane (bulbine) lepalpanela (bulbinella), kgopa, mahlakantsha (comfrey) le botshashabogope (stinging nettle);
 - Mehlae ya dikonkokoma ka medung go swana le sesepenia sasepene (Sesbania sesban) moringa, disakwana (pigeon pea) le meshwana/meoka (Acacia spp).
- Go dira dibidishwa/ teye tsa goba le ditlabele tsa go laola malwetsi le dikhunkhwane. ke mekgwa ya go tlwaelega ya ka gae go apea/dira diteye, yona e akaretsa gohlakantsha pherepere ya go baba, kaliki ya segwere, nyala ya segwere le sesepa sa llofo (go laola dikhukhwane tsa mebele ye menanana bjale ka matlae (aphids)) parafene le nyala ya segwere (go laola dikhunkhwane tsa goba le sekhakha se se thata, go swana le tsie le manphushaboloko le mapolare (go laola fela, le dikwakwa tseo di sa hlabegogo moroba/bonolo ebile di tala lefola), le ge gole bjale go sana le mekgwa ye mengwe e mentshi

TIRAGATSO

- Ka serapaneng, le ka mashemong a magolo
- Lefelong la bonnyane bja seripa se tee go tse lesome sa heketere goya go heketare e tee (<0,1ha, 0,1-1ha)
- Go bitsa masheleng a tlase, didirishwa di hwetsega ka bo kgauswi
- Go hlokega matsogo a malwa goya go a magareng le tsebo ya go tsenelela



Thlokomelo ya serapana ya go tsenelela; thlokomelo ya meetse le mobu, dimela tsa go fapafapana, thlakantsho ya dimela tsa sehla ka sehla le tsa goya goile



Pest control brews; soap chilli garlic mixes, paraffin and onions mixes – for soft bodied insects



Diji tsa dikhukhwane- di laola dikhunkhwane ka go dija le go bea mae



Kudu ya peu ya go agega bjale ka morithi – go swana le ya nyala di ooketsa diii tsa dikhunkwane biale ka



Marigolds protect against root knot nematodes



1. KONOFOLO /kaliki (Garlic) – Mohlala

MEKGWA YEO E LATELWAGO

Ripelela digwere tse nnyane/digweshana ka bosese (segwere se tee se se golo, goba tse pedi tsa magareng) di inele ka gare ga mahwana a mabedi a mannyane a makhura a go apea letsatsi le tee, goba matsatsi a mabedi ka gare ga parafene. Shomisha sebjana sa galase, e sego kotikoti. Hlakantsha le seripa sa litara e tee ya meetse a sesepa gomme o sefe. Tswakantsha karolo e tee ya motswako le dikarolo (tsa go lekana le yona) tse lesome tsa meetse pele o fokela dimeleng. Shikinya gabotse pele o fokela.

TSEO DI NYAKWAGO (TARGETS)

DiKhunkwane ka kakaretso: menang, strainara tsa katune, matlae, dintshi, diboko, dikgofa/masekane, ditsoshi, beetles, ditsie, khukhwane ya go bitsodiamond back moths, false codling moths, grubs, dimaete (mites), ya go bora diperekisi (peach borers) le magoro/motlhwa.

Mouta (Fungi): dintho tsa dieywa (Scab), bo sehla bja matlakala (mildew), dintho tsa matlakala a dinawa goba diponkisi (bean rust) le dintho/le go hunyapana ga tamati (tomato blight).

Aletheneria (Alternaria) – ro bola ga enywa, go omelela ga matlakala (early blight), go swag a matlakala gag ole a nnyala ka godimo le ka mathoko (purple blotch), dipatso mo matlakaleng (leaf spot).

Sekhosepora (Cercospora) – go bola ga matlakala a go oma ka go dira boshweu, (leaf mould), dipatso mo matlakaleng (leaf spot), go omelela ga matlakala (early blight), dintho tsa go swana le leihlo la segwagwa moo matlakaleng (frog-eye).

Kholeketothrikhamo (Colletotrichum) - dipatso mo matlakaleng (leaf spot), go swa le go hunyapana ga matlakala mo mafelelong (anthracnose), go bola ga dienywa (fruit rot), go bofega ga kutu (smudge).

Dipaketheria(Bacteria): *Xanthomonas* spp.



Digwere tsa kaliki/konofolo



Seboko le serurubele



Go lolwa ga mahlare ya setroperi ke *Xanthomonas campestris*



Dika tsa bolwetsi bja go bitswa anthracnose (e hlotse ke *Colletotrichum*) go enya ya capsicum

5.5 THLOKOMELO YA NGWANG YA GO TSENELELA

ngwang ke dimela, bobedi tsa sehla ka sehla le tsa goya goile, tseo dimelago le go gola ka golokologa ka mashemong le ka dirapaneng, di phenkgishanetsa dijo, sekgoba le meetse le dimela tse dingwe.

