

CLIMATE RESILIENT AGRICULTURE: PRACTICES FOR SMALLHOLDER FARMERS

FARMER HANDOUTS: ISIZULU

E Kruger, BT Maimela, H Hlongwane, Philisa Dunyana



**WATER RESEARCH
COMMISSION**
Supporting Sustainable
Water Futures
1971-2026

TT 967/9/26



Climate Resilient Agriculture: Practices for smallholder farmers

Farmer Handouts: isiZulu

E Kruger¹, BT Maimela¹, H Hlongwane¹, Philisa Dunyana²

¹Mahlathini Development Foundation

²Independent translator

Report to the
Water Research Commission
by
Mahlathini Development Foundation
Email: info@mahlathini.org

WRC report no. TT 967/9/26

ISBN 978-0-6392-0791-9

ISBN set number

April 2026



Obtainable from

Water Research Commission
Private Bag X03
Gezina, 0031

Download from www.wrc.org.za

The publication of this report emanates from a project entitled *Dissemination and scaling of a decision support framework for CCA for smallholder farmers in South Africa* (WRC Project No. C2022/2023-00746).

This publication is part of a series. The other publications in the series are:

- Dissemination and scaling of a decision support framework for climate change adaptation for smallholder farmers in South Africa (**WRC report no. TT 967/1/26**)
- Community-based climate change adaptation and local food systems: Handbook and case studies (**WRC report no. TT 967/2/26**)
- Climate resilience impact measurement for poor rural communities. A MERL (Monitoring, evaluation, reflection and learning) manual for community-based climate change adaptation (CbCCA) (**WRC report no. TT 967/3/26**)
- Community-owned water access: Guidelines and case studies (**WRC report no. TT 967/4/26**)
- Microfinance handbook for smallholder farmers in South Africa: A case study on small businesses (**WRC report no. TT 967/5/26**)
- Multistakeholder platform development manual: Guidelines for successful implementation (**WRC report no. TT 967/6/26**)
- Climate Resilient Agriculture: Practices for smallholder farmers. Farmer Handouts: English (**WRC report no. TT 967/7/26**)
- Climate Resilient Agriculture: Practices for smallholder farmers. Farmer Handouts: isiXhosa (**WRC report no. TT 967/8/26**)
- Climate Resilient Agriculture: Practices for smallholder farmers. Farmer Handouts: sePedi (**WRC report no. TT 967/10/26**)

DISCLAIMER

This report has been reviewed by the Water Research Commission (WRC) and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the WRC, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Published in the Republic of South Africa
© WATER RESEARCH COMMISSION

IZIBONGA

The MDF project team wishes to thank the following people for their contributions to the project.



Reference Group	Affiliation
Prof S. Mpandeli	Water Research Commission
Dr L. Nhamo	Water Research Commission
Dr S. Hlophe-Ginindza	Water Research Commission
Dr M. Mutema	Agricultural Research Council
Dr L. Muzangwa	Northwest University
Prof S Walker	Agricultural Research Council
Dr J.J. Anderson	Agricultural Research Council
Dr T. Dirwai	International Water Management Institute
Dr E. Kamba	KwaZulu-Natal Poultry Institute
Others	
Dr B. Letty	Institute of Natural Resources – INR
Mrs N. McCleod and Dr S. Mathela	Environmental and Rural Solutions
Dr D. du Toit	Association for Water and Rural Development
Ms A. Kotschy	Independent consultant
Mahlathini Development Foundation (MDF) staff and interns	Mazwi Dlamini, Hlengiwe Hlongwane, Nqobile Mbokazi, Lungelo Buthelezi, Siphumelelo Mbhele, Noxolo Sibiya.
MDF board members	Timothy Houghton and Desiree Manicom
Independent editor	Mr T.G. Houghton
Co-funders	SODI-BMZ
Community members	All participants involved in the process across five provinces.

This document used AI-assisted editing and summarisation (ChatGPT, OpenAI) to help condense, restructure, and rewrite draft chapter material provided by the authors. All factual content, case study data, and interpretations remain the responsibility of the authors. **OpenAI. (2025). ChatGPT (GPT-5.2) [Large language model]. <https://chat.openai.com>.** All chapters in this report were also sent to a professional and independent language and grammar editor for review

OKUQUKETHWE

EZOLIMO EZIMELANA NESIMO SEZULU: IZINDLELA ZOKULIMA ZABALIMI ABANCANE.....	1
1 ZIYINI EZOLIMO EZBEKEZELELA ISIMO SEZULU?.....	1
2 IMIGOMO.....	2
3 UKUPHATHWA KWAMANZI (UKUPHATHWA KWAMANZI ATHOLAKALAYO NOKUKUPHULA UKUFINYELELA KWAWO KUBANTU)	2
3.1 IMISELE YOKUNGENA KWAMANZI EMHLABATHINI.....	2
3.2 IMISELE YOKUNQAMULA AMANZI/ I-SWALE.....	3
3.3 IMISELE EMHLABATHINI NAMADONGA APHAKEME.....	4
3.4 AMATHIPHU: AMADONGA AXHUNYIWE UKUDAMBISA UKUGELEZA KWAMANZI NOKUGCINA UMHLABATHI NAMANZI.....	5
3.5 IZIMBOBO ZOKUNGENA KWAMANZI / AMA-CIRCLE EZAMABHANA	6
3.6 ISEMBOZO	7
3.7 UMHUBHE / I-TUNNEL.....	8
3.8 UKUKHONGOZELWA KWAMANZI	9
3.8.1 Ukumbelwa kwamathange	10
3.8.2 I-damu elincane	11
3.9 UKUTHOLAKALA KWAMANZI	12
3.10 UKUPHATHWA KWAMANZI AMPUNGA	13
3.10.1 Amabhakede okunisela kancane	13
3.10.2 Igadi ephakeme yesitayela se-tower	15
3.10.3 Izinqwaba zokulima zohlobo lwe-keyhole	16
3.11 IZINDLELA ZAMANZI EZINEMFINO	17
4. UKUPHATHWA KOMHLABATHI (UKULAWULA UKUGUGULEKA, UMNOTHO WOMHLABATHI KANYE NEMPILO YOMHLABTHI)	18
4.1 AMAKHANDA AMATSHE	18
4.2 IZINQUMULELI ZAMANZI	19
4.3 AMATHERESI	20
4.4 UKUTHUTHUKISWA KWEZINTO EZIPHILAYO EMHLABATHINI	21
4.5 UKUTSHALA AMA-LEGUME NEZITSHALO EZILUHLAZA ZOKUFAKA UMQUBA EMHLABATHINI.....	22
4.6 IMIBHEDE EJULILE	23
4.7 IMIBHEDE ENGAJULILE	24
4.8 INDANDATHO YEMVELO YOKULIMA NEYOKUGCINA AMANZI	25
4.9 UKUFAKWA KWAMANYOLO KANYE NOKELIKA	26
4.10 ZAI PITS / UKUTSHALA EMAHHOLWENI	27
4.11 UKULIMA NGOKONGA	28
4.12 UKULIMA NGAMAQEMBU EMIGQA	30