Mebu ya go fapana le leratadima; mekgwa ya go lema le go hlagola e ka ra gore mabakeng a mantshi ngwang oa iketla gwa ba boina go emeletsana le wona. Bjale ka mohlala; sehlwa le sedges di ithatela mobu wa letsopa la godimo, di ka thopa lefelo ge dihlagolwa fela ka go okola ka godimo ka mogoma/ letsepe. Ngwang o ikgodisha le go ikoketsa ka medu yeo elego ka tlase ga mobu.

ngwang wa go gola ka maatla wa sehla ka sehla bjale ka motshakgatshagane/ moshiitsi le thepe o thopa lefelo ge ngwang wa go hwetswa goya mafelelong a sehla o hlagolwa, bjale ka ge di dira peu e ntshi, yeo e kgonago go phela nako ye telele.

Thlokomelo ya ngwang yeo e tseneletsego e akaratsa mekgwa ya go balega go swana le lebopo la mobu leo le kaonafetsego le maphelo a mobu, go khupetswa ga mobu, dimela tsa go khupetsa mobu, go fetolafetola dimela le go go bjala dimela kgauswi le kgauswi. Gape e akaretsa le mekgwa ya go shomisha, megoma/matsepe, le tshafi/mpholo ya go laola ngwang. Go dira podishwa le gona go bolaya ngwang ge go dirwa gabotse, go ka fokotsa peu ya ngwang yeo e hwetswago tikologong. Go hlagola morago moo sehleleng go bohlokwa kudu, ka ge go fokotsa bontshi bja peu ya ngwang wa sehla ka sehla.

TIRAGATSO

- Ka dirapaneng le ka mashemong a magolo
- Lefelong la bogolo bja ka tlase ga seripa se tee go tse lesome sa heketare goya go heketare e tee (<0,1ha, 0,1-1ha)
- Go bitsa masheleng a tlase; didirishwa di hwetsega ka bo kgauswi,
- Go hlokega matsogo a malwa goya go a magareng le tsebo ya go tsenelela



Go bjala kgauswi le kgauswi le go hlakahlakanya dimela go shireletsa kgahlanong le ngwang – ka hlakoring la nnyele ke lehea leo le hlagolelwago ga nyane, mola ka hlakoring la go ja ke lehea lo le bjetswego kgauswi le kgauswi (leo le bjetswego ka nako e tee) bobedi a hlagolelwa go swana



Go dira podishwa (compost) go bolaya ngwang ebile ke tsela e botse vaqo kaunafatsa morole (ka go oketsa boleng bia ona)



Tshemo yeo tlegogo sehlwa –ka lebaka la go ekola ka godimo ge go hlagolwa



Pholoto ya lehea la go hlakana le diponkisi, fao ngwang o bekishago dimela



ka tlase ke mobu wa letswai, (ka godimo tsogong la nnyele, ke thepe) fao mobu o nonnengo empa ona le lebopo le lebe, moshiitsi (ka godimo ka go la go ia) e kgona go tsea dijo qabtse mobung



Sedges le sehlwa, go botsha go sena le moya wa go lekanale ka mbug, ka lebaka la go kitelaga ga mobu le lebopo le lebe la mobu

5.6 LEFelo LA GO TSWELATSA DIMELANA LE GO BJALA

Lefelo le lennyane la ka gae la go tswelatsa dimelana (tša merogo, dihepo le dienywa) le dimela tša mehola e mentshi (dimela tša go dira meriana, le tša go laola dikhunkwane) go tswa go peu, dipathana, go arosha, digwere le medu, le bohlokwa go netefatseng gore gobagona ga dimela tša go fapafapana ka serapaneng. Ga go hlokege didirishwa tša go ikgetha, ntle le mobu/podishwa yeo go ka bjalelwago go yona, mekotlana ya go bjalela goba ditherei tša go bjalela, mafelo a, a ka dirwa ka tlase ga morithi wa mohlare ka gae.

Mepete ya dimelana e dirwa gore e ye fase ka disenthimitara tša magareng ga tse 30 le 60 gomme ya tshelwa podishwa e ntshi (podishwa le morole), e swanetse e direlwe morithi go direla gore peu e phele e thapila (e seke ya thapa kudu) ka nako ya ge e thunya goba e sa thoma go gola. Mafelo a go tswelatsa dimelana a go shomisha ditherei tša dimelana a hloka thlokomelo e kgolo ebile go boima go dira bjalo ka mokgwa wa thlago. Go moroba go bjala dimelana mobung, wa bjallolla o bjala go tswa fao.

TIRAGATSO

- Ka dirapapeng
- Lefelo la ka tlase ga serapa se tee go tse lesome sa heketare (<0,1ha)
- Go bitsa masheleng a godingwana (peu, dimela, dibjana), didirishwa di hwetsega ka bokgauswi ,
- Go hlokega matsogo a go lebana



Tswelotso ya dimelana mpetaneng wa podiswa (compost) yeo e lekanetsego wa goba le morithi wa polasitiki go shireletsa dimelana



Moago wago dirwa ka lesaka wa go tswelatsa dimelana tša merogo le dihepo



Dimelana tša moba le dimango tša go tswelatsa lelwang la go tswelatsa dimelana



Lefelo le lennyane la ka gae lago tswelatsa dimelana, ka tlase ga morithi wa mohlare, go tswelatswa dienywa, mehlare ya mehola e mentshi mehlashana la dihepo. Fa go bjatswe dimango le moringa



Dipafo le dikotelo le tsona dika shomishwa: di ka shothishwa moroba

5.7 GO BOLOKA PEU

Go boloka peu ke mokgwa woo tlwaelegilego baleming ba mashegwana empa o ya le go sesefala. Dipeu di bewa ngwaga goya go woo latelago ka tlase ga maemo a mabe ao balemi ba kopanetsanago le wona, bontshi bja balemi ba bontshitse gore ba lahlegetse ke bontshi bja dipeu tseo ba bego ba di boloka.

Bontshi bja balemi ba reka peu ba lema ba fetsa ba leka go boloka peu go tswa go dimela tsa peu yeo e rekilwego, se se ra gore peu ya setso ea timelela. Go boloka peu go bohlokwa kudu, go thusa le go netefatsa gore peu ya dimela tsa setso/ selegae ga e timelele ruri. Balemi ba ithatela mehuta ya dipeu ya setso tseo di kgonago go emeletsa le maemo a leratadima la tikologo, dikhunkhwane le malwetsi. Tse dingwe tsa dikarolwana tseo di swanetsego go elwa hloko ge go bolokwa peu ke tse di latelago:

Go bohlokwa go hloheletsa gobagana ga diphedi goba dikhunkhane tsa go phatlalatsa peu (bjale ka dinosi), o ka dira seo ka go bjala mehutahuta ya dimela tsa go tswela matsoba le go netefatsa gofapafapana ga dimela ka gare le go rarela serapana goba tshemo, le go fokotsa tshomisho ya shefi ya go bolaya dikhunkhwane.

Boloka peu go tswa fela go dimela tseo di phetsego gabotse ebile di none. Le ka mohla, o seke wa boloka peu go tswa go dimela tseo di tsweditsego peu pele ga nako

- Kgetha dimela tsa magareng tse diselelago (6) goya go tse masompedinne (24) ge o boloka peu
- Le ka mohla, o seke wa boloka peu go tswa go dimela tseo di bontshago goba le malwetsi
- Peu e swanetse go butswa ebe e ome ele semeleng nako ye telele ka moo go kgonegago
- Dimela tseo di kgonago go amogela bonna/peu go tswa dimeleng tse dingwe ga bonolo (go swana le dimela tsa legoro le tee le khabeshe (motshofabeke), lehea, pherepere, pherepere ya go baba, mafodi/dithaka goba marotse le llethise bjale le bjale) di swanelwa ke go aroganywa go shomishwa sekgoba, nako goba di dirrisha tsa go khupetsa

TIRAGATSO

- Ka dirapaneng le ka mashemong a magolo,
- Lefelong la bogolo bja ka tlase ga seripa se tee go tse lesome sa ekere/mmorogo goya go ekere tse pedi le go feta (<0,1ha, -0,1-1ha, >2ha)
- Go bitsa masheleng a tlase, didirishwa di hwetsega ka bo kgauswi
- Go direga moroba, lege go hlokega matsogo a go lebana le tsebo yeo e tseneletsego



Serepana sa go tswela peu, le meago ya go khupetsa, le dimela tse 6 –24 tsa mehutahuta tseo go bolokwago peu go tswa go tsona, dimela tsa magoro ao a fananago di bialwa



Matsoba le dimela tsa go hloheletsa go thothwa ga peu; ke dinose, dirurubele, bjale le bjale



Lehea le dulafatswa ka letsogo gore go tle go kgethwe peu



Mohlare wa pherepere woo o ppiilwego ka okwana gore peu etle ebe yona yona

Dipholineitha di rata matsoba a go fapanafapana!!