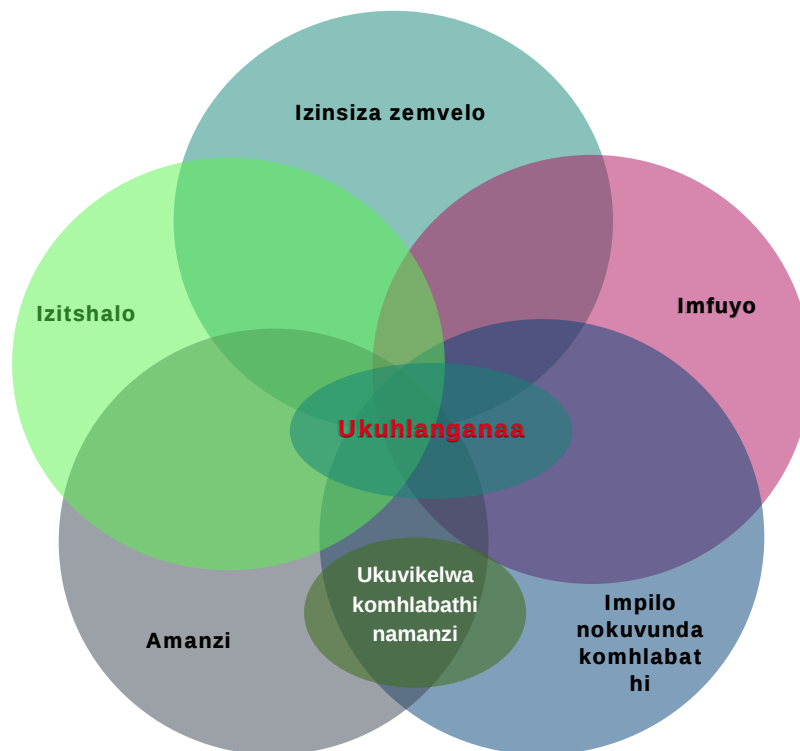
5	UKUPHATHWA LWEZITSHALO (IZINDLELA ZOKUTSHALA, IMPILO YESITSHALO, UKWANDISWA, NOKUKHIQIZWA KWEZITHELO).....	31
5.1	UMQHUBA WAMANZI	31
5.2	IZIKHUTHAZI ZEZITSHALO EZITHAKWE NGOKWEMVELO.....	32
5.3	UKUXUBA IZITSHALO	33
5.4	UKUSHINTSHANISA IZITSHALO	35
5.5	IZINDLELA ZEMVELO ZOKULAWULA IZINAMBUZANE NEZIFO	36
5.5.1	U- Garlic – Isibonelo	37
5.6	IZINDLELA EZIHLANGANISILE ZOKULAWULA UKHULA.....	38
5.7	IZIKHUNGO ZOKUKHULISA IZITHOMBO NOKUSABALALISA	39
5.8	UKONGIWA KWEMBEWU	39
5.8.1	Ukucutshungulwa kwembewu	41
5.9	UKUKHIQIZWA KWEZITHELO	42
5.10	UKUKHIQIZWA KOMANGO NGENDLELA YEMVELO.....	43
6	UKUBANDAKANYWA KWEMFUYO	44
6.1	EZOLIMO EZIBADNAKANYA EZAMAPHLATHI.....	44
6.2	EZOLIMO EZIBANDAKANYA (IZIHLAHLA, IZITSHALO KANYE NOTSHANI NDAWONYE) .	45
6.3	UKULUNGISELELA AMANKONYANA UKUKHUNYULWA KONINA KANYE NOKWENGEZA UKUDLA.....	46
6.4	UKUPHAKELWA KWEMFUYO EZIBAYENI NOKWENZIWA KWAMABHELE	47
6.5	UKUSHINTSHANISA AMADLELO	48
6.6	IZINHLOBO ZEZINKUKHU EZISEBENZA NGEZINDLELA EZININGI	49
6.7	UKUKHIQIZWA KOKUDLA KWEZINKUKHU	50
6.8	UKUKHIQIZWA KOKUDLA KWEMFUYO	51
6.9	UKUKHIQIZWA KWESITINI ESINEZAKHAMZIMBA	52
7.	IZINSIZA ZEMVELO.....	53
7.1	IMITHOMBO KANYE NAMAXHAPHOZI	53
7.1.1	Ukutholakala kanye Nokuphathwa kwamanzi	53
7.1.2	Izindlela zokuvikela imithombo ezingadingi ubuchwepheshe obukhulu	54
7.2	UKUVUSELELWA KWAMAXHAPHOZI.....	57
7.3	AMADAMU OKUQINISA	59
7.4	UKUTAKWA KWEZINTING/KWAMAGATSHA EZIHLAHLA.....	60
7.5	UKULUNGISWA KWEZINDLELA	60

EZOLIMO EZIMELANA NESIMO SEZULU: IZINDLELA ZOKULIMA ZABALIMI ABANCANE.

1 ZIYINI EZOLIMO EZBEKEZELELA ISIMO SEZULU?

Ezolimo ezibekezelela isimo sezulu zihlose ukukhuphula izinga lokukhiqiza nemali engenayo. Lokhu kuphinde kulekelelwe ukuvumela ushintso ezindleleni esilima ngazo olubheke noshintso olwenzeka ngasohlangothini lwezemvelo, Zibhekelela kakhulu ubungani ayi ubutha nezeMvelo. Ngale ndlela thina (balimi) kanjalo nemvelo siyakwazi ukumelana noshintso olwenzekayo kwezeMvelo. Kumayelana nokwenza izinguquko ekulimeni esimweni esishintshayo ezizokwazi ukulekelela thina kanjalo nemvelo ukumelana noshintsho.

Lapha sigcizelela kakhulu esigabeni sase khay. Ezolimo ezibekezelela isimo sezulu zihlose ukuthuthukisa ukukhiqizwa kwezitshalo nemfuyo, ukuphathwa kwamadlelo kanye nezinsiza zemvelo. Lokhu kuphinde kufake nokuphathwa kwenhlabathi kanye namanzi njengoba kuveziwe esithombeni esingezansi.



Isithombe 1: Indlela ekuhlanguana ngazo izinhloko ezahlukeni mayelana nezolimo ezibekezelela ukushintsha kwezulu ezingeni lasekhaya. (Ithathelwe ku Arslan, 2014)

Zibanzi izindlela zokulima ezingaba usizo. Umbono uthi asizame izindlela ezilungele thina, indawo esihlala kuyo siphinde siqhathise lezindlela nalokhu esivele sikwenza, ukuze sikwazi ukubona umehluko sikwazi nokuthatha izinqumo mayelana noshintsho endleleni esilima ngayo Ukuhlanguana izinhlobo ezahlukeni zezindlela zokulima kukhuphula imiphumela yazo Lezizindlela ziyachazwa ngezansi, Uma ufuna ulwazi ulungaphezulu xhumana nalama kheli:

www.mahlathini.org

www.amanziforfood.co.za

2 IMIGOMO

Imigomo/umqondo esigxile kuwo ekukhetheni izindlela zokulima ilena:

- Ukunciphisa ukusetshenziwa kwezinsiza kulima esingenazo
- Ukuphula ukuhluka kwezitshalo
- Ukugxila empilweni yenhlabathi nokuthola izindlela eziyimvelo zokwakha inhlabathi
- Ukunakekela imvelo
- Ukusebenzisa amanzi akhona ngendlela efanele
- Sisebenzisane, sifunde ndaanye siphinde sihle ndawonye

Zonke lezindlela sesike sazizama nabilimi abancane eminyakeni esuka kwemithathu kuya kweyisishangalombili edlule. Siyazi ziyasebenza, ngakho ken awe sikufisela inhlanhla ekuzizameni kwakho zonke.

3 UKUPHATHWA KWAMANZI (UKUPHATHWA KWAMANZI ATHOLAKALAYO NOKUKUPHULA UKUFINYELELA KWAWO KUBANTU)

3.1 IMISELE YOKUNGENA KWAMANZI EMHLABATHINI.

Lena imisele engajulile (30 cm ububanzi Kanye 15-30 cm ukujula) embiwa ukuhambisa amanzi ngendlela ethile endaweni ethile (diversion ditches /imisele ehambisa) noma ukubabamba amanzi avunyelwe ukungene enhlabathini esendaweni etshaliwe (run-on ditches)

Ukutshala kungenziwa enhlabathini eseduze nomsele, ngokufaka umqhuba noma ikhomposi ,uphinde wenze isembozo lapho otshale khona nasemseleni kuwombono omuhle.