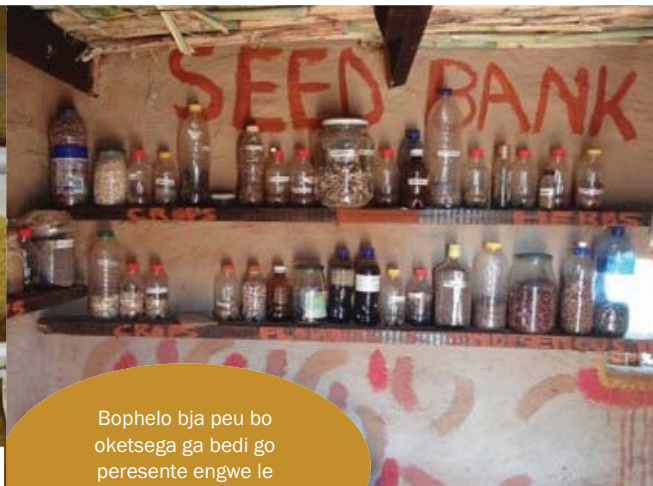
5.7.1 TOKISHO YA PEU LE GO BOLOKWA PEU

Ka kakaretso, peu e hloka go dula e fodile, leswiswing elibe e omile gore e dule e iketlile nako e telele ka moo go kgonegago. Ge peu e bolokilwe ka tlase ga maemo ao monola le phisho di fetegafetogago, e lahlgelwa ke bokgoni bja go thunya goba go mela ka pela. Ka tlase ke tse malwa tsa dinthla tse bohlokwa tsa mekgwa ya go boloka peu e mekaone:

- Monola; peu e swara monola go tswa moeng. Peu e bolokwa foa monola o lego ka tlase ga diperesente tse lesome (<10%) fao go omilego ebile go sa tsene moya.
- Phema go shomisha dipotlana le dibjana polasitiki
- Seetsa se fokotsa bophelo bja peu; boloka peu ka gare ga sebjana sa mmala wa go teba goba ka ntlong ya go hloka seetsa. Leswiswi le bohlokwa ka mehla
- Dithemperatshara/ phisho; peu e dula lebaka le letelele fao go tonyago, efela e sebe go tonyago gwa go omeletsa/gatsetsa
- Dipeu tsa go swana le ya tamati le khukhampa di apeshitse ke mamilana ao a shitishago gore di mele. Mamilana ao a hloka gore a tloshwe pele gage peu e bolokwa goba e bjalwa. Mamilana a ka bedishwa ka meetse le swikiri gomme peu ya pulwa ka meetse ya festsa ya omishwa
- Silica gel e ka somishwa go omisha peu le go fetelela
- Peu e ka tshelwa molora, kalaka le butswana bja matlakala/mahlare a go omishwa (bjale ka kgopa) go thibela phehli.



Peu ya tamati le gooseberry di a bedishwa pele di bolokwa goba di bjalwa



Bophelo bja peu bo oketsega ga bedi go peresente engwe le engwe e tee ya go fokotsega ga monola



Shomisha silicon ntsha monola/meetse peung le molora boloka peu ya go oma



Ntlwana ya go boloka peu; foa peu e omishwago, mekotlana ya pampiri le mapotlelo a galase



Boloka peu ka gare ga mopotlelo a galase



Bophelo bja peu bo oketsega bedi ga phisho e fokotsega ka ditikirisi tse hlano (5°C)

Boloka peu le dithaka/marotse lefelong la go tonya, la go oma, fao go sa tseneqo seetsa

5.8 TSWELETSE YA DIENYWA

Go tswelletsa mehuta ya dienywa tsa go fapana magaeng, tseo di butswago nakong e kgolo ya ngwaga, ke karolo ye bohlokwa ya thlakathlakano ya dimela le boitlamelo. Dienywa di ka tswelletswa go tswa go peu, kutu, modu/medi, go aroganywa ga sehlopana sa dimela e go kgomaretsa godimo ga semela se sengwe. Dihlare /Mehlare ya dienywa e bjalwa ka gare ga melete ya mobu wa go nona le goya tlase, e hloka go noshetshwa/tsheletswa ga golo ge sale e mennyane. E hloka go tshireletswa kgahlanong le moya, e swanetse go thenelwa sehle sa marega (mehlare ya go swana le ya diperekisi, dipolamose le diapola) goba e thenelwa gore e tshweletse dienywa tse ntshi (mehlare yeo e phelago ele tala go swana le mehlare ya legoro le tee le menamone, dimango le dikotapene goba diobakhathe). Metswako ya go dirwa ka dilo tsa thlago e ka shomishwa go laola dikhunkhwane (go swana le, diboko, ditshoshi, sepsagapsaga le magoro) le malwetsi mehlareng.