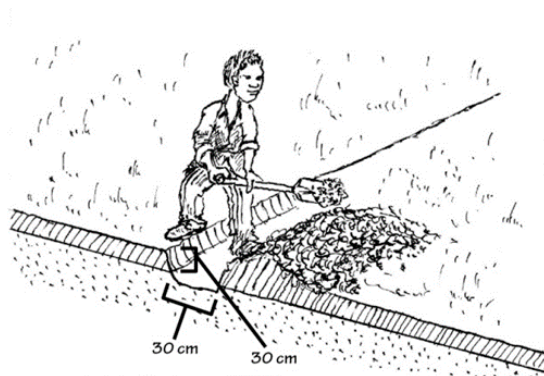
Lemisele ikhuphula ukufinyelela nokutholakala kwamazi uma kukhiqizwa ukudla nokuningi endaweni encane

Okudingayo:

- Imvula engaphuzulu kuka 150 mm ngonyaka
- Amazinga okushisha nokubanda angaphezulu kuka 5°C
- Indawo: Noma enjani
- Inhlabathi : 5-35% ubumba, ukujula >15cm

Ukwenza

- Ezingadini, amasimu
- Indawo engaphansi kuka 0,1ha, indawo esuka ku 0,1 ha kuya ku 1 ha
- Izindleko eziphansi, isinzisa ezitholakala endaweni
- Kulula ukuyenza nokuyigcina, idinga abantu abaningi abazosebenza



Umsele ohamabisa amanzi, owembozelwe kwase ku tshalwa ubhatata phezu kwenhlabathi ebhuthazelwe



Ukumbiwa komsele endaweni ubume bayc obungu 1.5%, 30 cm ububanzi kanjalo no30 cm ukujula, inhlabathi ibekwe ngasenhla komsele



Ukulungiselelwa kwenhlabathi ebuthazelwe ukuze kukwazi ukutshalwa, ukuma kahle kanye nokufakwa komqhuba.

3.2 IMISELE YOKUNQAMULA AMANZI/ I-SWALE

I-swale inhlabathi ebuthazelwe eduze komsele (40cm ukujula Kanye no 50 cm ububanzi) ohamba kwikhontolo. Inhlabathi ebuthazelwe iyaqondiswa ukuvumela ukutshala. I-swale ivimba amanzi ahamba engadini noma ensimini iwasabalalise ukuze ezokwazi ukungena ajule enhlathini. Ngokujwayelekile, izitshalo ozitshala kanye (njengezi hlahla zezithelo) zitshalwa ngezansi kwenhlabathi ebuthazelwe mase lezitshalo ozitshalo minyaka yonke zitshalwe bephuzulu kwenhlabathi ebuthazelwe.

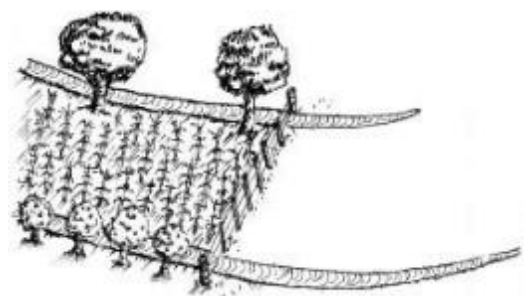
Okudingayo

- Imvula engaphezulu kuka 150 mm ngonyaka kuya kwengaphansi kuka 1200 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Indawo 5%-10%
- Inhlabathi: zonke izinhlobo - nakuba izinhlobo ezisasihlabathi noma salubumba kakhulu kunzima ukuzisebenza



Ukwenza

- Izingadi, amasimu
- Indawo engaphansi kuka 0.1 ha kuya kweziphakathi kuka 01 ha kuya ku 1 ha, nangaphezulu kuka 2 ha
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Inomsebenzi omuningi



Ukwakhiwa kwe- Swale nnesithombe isiveza indlela amanz ahamba ngayo kuma- swale amabili



Ukumbiwa kwe -swale inhlabathi ibekwa ngasohlangothir olwehlelavo



Isembozo singabekwa phakathihi emseleni naphezu kwenhlabathi ebuthazelwe



Ukumbiwa kwemibhede ejulile ngezansi kwe "swale"

3.3 IMISELE EMHLABATHINI NAMADONGA APHAKEME

Imisele imbiwa kwikhontolo nehlabathi ibhekwe ngasenhla kwawo ibe imbundu. Ukutshala kwenzeka phezu kwemibundu kanjalo nokuchelela. Uyakwazi ukwakha ama- cross ties ukuze uqinisekise ukuchelela okuhle- lokhu kwenza amanzi agcwale emiseleni aphinde angene emhlabathini. Ukwemboza kuwumbono omuhle

Okudingayo

- Imvula engaphezulu kuka 150 mm ngonyaka
- Amazinga okushsa nokubanda angaphezulu kuka
- Ubume bendawo 0.5 -5%
- Umhlabathi: Zonke izinhlobo

Ukwenza

- Ezingadini, emasimini
- Indawo Engaphansi kuka 0.1 ha kuya kwe ohakathi kuka 0.1 -1 ha
- Izindleko eziphansi, izinsiza ezitholakala euze
- Kunomsebenzi omningi



Imisele nenhlabathi ebuthazelwe esetshenziswe emasimini, bhekisisa amatied ridges abamba amanzi



Ingadi enimsele nenhlabathi ebuthazelwe etshalwe utamatisi, izaqhathi, ispinash. Bheka imibhede ejulile engaphambili esithombeni esingakwesokudla.



Imisele emboozelwe esengadini etshalwe utamatisi. Ukuchelelela ukusazikhukhula uma kusebenziswa lemisele engadini.



Izilahla zezithelo nazo zifakiwe mbhedeni kuloluhlobo lukutshala

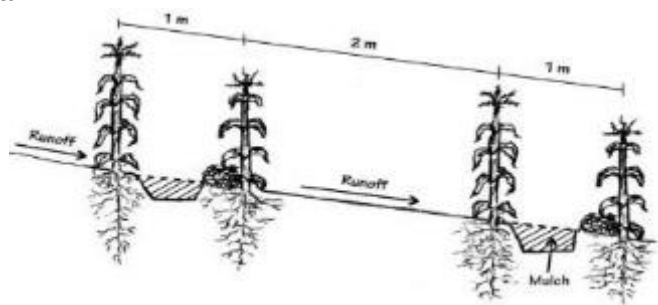
3.4 AMATHIPHU: AMADONGA AXHUNYIWE UKUDAMBISA UKUGELEZA KWAMANZI NOKUGCINA UMHLABATHI NAMANZI

Lendlela inyusa amanzi izitshalo ezikwazi ukuwathola ngokuqoqa imvula egeleza endaweni engatshaliwe eyehlelayo amanzi angene enhlabathini esandishi ebese ebanjwa imisele. Ukutshala kwenzeka nhlangothi zonke zomsele lapho amanzi asengene khona.

“Izindishi” zakhiwa ngokumba imisele engajulile phezu kwamakhontolo kanye nokwakha imibundu ngasohlangothini olwehlelayo lwemisele. Lokhu “kuboshwe” ndawonye imibundu engaphakeme eyakhiwa ngokushoyana ngezikhawu ezilinganayo uma ukudla umsele.

Okudingayo

- Imvula usuka ku 400- 700 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Indawo: 0.5%-7%
- Umhlabathi kumele uzinze. Umhlabathi okuyiwo ohamba phambili owubumba noma inhlabathi yangaphezulu- topsoil- ewvumela ukungena kwamanzi ephezu kwenhlabathi yangaphansi- subsoil engavumele ukungena kwamanzi



Ukwenza

- Ezingadini nase masimini
- Indawo engaphansi kuka 0.1 ha kuya endaweni esuka ku 0.1 ha kuya 1 ha
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Idinga abantu abningana ukuyenza



Imisele embozelwe engadini enama amadonga axhunyiwe.



Amanzi aqoqelana emiseleni ensimini etshalwe ummbila kwase kuba nama amadonga axhunyiwe



Insimi encane enama amadonga axhunyiwe kwase kutshwala ubhatata nommbila eFreestate.

3.5 IZIMBOBO ZOKUNGENA KWAMANZI / AMA-CIRCLE EZAMABHANA

Izindishi zimbiwa enhlabathini lapho kubonakala ukuthi amanzi ahamba khona (ukuze abanjwe kuohinde kuncishiswe nesivinini sawo). Lezi “ndishi” zigcwaliswa ngezinto ezibolayo ezivela ezitshalweni noma ezilwaneni. Enxube iphinde ixutshwe nomhlabathi ebese kutshwalwa izitshalo ezithanda amanzi ezifana nobhanana

Enye indlela yokwenza lokhu ukumba “indishi” lapho kuhamba khon amanzi ebese okubolayo kufakwe kancane kancane ukuze kuzobola kancane kancane. Lapha ubhanana utshalwa emphethweni noma onqenqemeni lwe “ndishi”

Okudingayo

- Imvula engaphezulu kuka 350 mm ngonyaka
- Amazinga okushosa nokubanda angaphezulu kuka 5°C
- Ubume bendawo : 1.5% -25 %
- Umhlabathi: lonke uhlobo (5-30% ubumba) nokujula okungaphezulu kuka 30 cm

Ukwenza

- Ezingandini
- Endaweni engaphansi kuka 0.1 ha
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Kulula ukwenza nokugcina esesimweni, inomsebenzi omuningi



Izindishi ezincane zingenziwa, ziyambiwa mase ugcwaliswa



Indilinga kabhanana embozelwe kwase kufakwa nezinongo



Izindishi ezime sasitebhiso lapho kuhamba khon amanzi ensimini. Amatied ridges enziwa phakathi kwazi “ndishi”

3.6 ISEMBOZO

Umhlabathi umbizwa ngezinsalela zezitshalo ezahlukahlukeni kanye nokubolayo ukuze kongeke amanzi, kulawulweamazinga okushisa emhlabathini nokunyusa izinga lempilo yomhlabathi

Okudingayo

- Imvula engaphezulu kuka 350 mm ngonyaka
- Amazinga okushosa nokubanda angaphezulu kuka 5°C
- Ubume bendawo: 1.5% -25%
- Umhlabathi : lonke uhlobo (5-30% ubumba) nokujula okungaphezulu kuka 30 cm

Ukwenza

- Izingadi
- Indawo engaphansi kuka 0.1 ha
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Kulula ukwenza nokugcina esesimweni,
- Inomsebenzi omuningi



Ifucuzi yamacembe imboze umbhede



Ilucerne noma utshani njenge sembozo endimeni elinyiwe ngokonga ngale kokunisela (dryland) ucerne or grass mulch of dryland. Conservation agriculture plot



iNapier fodder, umoba, izinsalela zombila njengesembozo emibhedeni etshalwe amaveje



Ukwemboza ngotshani kwemsele nenhlabathi ebuthazeliwe

3.7 UMHUBHE / I-TUNNEL

Inethi ewumbala ompunga evumela ukungena kwelanga ngamazinga ako 40% eli wu 4.2 m ubude * 6 m ububanzi, aphakeme kangako 2 m asethsenziwa ukuwakha amathaneli ngama khithi akhona. Ukugoba kwensimbi imisa ithaneli kwenziwa ngensimbi ebizwa ngokuthi ijig. Lezinsimbi ezigobayp zifakwa emhlabathini ebese inethi igaxwa phezu kwenzimbi ezigotshisiwe maqede lithungelwe kuzona izinsimbi. Ithaneli iboshelwa esikhonkwaneni nhlangothi zombili Ngaphakathi ethaneleni kunembhede egujiwe evuleke ngo 1 m ubude 5 m. Ubhede ngamunye unikezwa ibhakede eliwu 20 l elixhunyelwe amapayipi avumele amanzi aphume kancane kancane. Inxube yezitshalo iyatshaalwa kanti namanzi asesebenzile nawo angaphinde asebenziswe. Lama thaneli alungele zonke izindawo lapho ukutshala kungenzeka khoma, imibhede uyakwazi ukugubha kanti nokokunisela kuyatholakala Ukwenza

- Ezingadini
- Endaweni engaphansi kuka 0.1 ha
- Izindleko nekhono eliphakathi nendawo liyandingeka kanye nokululekwa nokufunda.



Ithaneli eqeda kwakhiwa enamabhakede okunisela kancane(i-dripkit) kutshalwe ispinashi



Umuqa 1: Ngenhla ngakwesokunxele nangakwesokudla: ukusebenziswa kwentambo njesikhali sokumaka lapho ithaneli kumele ime khona. Ukusetsheziwa kwensimbi esambobo ukumbela izinsimbi ezigotshisiwe imigodi. Ukugotshwa kwezinsimbi kusebenziswa isimbi yokugoba: i-jig, ukuxhunywa kwesinhlangatholi ezimbili ezigotshiwe ngensimbi yokuxhuma ejwayelekile

Umuqa 2 ngenhla ngakwesokunxele nangakwesokudla: "Ukutshalwa" kwezinsimbi ezigotshisiwe ezibombeni ezimbiwe, ukuthungelwa kwenethi ezinsimbini ezigotshisiwe ngaphambi kokuthi zifakwe. Ukudonswa nokuqiniswa kwenethi kuzona zonke izinhlangothi uma selifakiwe, ukuboshelwa esikhonkwaneni, ebese uqinisekisa ukufakakeka nokudonseka kahl noku qinisekisa ukuthi inethi ephansi emaceleni iyagqitshwa ukubambelisa ithaneli uma kufika imimoya enamandla

Umuqa 3: Ngenhla ngakwesokunxele nesokudla: Izibonelo zamathaneli aseqedliwe kwafakwanamabhakede okunisela kancane kancane (-- drip kit)

3.8 UKUKHONGOZELWA KWAMANZI

Ngokujwayelekile abalimi amanzi bawaqoqela ezitsheni, imiphongolo kanye noJojo. Kepha lokhu akubanikezi amanzi amaningi

Amathangi ambelwe ngaphansi komhlaba akwazi ukugcina amanzi athe xaxa. Lamathangi aqoqa amanzi aqhamuka ezakhiweni,

emigwaqeni,

nayinoma iyiphi

indawo ejwayelekile

ukuze agcineke ngokubuningi (25 000- 40 000 amalitha) lawa ngamanzi anele ukunisela ingadi esuka ku 100- 200 m² izinyanga ezisuka kwezine kuya kweziyisithupha

Imigodi evulekile idinga ukumbiwa ebese mathangi ayakhiwa ngohlobo lwa simede oluy khonkolo wensimbi, izitini kanye ne geofabric kanye nebitumen

Okudingekayo

- Imvula engaohezulu kuka 450 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 1.5% -25 %
- Umhlabathi : lonke uhlobo (5-30% ubumba) nokujula okungaphezulu kuka 30 cm

Ukwenza

- Ezingadini
- Indawo engaphansi kuka 0.1 ha kuya endaweni esuka ku 0.1 ha kuya 1 ha
- Izindleko eziphezulu kumbe nomsebenzi omningi
- Izinga eliphezulu lwekhono nolwazi (isizo noqeqesho oluvela ngaphandle luyadingeka uma usaqala
- Amanzi akhiswa ngebhakede, noma aphampwe. Inzika yenhlabathi kumele ikhishwe ngebhakede njalo njalo ingakho lokhu kudinga ukwenza ngokuzimisela nokuqikelela.



Izindlela zasendaweni yaselimpopo sokukhongozela amanzi, izindishi imiphongolo 210 izigubhu 1000 L kanye nmathangi oJojo. Lezi zindlela zigcina amanzi amancane



Ilthangi leferrocement eligujelwe ngaohansi elinodonga lwezitini ukwakhela indawo yokubamba amanzi nophandla nslusakhiwa



Isbonelo sethange eligujwele phansi (18 m²) elinophandla lwathayela olusukayo (Acornhoek)



Isisefo sokuvimba inzika yenhlabathi ethangini elingu 25 000 L eliguwele ngaohansi ukunciphisa inzika yenhlabathi emanzini abekiwe



Ilthangi leGeofabric nodonga lwezitini nophanhla ukuze kuohephe. Umsele ofaka amanzi ungaphambili

3.8.1 Ukumbelwa kwamathange

oJojo bangasetshenziswa okuvuna amanzi aqhamuka ophahleni lwendlu. Kubaluk=lekile ukuqinisekisa ukuthi ogadasi namapayipi afanele ayaxhunywa

Ungakwazi ukusebenzisa uJojo ongagqitshwe wonke uma amanzi evunwa endaweni eyehlela kakhulu. Uma indawo yehlela amanzi angakwazi ukuphakwa esuka ethangini ngale ngokusebenzisa amaphampu noma amabhakede.

Ziphinde zibekhona futhi nezindlela zokusebenzisa oJojo ngaphansi komhlaba, nakuba kulezizimo kudingeka ukuba baqiniseke. Ukusebenzisa oJojo kulula kuno kulakha ithange.