Shomisha metsoko ya thlago bjale ka pyrethrum, oli ya dimenerale le lime sulphur. Shomisha butswana bja go bjala mehlare ka phata/kutu

Mehuta ya go fapana ya dienywa emela/bjalwa ditikologong tsa go fapana goya ka seemo sa leratadima. Ga gologolo, gona le mehuta ya hloka sehla sa marega sa go tonya (dienywa tsa fao selemo se fishago gomme marega a tonya), bjale ka diapola, dipiere, dipolamose, diterebe le diperekisi, gape gona le le dienywa tseo di sa kgonego go kgotlelela marega a go tonya kudu, bjale ka dimango, dipanana, diabakhato le dilitshi. Mehlare ya legoro le tee le menamone e kgona go kgotlelela phiso le go tonyo go go fapafapanego, efela e hloka go noshetswa/ tsheletswa.

TIRAGATSO

- Ka dirapaneng le ka mashemong a magolo a mehlare
- Lefelong la bogolo bja ka tlase ga seripa se tee go tse lesome sa ekere/mmorogo goya go ekere tse pedi le go feta (<0,1ha, -0,1-1ha, >2ha)
- Go bitsa masheleng a ka godingwana (dipeu le dimela), didirishwa di hwetsega ka bo kgauswi
- Go hlokega matsogo a go lebana le tsebo yeo e tseneletsego



Go tshelletswe mehlare ya dinamome, sekgotlotswana se swara meetse ka bontshi



Mehlare ya ditamati yeo e bjetswego ka peu e humile ka (vitamin C) e enya magareng ga kgwedi March goya go kgwedi ya May, ka nako yeo dienywa di tlokegago



Mehlare ya dikurunate, diobakathe dimango le ditamati e bjalwa ka peu



Tshomisho ya dikgotlotswana, go agelatsa meetse a pula



Selaga ya maitirelo ya go rea dintshi go shomishwa namone, panama le meetse



Bjala mehlare ka gare ga melete ya go ya fase ya go tlatswa ka podishwa (compost); dira sekgotlotswana sa go noshetsa o fetse o khutetse mobu

5.9 DIMANGO TSA GO TSWELETSWA KA MOKGWA WA THLAGO

Dimango di kgotlelela dihla tse boina, di mela/gola gabotse mafelong a marega a go tonya le selomo sa go ruthela goya go sa go fishi. Go na le mehuta ya sekgweng/nageng yeo e melago gabotse ge e bjetswe ka peu. Mehuta ya sebjalebja yeo e bjalewago ka mokgwa wa go kgomaretsa godimo ga mehlare e mengwe (crafting) e bjalelwa bogolo, goba monate, le go hloka digare ga yona. Fao go hlokegago mahlogedi a maswa a kgomaretswa mehlareng yeo e kgotlelela maemo a mabe goba medu ya mehlare yeo e sa ganelelwego ke malwetsi. Mehlala ya maina a mehuta yeo e tlwaelegilego matsatsing a lehono ke e elatelego, Keit, Kent, Shelley le Tommy Atkins. Mehuta ye, e rekishwa bjale ka dienywa, juse, dimango tsa go omitshwa goba letlalo la dienywa (fruit leather).

Ka tlase ke; malibisha a malwa a go bjala mehlare ya dimango ka mokgwa wa thlago:

- Dira positshwa dikgwedi tse nne (4) goya go tse tshela (6) pela ga ge o bjala mehlare
- Bjala mehlare yeo o sa tswago go e hwetsa ka sehla sa seruthwane ka gare ga melete ya bophara bja (60 cm) le botelele bja (60 cm) o shomisha motswako wa poditshwa, mobu, kalaka (lime) le morole wa go dirwa ka marapo a go oma (bone meal). Dira, goba aga sekgotlotswana sa go notsetsa/ tshelsetsa go rarela mohlare, ofe dikhupetsa mabu (bjale ka bjang).
- Podishwa e oketswa ngwaga ka ngwaga ka morago ga ge mehlare o thomile go enya dienywa
- Go thenela go dirwa ngwaga ka ngwaga ka morago ga ge mohlare o thomile go enya, se se netefatse gore mohlare o phela o bulegile, moo dienywa di hwetsago mahlasedi a letsatsi
- Mehlare e mennyane e hloka dilitara tse 20 goya go tse 40 tsa meetse ka beke

DINYAKWA

- Pula ya dimilimitara tsa ka godimo gat se lekgolotharo-masomehlano ka ngwaga (>350mm/year)
- Dithemperetshara tsa ditikirisi tsa ka godimo ga tse hlano (>5°C)
- Go lekelelana ga lefelo ga magareng
- Mobu wa mohuta ofe goba ofe
- Go tshelsetsa/noshetsa, didirishwa le meetse a go tshelsetsa dia hlokega