Inyanga	Silinganiso semvula yanyanga ngayinye (mm)	Indawo yephepha lophahla (m ²)	Isilinganiso sokugeleza kwamanzi	Ivolumu yamanzi agijimayo (amalitha)
Januwari	115	43,6	0,9	4513
Februwari	123	43,6	0,9	4827
Mashi	109	43,6	0,9	4277
Ephreli	78	43,6	0,9	3061
Meyi	61	43,6	0,9	2394
Juni	35	43,6	0,9	1373
Julayi	30	43,6	0,9	1177
Agasti	35	43,6	0,9	1373
Septemba	55	43,6	0,9	2158
Okthoba	60	43,6	0,9	2354
Novemba	80	43,6	0,9	3139
Disemba	95	43,6	0,9	3278
ISAMBA	976			24274

Ithebula elincane elibonisa amanzi angaqoqwa endlini encane ye-RDP



i-Phampu ingasebenziswa ukuthela amanzi



Ogadasi namphayiphi afaka amanzi abalulekile uma kusebenziswa oJojo ukukhonzela amanzi aqhamuka ophahleni lwendlu



Amathangi angagqitshiwe wonke abekelwe ukuvuna amanzi engezayo



Amathange abelwe phansi

3.8.2 I-damu elincane

Amadamu amancane angakwazi ukumbiwa enhlabathini enkwazi ukubamba amanzi (enobumba longaphezulu kuka 25%). Amadamu ajwayele ukulahlekelwa amanzi, aphinde agcwale isikhathi esifishane kodwa aletha amanzi amaningi enhlabathini elapho embiwe khona.. Avamise kumbiwa lapho kuneziphethu khona ezizokwazi ukuwagcwalisa njalo njalo okanye lapho kugijima khona amanzi njalo azokwazi ukuligcwalisa.

Ungakwazi ukundlalela idamu ngopulasitiki kodwa kuphela uma kunamathuba okuthi lihlale ligcwele njengoba upulasitiki uguga kalula uma uzoshaywa ilanga.

Kuyenzeka ukuthi idamu lindlalelwe – i-bentonite ukuze livaleke nalapha futhi kumele kubhekwe ukuthi idamu lizohlale ligcwele yini



Izibonelo ezintathu zama damu amancane ambiwe emhlabathini ongakwazi ukubamba amanzi, inhlabathi enobumba olungaphezulu kuka 25% ukuze ube nesiqiniseko. Leli elingakwesokudla idamu elikhu eliphakelwa umthombo ongasehla kwalo. Leli eliphakathi nendawo liphakelwa ipayiphi elinamanzi azihambelayo (ahamba ngale kwephampu) aqhamuka emfuleni.



Isiziba esincane esindlalelwe ibentonite (ubumba oluphuzi phakathi esizibeni) egcwaliswa esizibeni. Qaphela indlela izindonga zesiziba ezimi ngayo, zimi ngendlela evumela ukugqisheleka kwebentonite ezindogeni nangaohansi kwesiziba ukuze sivaleke (amanzi angabaleki



Isiziba esincane isimbiwe engadini yomohakathi esiphakelwa amanzi ageleza emgaqeni lase lindlalelwa ngopulasitiki.

3.9 UKUTHOLAKALA KWAMANZI

Ukuphathwa nokuthuthukiswa kwemithombo yokuthola amanzi ezindaweni akwazi ukuhamba afike emakhaya nasezi ngadini kungenzeka emiphakathini emincane yasemakhaya engamaqhembu

- Amaqembu asemiphakathi asebenzisana ndawonye ukuvumela ukuba ngubani ozoba inxenye (ayi bantu abanphezulu kwamashumi amabili isibalo) okudinga babe abantu abalimayo futhu abakhelene.
- Ibo abathola indawo okungatholakala kuyo amanzi eseduzane nalapho bakhe khona okungaba umthombo okanye indawo okungambiwa kuyo iborehole ebese bekhulumisana nonuhholi bendawo ngemvume yokuba bekwazi ukuwasebenzisa amanzi
- Emva kwalokhu kuba khona uhlelo lokuba ithangi okuyilo elizomukela amanzi ligcwaliswe ngamanzi amaqhamuka emthombeni wamanzi ngale kokusebenzisa iphamphu ahambe afike emakhaya kanye nasezingadini
- Ikomidi lamanzi kuhlela ibese libheka imithetho mayelana nokutholakla kwamanzi ikhaya ngalinye liphinde libhekelele nezezimali nezokukhokha.
- Bonke abantu abayi nxenye balindeleke ukuba babenomnikelo oyimali, basebenza ngekhati kumbiwele amapayipi baphinde babhekelele okuphathwa kwamanzi ndawonye nabanye ozakwabo emaqenini
- Zonke izimvumo ezivela kwabaphethe ezamanzi knaye nomkhandlu kumele zitholakale kuphinde kube nehlelo lokunakekela ukuya phambili

Okudingekayo

- Rainfall: Imvula engaphezulu kuka 150mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo : noma enjani
- Umhlathi: noma onjani
- Izindawo zokuthola amanzi imithobo okanye amnzi azombelwa

Ukwenza

- Emakhaya nasezingadini
- Indawo engapansi kuka 0.1 ha
- Izindleko ziphezulu, udinga izinsiza eitholakala endaweni nalezo ezingatholakali endaweni
- Kudingeka ulwazi kanti kuyasethenzwa, kudingeka ukuqeqesheka nosizo kwabanolwazi



Umthombo ombiwe kwenziwa idamu elincane. Ukuvikelwa komthombo kufaka ukufakwa kwepayipi egqitshwe emgodini ombiwe ngezanso kwedamu obe usumbozwa ngegravel, inethi kanye nomhlathi ukuze uvikeleke. Ngalandela umthombo uyavikeleka,



Isibonelo sethathi okuyilo elithwala amanzi asabalaliselwa emakhaya ngale kwephampu



Isibonelo sokuxhunywama kwemiphongolo emakhaya. Lemiphongolo ixhumene iphinde nebholo elivalayo uma amanzi esegcwele



Ukumbiwa kwe- borehole nokufakwa kwepayipi elisuka ethangini liya emakhaya

3.10 UKUPHATHWA KWAMANZI AMPUNGA

Amanzi ampunga amanzi ebekade esebenziselwa izinto sasendlini ezifana nokuwasha izingubo, izintsha kanye nokugeza kodwa lokhu akufaki amanzi 'amunyama' okunamanzi asezindlini zangasese kanye nendle engamanzi ehamba ngamapayipi okuchitha. Amanzi ampunga avamise ukuba nensipho eningi nokunye. Ubungozi obungakhona ukuba namaciwane kwalamanzi okungeniwa insipho kanye noqweqwe ngoahozulu komhlabathi uma ezosebenziswa njalo. Ukuqikelela ukusebenziswa okuphephile nokulahlwa kwamanzi ampunga kubalulekile. Lokhu kufaka ukusebenzisa umlotha nezinye izinto ezifana nembewu yemoringa ukubamba iphinde izikise insipho kanye nezindlela zokunisela ezizogwema amanzi ampunga ukuba athinte amacembe ezitshalo. Zintathu izindlela zokusebenzisa amanzi ampunga ezichazwe lapha.

3.10.1 Amabhakede okunisela kancane

Lezi izindlela zokunisela kancane kancane ezakhelwe imibhede ehlukeneyo, evamise ukuba 1m ukuvuleka kanye 5 m ubude ebese kufakwa ibhakede elingu 20 L. Ama-drip kit yokunisela axhunywa lapho ezofakwa khona usenzele ezibombi zokunisela usebenzisa intambo, uphinde uzikhethele ukuqhelelana kwamaphayipi nokushiyana kwembobo ezinisela kancane kancane. Ngokujwayelekile amaphayipi amabili asebenzayo ahlukeneyo kangango 30 cm. Ukunisela kwenziwa nsuku zonke. Lamabhakede angaphinde ashitshwe afakwe nezisefo zokusefa umhlabathi, ukusefa amanzi ampunga namanzi okunisela angcolile. Kulezizimo kundlalelwa amatshe awuhlwayi phansi ebhakedeni ebese kulandela isihlabathi sasemfuleni esigeziwe. Isihlabathi sasemfuleni sifakwa esikhwameni ukuze singaxubani namatshe uma amabhakede efakwa amanzi. Lezi zisefo kudingeka zishitshwe emva kwesikhathi esithile uma sekubonakala ukuthi izinga lokuhamba kwamanzi emaphayiphini liyehla. Amaphayipi angagezwa ngokuvula lezitobha ezivala lapha kuphela khona umbhede, lokhu kuvumela inzika okungenzeka yakhele emaphayiphini.



Amatshe afakwe phansi ebhakedeni



Kokubili amatshe nesihlabathi kuyagezwa ngaphambi kokusebenziswa, ukuqinisekisa ukuthi ahlanzekile ukugwema ukuvimbeka kokuphuma kwamanzi emaphayiphini



Isihlabathi esifakwe esikhwameni esivaliwe esibekwe phezulu kwamatshe, ukugwema isihlabathi ukuthi singene emaphayiphini



Iisibonelo samphayipi amabili okunisela kancane kancane ahlukeneyo



Izindilinga zobumanzi ezinziwe izimbobo ezifakwe izintambo zokunisela



Amanzi ampunga ohlelweni lokunisela kancane kancane

Lezizithombe zisinikeza indlela esikwazi ukuyibon ayokuchaza ukuthi loluhlelo lokunisela kancane kancane lwenizwa kanjani



Imbobo encane yenziwa emzimbeni webhakade maphansi nalo ukuze kuzofakwa 'indololwane' okuxhuma kanye nephayiphi elehlayo



Ibhakade libekwa phezulu kwento bese kuxhunywa iphayiphi elehlayo, ukuqiniseisa ukuthi amanzi anomfutho owanele emaphiyiphini.



Izibombo zenziwa lonke iphayiphi nhlangothi zombili ebese kufakwa intambi kapulasitiki eboshwe amafindo amancane ukuvumela okonsa kancane kance kwamanzi



Bomama benza izintambo zokufakwa eohayiphini lounisela kancane kancane



Amaphiyiphi okunisela kancane kancane ahlukene kangango 30 cm axhunywe ephayiphini elehlayo



Iphayiphi livalwa ngokuligoba ebese liboshelwa emhlabathini



Uma sekwenziwe, uhlelo lungahlolwa ukuqinisekisa ukuthi ubukhulu bezindilinga zobumnazi buyafana kozona zonke izimbobo zokunisela kancane kancane

3.10.2 Igadi ephakeme yesitayela se-tower

Amagadi yetawuni akhiwa kusukela phansi ngokusebenzisa izigxobo ezine ebese ufaka inethi elivumela ukungena kwelanga okungango 80% usuzengeze izigxobo. Phakathi nendawo, insika yamatshe yakhiwa gokusebenzisa ibhakede elivuleke nhlangothi zombili njenge ndilinga. Umbhede ugcwaliswa ngenxube elungiselelwa ngaphambi kokwakhiwa kombhede, lenxube yakhiwa izinxenye ezintathu (inxenye inhlabathi, inxenye umqhuba, inxenye umlotha- kudingeka umlotha omuningi ozokwazi ukukhucula amanzi asebenzile. Izimbobo ezincane senziwa emaceleni esikwama kanye nezithombo ezitshalwe zime mpo phakathi kulezimbobo ezincane- ngokujwayelekile isipinashi noma ezinye ezitshalo ezisamfino. Ingaphezulu lombhede lingasebenziselwa ukutshala ezinye izitshalo- njengo tamatisi ongaphinde ukwazi ukuzithandela ezigxotsheni. Umbhede unganiselwa ngothela amanzi ensikeni yamatshe ephakathi nendawo nombhede.

Ukwenza

- Ukulawula ukusebenza kwamanzi ampunga
- Ezingandini
- Indawo engaphansi kuka 0.1 ha
- Izindleko ezincane kuya kweliphakathi, ikhono elincane kuya kweliphakathi kubandakanya nokufunda nokwelulekwa, izinsiza zitholkakala endaweni.
- Kuncane okwenzayo ukuyilungisa- nakuba izikhwama zidinga ukushintshwa emuva kwesikhathi (eminyakeni emithathu kuya kwemihlanu 3-5 years)



Ukwenza inxube yomhlabathi, umqhub akanye nomlotha ezogcwalisa itower garden



Ukubekwa kwamatshe- ibhakade elincane elivulekile ngaphansi libekwa phakathi nendawo kombhede



Ukwakhiwa kwe gadi yetawuni- igcwaliswa ngenxube yomhlabathiazungeze amatshe afakwe ohakathi nendawo ebese iyakhuphulwa.



Ukuvulwa kwembobo ezincane esikhwameni ukuze kutshalwe izithombo



Ukunisela phakathi nendawo ensikeni yamatshe.



Igadi yetawuni 'esivuthiwe' etshawe ispinashi, kale, spring onion kanye ne marigold

3.10.3 Izingwaba zokulima zohlobo lwe-keyhole

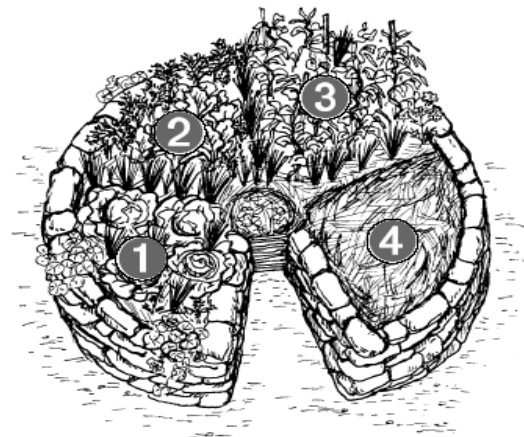
Lena imibhede eyakhiwa ezindaweni ezincane lapho iphakathi nendawo linobhasikidi wekhomposi ukuze kuchelelwe kanye nokufakwa kwamanzi asesebenzile. Imibhede elula ukuyinakekela. Imibhede emise okwendilinga evuleke kangango 3 m, ebese kuba khona “imbobo kakhiye” lapho ubhasikidi wekhomposi ugcwaliswa khona njalo njalo ngokubolayo kanye nokufakwa kwamanzi. Izindonga zakhiwe zaphakama kangango 60 cm kuya ku 80 cm ukuya phezulu ebese ugcwaliswa ngenxube yomhlabathi kanye nekhomposi okanye umqhuba kanye nomlotha. Ukelika noma l’bonemeal’ nayo ingafakwa. Umbhede utshalwa izinhlobonhlobo zezitshalo noma uhlukaniswe ngesikhawu ukuze kulandelaniswe izitshalo

Ukwenza

- Ezingandini
Indawo engaothansi kuka 0.1ha
- Indleko ziphansi, ikhono elincane kuya kweliphakathi, ukufunda kanye nokwelulekwa , izinsiza saze ndaweni(amatshe kumele atholakale kalula njengob akudingeka amatshe angu 500 kg kuya ku 800 kg
- Kuncane okwenzayo ukuyilungisa



Igadi esijikelezayo esifana nesikhiye eqeda kwakhiwa. Lapha iphakathi nendawo lakhiwe ngamashe amancane kunokuba kufakwe ibhasikidi wekhomposi



Umdwebo okhombisa ikeyhole kusukela ngasenhla lapha ubhasikidi wekhomposi uhlukaniswe kane ukuze kushintshaniswe izitshalo (izithelo, ukusakhaba, okunezimpane- okunemdumba)



Igadi esijikelezayo esifana nesikhiye esivuthiwe etshalwe izinhlobonhlobo zezitshalo.

3.11 IZINDLELA ZAMANZI EZINEMFINO

Zindlela ezihmaba amanzi ezinziwe ngotshani zivulekile, azijulile zijwayele ukumisa okwe soso zakhelwe ukuhambisa amanzi aphezu komhlabathi ngale kokuguguleka. Lezindlela zisebenzisela ukuhambisa amanzi agelezayo emasimini ezindaweni eziphephile ezifana nemimfula.