DIRAGATSO

- Ka dirapaneng le ka mashemong a magolo a mehlare
- Lefelong la bonnyanne bja seripa se tee go tse lesome sa ekere/mmorogo goya go ekere e tee (<0,1ha, 0,1- 1ha)
- Go bitsa masheleng a ka godingwana, didirishwa di hwetsega ka bo kgauswi mola tse dingwe di sa hwetsege ka bo kgauswi, Go hwetswa mehlare ya mehuta ya sebjalebja
- E hlocomelega bonolo, efela go hlokega bokgoni/tsebo yeo e tseneletsego



Boleng bja dienywa tsa mango bo godishwa ka go dira jusi le go di omisha



Mango woo thomago go hloga ka leswa ka morago ga gore o thenelwe, podishwa e tshetswe ka sekgotlotswaneng sa go tshelsetsa gomme qwa khupetswa ke mahlare a go oma



Tshemo ya mehlare ya dimango ya molemi-potlana wa Limpopo, e lekolwa ke molaudi wa mango estate



Mohlare wo mogolo/ wa kgale o a thenelwa, wa tshelwa podishwa, wa ba wa agelwa sekgotlotsana sa go noshetsa go o

6 KAKARETSO YA LERUO KA MASHEMONG

Gona le dikarolo tsa thlokomelo ya leruo/diruiwa tseo di gatago mehlaleng e tee le tsa thlokomelo ya dimela goba bolemi bja go thlago/ bja go netefatsa nyalelano ya dilo tsa ka mashemong.

Mo seripeng se, re leka go kwishisha, mekgwa ya go oketsa le go kaunafatsa mafulo/ le dijo tsa diruiwa

- GO LEMA KA GO GOBANYA MEHLARE LE DIMELA TSE NNYANE

Mehlaree swametswa ka garegabolemiyadimela ka mekgwa yeo e latelago, ka nako yeotshemo e letsegoba e salemiwa, ka go e bjalamagarenggadimela(mabakeng a mantshi ka meraladi). Mehlaeyadijotsadiruiwabjale ka disakwane(pigonpea) meoka/meokana, meshwana, moringa le Leauceanaspkeyona e tlwaelegilego gore e lemiwe le dimelatsennyane.

DINYAKWA

- Pula yadimilimitaratsa ka godimogatselegolotharo-masomehlano ka ngwaga (>350mm/year)
- Dithemperetsharatsaditikirisitsa ka godimogatsehlano (>5°C)
- Go lekelelanagalefegogadipresentetsamagarengya tee fegelwanahlanogoya go tselesomehlano (1,5-15%)
- Mobuwamohutaofegobaofe



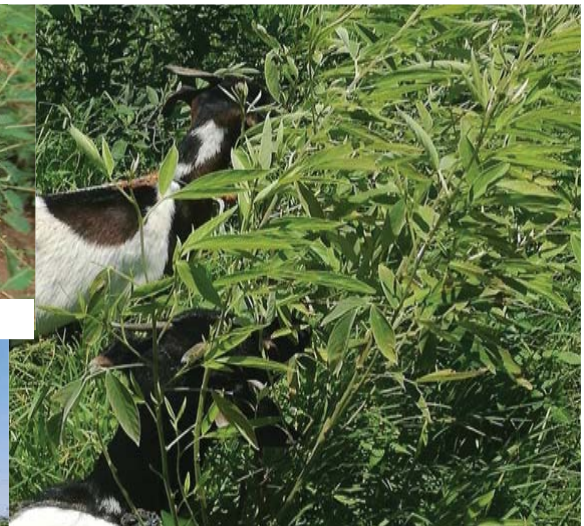
Mehlalaya go bjalamehlaremafelong a go ema ka gofapana

TIRAGTSO

- Ka dirapaneng le kemashemong a magolo
- Lefelong la bogolobja ka tlasegaseripa se tee go tselesomesaekere/mmorogogoya go ekeretsepedi le go feta(<0,1ha, -0,1-1ha, >2ha)
- Go bitsamasheleng a godingwana(peu ledimpsane/dimelana), didirishwa di hwetsega ka bokgauswi
- Go hlokegamatsogo a go lebana



MohlarewaSesbania o bjatswebjale ka legora ka tshemong



Pudi e fulamehlareyadisakwane (pigeon peas)



Moringa o bjatswe ka mereladi ka tshengwaneng



Legora la mehlareyaLeaucena, e bjatswe le diponkisi (ka pele) le lehea (ka modaro)

6.1 GO LEMA MEHLARE, DIMELA LE BJANG LEFEONG LE TEE

Mokgwawagohlakantshamehlare, dimela le bjanglefeong le tee o shomishwa go godishwatsweletsoyalefelo. Mokgwa woo akeretsamekgwana yeo e lateago:

- Go lemagadijo, dijotsadiriwamagarenggameradidiyamehlare; go lemadimela/ mehlareya go diradikgong/ dikgonyelegorenggobadibjalwa ka meraladimagarenggalegora la dimela. Mehlareyadikgong/kgonye e bohlokwa go kaokafatsa go nonagamobu le dimelatseodingwetseo dibjatswego le yona
- Tshomishoyadimela go fihlelasetlogosalefelogobatschemo; mehlareyadikgonge a bjalwayatlogelwa gore egole ka nako yeo tshemo e letse (e salemiwa). Mehlareyadikgong ekaonafatsa go nonagamobu le bokgonibjamobubja go swarameetse.
- Serapanasa ka gae; thlakathlakanyoyamehlare le dimelatsa go fapafapanagorelamotse/legae go na le meholo e mentshiya go akaretsa, merithi, meriana, dienywa le dijotsadiriwa.
- Mehlareyameholaya go fapafapana ka garegatshemo; mehlareeatshwalalana, gobayabeakanywagodimogametotolo, merako, mekerodiforogoba moo tshemo e felelago. Mehlare ye e kgothwagoya ka go fotaetsadijotsamobung, go tseletsadienywa, dikgong le dijotsadiriwa.

DIRAGATSO

- Dirapana, mashemo a magolo, diruiwa
- Lefelong la bogolebja ka tlasegaseripa se tee go tselesomesaekeregoya go ekere e tee (<0,1ha, 0,1-1ha >1ha)
- Go bitsamasheleng a godingwana Medium cost (peu le dimela), didirishwa di hwetsega ka bokgauswi,
- Go hlokegamatsogo a go lebana le tseo yeo e tseneletsego



Sasepenia sesepene le lehea di bjatswe mmogo, KZN



Go bjatswe lehea ka morago ga mengwaga e mebedi ya disakwane



Mehlashana ya dinkokoma ka medung e bjaletswe go fudisha diruiwa



Kaunafatso ya tshemo ya go lala, e bjatswe disakwana ngwaga o tee, KZN



Serapana sa ka gae, Mhlabayaligana, KZN; Thlakathlakanyo ya dienywa, merogo le dimela tse dingwe



Bjang bja phulo bo bjatswe ka gare ga tshemo ya mehlare ya dikoko

6.2 GO FEPADIRUIWA LE PHEPOYATLALELETSO

Phuloyatlaleletsokemokgwawa go hlokomemaladiruiwa woo shomiswago go fa diruiwadifepammelegobadijotseo di sahwetsegegomafulong. Se sebohlokwasehlengsamarega, gegona le tlhokegoyaphulo, ebilebolengbjaphulobole tlase (mohlala, gebjang bona le diporothinetsatlase). Dikgethotsaphuloyatlaleletso di akaretsatse di latelago:

- Dijotsagoba le diporoteinsadielabjale ka Voermol Premix 450 (lerole) le LS 33 (seela)
- Dithorole peu, bjale ka lehea le leroro/ mabelethoro a go shilwa, bjale le bjale
- Dimomanamonane; tse dimenerale le diproteine

Phuloyatlaleletso e kaba le ka mokgwawabjanggobaphuloyamohuta wo mongwe. Se se ama go bjala/ lemabjangbjamehutaya goba le difepammeletsentshigobatsekaoubeg go bapetswa le furuyo elego gona. Mehuta e mentshi e bjalgwafafuru ye tala yabolengbjagodimogoya go felenggamarega.

Mehlalamehuta ye e akaretsa: Lucerne, fodder rye, black (saia) oats, vetch, Teff, fodder radish, Japanese radish, Kale, le turnips. Bjangbjoobophelagonako e telebodulagobo le tala lesehlengsamagerabjale ka Kikuyu le Tall fescue bo ka bakakanyo e botse.

Phepoyadiruiwatsennyane kemokgwa woo bonolowa go hlokomeladiruiwatsennyane ka go dumalelamanamanephepoyatlaleletse a saanywa go tswakgomong. Manamane a hwetsaphepoyatlaleletso ka se bitswago "Creep" e lego go bulegagalegoragobakgorwanae kgologo dumelelamanamane a fete mola e le enyane gore dikgomo di ka feta.