Ukwembozeka izitshalo kwalapho kuhamba khona mamanzi kunciphisa ukuhamba kwamanzi kuphinde kuvikele umgud u ekugugulekeni ngenxa yamanzi agijimayo.

Ukutshala izitshalo ezinabayo notshani obungashi njenge paspalum, fescu, kikuyu kanye noqambalala kungcono kunotshala ukutshani obukhula bume obuphinde bushe.

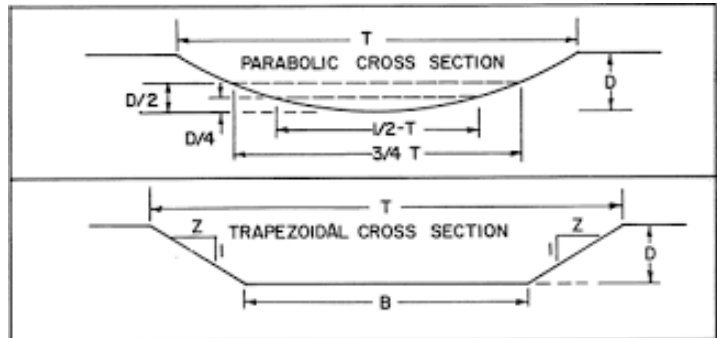
Uma ubuka ohlangothini kumele indela ehamba amanzi iqonde noma ibesandishi, ukujula kube okungenani okusukela ku 30 cm kuya ku 40 cm ubume bendawo ezindongeni kumele zinganyukeli okudla okukodwa kokune (kunye kwezine)

Okudingayo

- Imvula engaohezulu kuka 450 mm ngonyaka
- Amazinga okushisa nokubanda angaohezulu kuka 5°C
- Ubume bendawo: 1,5%-25%
- Umhlabathi: zonke izinhlobo (5-30% ubumba), kanye nokujula okunga phezulu kuka 30cm

Ukwenza

Emasimini: 0,1-1ha, >1ha Indawo esuka ku 0.1 ha kuya ku 1 ha, nendawo engaphezulu kuka 1 ha Izindleko ziphansi, izinsiza zitholakala endaweni Kulula ukwenza nokulungisa kodwa inomsebenzi omningi



Ukuma okusandishi noma okuqondile okungcinywa ukuthi kulungele indlela ezinhamba amanzi ezenziwe ngotshani. Qaphela izindonga lapho kungajulile khona (Michigan state University, (MSU Extension 2015)



Ukuwohloka komhlabathi okubangelwa amanzi agijimayo emasimini vefulawa (MSU Extension 2015)



Le nsimu efanayo lapho kufakwe khona indlela yokugeleza kwamanzi enotshani, eminyakeni embalwa kamuva (MSU Extension 2015)



Paspalum (Bahia Grass): Yinketho enhle yezindlela zokugeleza kwamanzi – ininile futhi avisweli emanzini



Utshani lwe-Tall Fescue luhlala luhlaza ngenkathi yasebusika



Utshani lwe-Couch (Elymus repens) lubhekwa njengesihlahla ensimini, kodwa lukhula kahle emhlabathini omubi futhi luhlala luhlaza endleleni vokuzeleza kwamanzi

4. UKUPHATHWA KOMHLABATHI (UKULAWULA UKUGUGULEKA, UMNOTHO WOMHLABATHI KANYE NEMPILO YOMHLABTHI)

4.1 AMAKHANDA AMATSHE

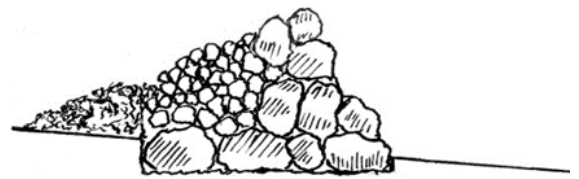
Amatshe atakwa saluthango phezu kwekhontolo ukuze alawule ukuhamba kwamanzi kuphinde kulekelele ukwakheka kwenhlathi ngemuva kwawo amatshe. Amatshe “akhiyelwe” emseleni ngokuthi ambelwe umsele ongajulile lapho khona amatshe amakhulu ebekwa lapho kwehlela khona kakhulu ukuze uthango lwamatshe lungawi kuphinde kuvumele nokuhamba kancane kwamanzi phakathi namatshe. Ukutshala kungenziwa ngezansi kothango lwamatshe njengoba kujwayeleke ukuthi abemaningi amanzi akhala lapho okanye ngenhla kwalo uthango lwamatshe lapho kwakhela khona umhlabathi noma inzika yenhlabathi

Okudingayo

- Imvula engaphezulu kuka 1500 mm ngonyaka
- Amazinga okushisa nokubanda angaohezulu kuka 5°C
- Ubume bendawo 0.5%-5%
- Umhlabathi- zonke izinhlobo- nalapho amatshe etholakala khona kalula

Ukwenza

- Ezingadini, nasemasimini
- Indawo usukela kwengaphansi kuka 0.1 ha kuya kwephakathi kuka 0.1 ha- 1 ha, nangaphansi
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Inomsebenzi omningi



Amakhanda amatshe- akhiwa phezu kwekhontolo kanti angenzinwa endaweni noma engakanani



Sibona amatshe akhiyellwe emseleni, amakhulu lapho kwehlela ngakhona umsele kunalawa amancane.



Amatshe amancane asebenzisela okulwawula ukugeleza kwamanzi emgwaqeni awahambise ezingadini



iBrinjal utshalwe enzikeneni eseyakhe ngenhla kwengadi ematsheni alujenge



uBanana utshalwe ngenzansi kwamatshe alujenge asebonakala

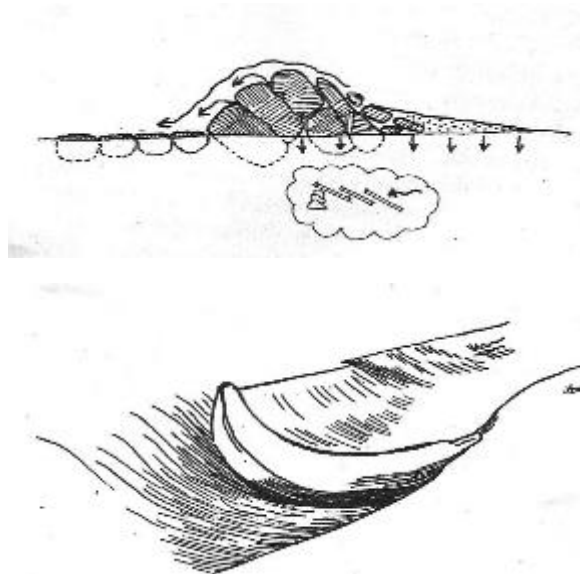
4.2 IZINQUMULELI ZAMANZI

Idamu elincane elingakiwe inomphelo maqondana nomsele kumbe lapho kunezimpawu zokuhamba kwamanzi ukuze kunciphiswe ukuhamba kwamanzi nesivinini sawo ukuze inhlabathi ikwazi ukwakhela lapho. Ziningi izinto ezingazebenziswa okubalwa kuzona umhlabathi, amatshe, izingodo kanye nokutshaliwe. Amatshe kanye nokunye kwakhelwa endaweni eyehlelayo noma kwikhontolo ukunciphisa ukuguguleka okungenzeka kwenziwe amanzi azihambelayo. Umphumela walokhu okwakheka kwetebhisi ezinomhlabathi onothile ongavumela okutshalwa kwezitshalo

Izinqumuleli zamanzi ajwayele ukubekwa uvundle lapho kubonakala ukuthi amanzi ayahamba khona ngemumva kwezimvula, kodwa engihambi khona unomphelo. Ayabekwa nalapho kuguguleke khona. Asebenza kahle ukwenza imigwaqo izinze noma izindlela eziqamula lapho kuhamba khona amanzi. Amatshe aziyicaba kunalawo angorawondi iwona amahle. Amatshe abekwe abekwe ngaphansi kumele avuleke ngamanani 30 cm- 60 cm ebese isindo sibe 5 – 9 kg. Amatshe amancane aphezulu nokuyiwo asa “phinifa” kumele abe 15- 22 cm ukuvuleka. Kungawumbono omuhle

Okudingayo

- Imvula engaphezulu kuka 1500 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 0.5%-5%
- Umhlabathi- zonke izinhlobo- nalapho amatshe etholakala khona kalula



Idonga oselakhela ensimini



Ukumbiwa komsele wokukhiyela amatshe echck dsam



Isibonelo sedamu lokuhlola esiqediwe lapho i-apron isezansi kodonga, futhi uhlobo lodonga olufana nebhanana luyabonakala.