TIRAGATSO

- Diruiwa/ leruo
- Lefelong la bogolobja ka godimogaekere e tee (1-1ha >1ha)
- Go bitsamasheleng a godingwana, Diririshwa di hwetsega ka bokgauswi
- Go hlokegamatsogo a go lebana le tsebo yeo e tseneletsego



Mohlalawakgorwanaya go dumelalamanamane go tswamola e thilebadikgomotsekgolo go tswa



Go bjala ka go fetafetanaga vetch le Saia oats ka garegatshomoyalehea



Dijotsaphuloyatlaleletsotsa go dirwa ka matlakala a go oma a Sesbaniasesban, lehealeswai

Dimomananetsaporoteinetse go itirela ka gaetseo di nago le, urea protein meal, mothopowaphosphorous, meetse, se samente le leswai le lennyane

6.3 GO FEPA/FODISHA KA SEPARENG/LESHAKENG LE GO DIRAFURU

Go fuditsetsa ka leshakeng gabotse go ra gore go ripawarwala (bjang/furu) waishetsaleruo ka leshakeng, se sethibelatshenyo yeo e ka hloagokediruiwa ka tshemonggape le go netefatsaphepoyagodimo.

furu le dijotsadiruiwatseo di omishitswego, e ka dirwa ka bjangbjahlageng/ lefokeng, mehuta yeo e ikgethiletegbjale kalucerne, dinawa, mabelethoro/ lerorobjale le bjale, gobamashaledi a dimelagobadithlaka.

Gobalemipotlana, disherefetsafuru di ka dirwa go somishwadidirishwatsamatsogo.



SherefeyabjangbjaEragrostisTeff



Sherefeya Lucerne

TIRAGATSO

- Diruiwa
- Lefelong la bogolobja ka godimogaekere e tee (1-1ha >1ha)
- Go bitsamasheleng a godingwana, Didirishwa di hwetsega ka bokgauswi
- Go hlokegamatsogo a go lebana le tsebo yeo e tseneletsego



Go fodishetswa ka shakeng/ setaliking



Dithlaka tsa lehea



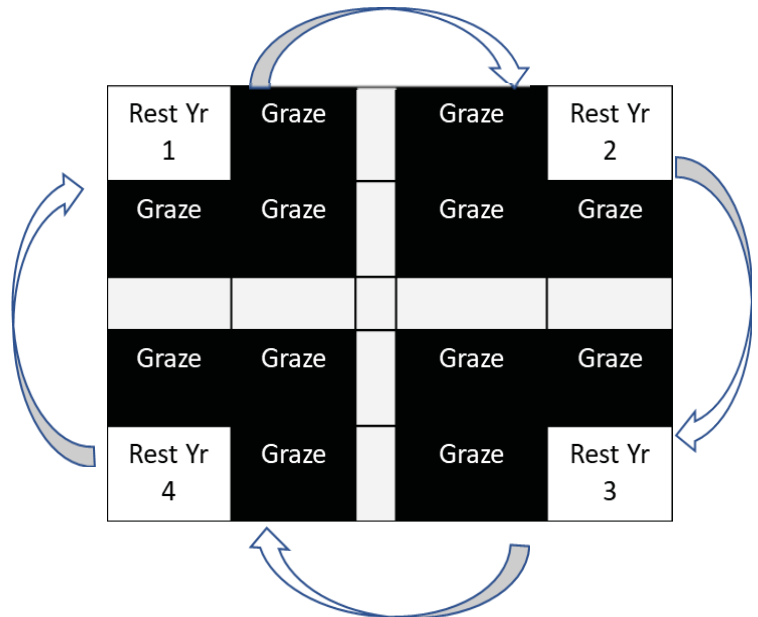
Sedirishwa sa matsogo sa go dira disherefe, fa, go shomishitswe bjang bja lefokeng



Mashaledi a dimela tsa dinkokoma medung

6.4 GO FUDISHA KA MOKGWA WA GO SHIETSA

Bjangbjobojegagogebofushishwa ka go fitishisha, be fetsa be felelakemaatlajbatimelela, kemokabjangbja go se jegebjaemphalefelo. Go bolokatsweletseyamafelo a go mela bjang, go bohlokwa gore karolomafulo e khutshishwesehlaa go tlaa gore bjangbobogole. Se sedumelelabjang gore bobolokedifepammele ka medung/meding le go dira gore bjangbo be le phepo. Ge maemo a dumela, seripa se tee go tsenne se swanetse go khutsitswamengwangemegwe le emegwe e mene. Go bohlokwa gore baruibashomemmogo go tla le lenanego la go khutsishamafelo a go fuditsadiruiwa.



TIRAGATSO

- Diruiwa
- Lefelo la diekeretsa ka godimoga e tee (>1ha)
- Go bitsamasheleng a godingwana, didirishwa di hwetsega ka bokgauswi
- Go hlokegamatsogo a go lebana le tseo yeo e tseneletsego



Lefelo le fudishitswe ka go fitishishamathomong a sehla – bjangkebjobokopana, go bonagala le kgogolegoyamobu



Mafelelong a sehla, lefelo la go hlokomelwagabotse; gona le bjangbjobontshibjobohubedu (Themedatriandra), bobonagala ka mmalawadihlogotsadipeu.

Bjangboapeshitselefaseebilegona le mehutahutayabjang.