Siqala ukufaka izinto zodamu lokuhlola. Amatshe amakhulu afakwa phansi.

4.3 AMATHERESI

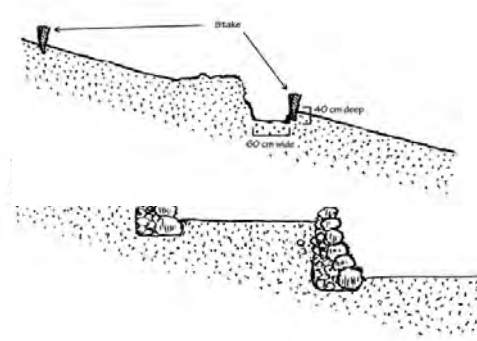
Itheresi umhube oqondile womhlabathi owakhiwe wagudla ikhontolo endaweni eyehlelayo yase iphaswa ngehlabathi, noma amasthe noma imiqo yama thayi amadala. Amatheresi akha indawo ezinzile yokutshala obekungaba azitshaleki ngenxa yokwehlela okwekhulu. Amatheresi mase emaninzi ajike abukeke ngzitebhisi ezinciphisa amanzi agelezayo, akhuphule ukungena emhlabathini ebesa esiza ekulawuleni ukuguguleka komhlabathi. Amaterreace akhiwa ezindaweni ezehlela kakhulu.

Okudingayo

- Imvula engaohezulu kuka 350 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5° C
- Ubume bendawo: 10%-40%
- Soil: all types – where stones and rocks are easily available

Ukwenza

- Ezingadini nasemasimini
- <0,1ha, 0,1-1ha, >2ha indawo enngaohansi kuka 0.1 ha indawo ephakathi kuka 0.1 kuya ku 1 ha, nendawo engaphezulu kuka 2 ha
- Indleko ziphansi, izinsiza zitholakala endaweni
- Inomsebenzi omningi



Amatheresi angamatshe emasimini



Sibona ubume bendawo (20%) kwakhiwa amatheresi kutshalwe umbala

Ukugoba komhlaba		Ibanga phakathi kwama-terrace (amamitha)
Iphesenti	Ubulingani	
10%	01:10	8
15%	01:06,7	5,3
20%	01:05	4
25%	01:04	3,2
30%	01:03,3	2,7
35%	01:02,8	2,3
40%	01:02,5	2



Amatheresi angakhiwa ngokusebenzisa amasondo amadala ezindaweni lapho amatshe enqatholakali



Umbono wama-terrace ezingeni legadi ebhange elishisayo (~40% ukugoba komhlaba)

4.4 UKUTHUTHUKISWA KWEZINTO EZIPHILAYO EMHLABATHINI

Ukuphucula izinga lokubolayo emhlabathini kubaluleke kunayinoma isiphi isigaba sokusebenza. Izindlela zifaka:

- Ukwengeza umquba. Ukuphucula izinga lomquba ngokuqoqa kuphela lowomquba onomchamo ezibayeni, lapho kusetshenziswa khona utshani ngengombhede wokundlala ebese kuyambozwa ngocwazi. Kubekwe okungenani izinsuku ezinhlanu kuya kweziyisikhombisa ngaphambi kokuba isetshenziswe.
- Ukwengeza ikomposi ngokundlala okomile, okusuhlaza, umquba kanye nenhlabathi emanzi ngokwanele.
- Izinsalela zizitshalo ezisanhlamvu, satshani, samdumba, samfino kanye nama chenopods
- Isembozo esijulile noma isiyishidi

Ukuthola zinsiza ezinezinga eliphezulu lemisoco edingekayo njenge skhuthazi Nitrogen kanye ne Carbonis kubalulekile. Ezinye izinsalela zezitshalo zinesibalo esiphezulu siminye ymisoco edingekayo efana no Potassium (comfrey) kanye ne silicon (stinging nettle)

Okudingayo

- Imvula engaphezulu kuka 150 mm ngonyaka kodwa engaphansi kuka 1200 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 5 % - 25 %
- Umhlabathi- zonkke izinhlobo nakuba umhlabathi osasihlabathi kakhulu noma salubumba kakhulu ungaba nzima ukulawula

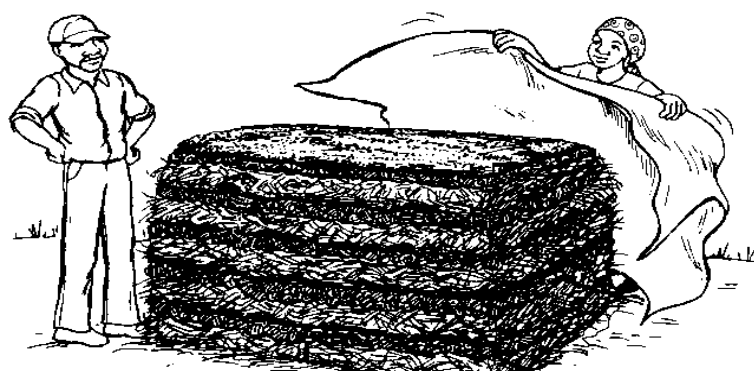
Ukwenza

- Ezingadini nasemasimini
- Iindawo engaphansi kuka 0.1 ha indawo ephakathi kuka 0.1 kuya ku 1 ha, nendawo engaphezulu kuka 2 ha
- Indleko ziphansi, izinsiza zitholakala endaweni
- Inomsebenzi omningi

Kg/ngetoni	Inko mo	Ihhashi	Imbuzi	Ibhokwe	Ingulube	Inkukhu	Umvundla	Umquba othengiwe
N (Nitrogen)	5	6	14	7	5	13	18	5
P (Phosphorus)	2	3	2	3	4	11	13	2
K (Potassium)	3	6	6	4	6	20	6	8



Isibaya sezimbuzi sindlalelwe usthani ukuphucula izinga



Ingqumbi yekomposi eyendlelwe okomile okuluhlaza, umquba kanye nenhlabathi emanzi ngokwanele mase kuyamboza



Icomfrey, izinsalela zotshan nezambila nenxube vezitshalo ezizizembozo- uiika nelanaa, amabele, dolichos kanye

4.5 UKUTSHALA AMA-LEGUME NEZITSHALO EZILUHLAZA ZOKUFAKA UMQUBA EMHLABATHINI

Izitshalo ezimdumba zibaluleke ngokuthi zikwazi ukufaka isikhuthazi iNitrogen esimoyeni enhlabathi ziphinde ziphucule nezinga notha komhlabathi nempilo yayo inhlabathi ukuze izitshalo eziseduze nezizolandela zikwazi ukuzithola lesisikhuthazi. Ungakwazi ukuzitshala kanye kanye nezinye izitshalo okanye uzilandelanise nezinye.

Izibonelo zalelezitshalo ezitshala ngezikhathi ezifundumele zibandakanya ezitshala ngezikhathi ezifundumele zibandakanya ezitshala ngezikhathi ezifundumele zibandakanya ilezi sugar beans, runner beans, cowpeas, Jugo beans, ground nuts, Dolichos (Lab-Lab), Velvet beans (Mucuna), Jack bean, mung beans, chickpeas, lentils, Lucerne and Sun hemp. Zibonelo zalelezitshalo ezitshalwa ngezikhathi ezipholile ilezi peas, broad beans, vetch, and clover.

Izitshalo ezingama green manure zitshalelwa ukuphendulelwa emhlabathini, ngaphambi kokuthi ziqhakaze lapho ezisebenzisa khona imisoco eminingi ebandakanya isikhuthazi iNitrogen zibe sezi fakwa emhlabathini ukwenzela izitshalo ezizayo. Zivamise ukuba izitshalo ezinemdumba ezifana ne nevetch neclover, ukuyizinhlamvu nokusatshani njenge black oats kanye ne fodder rye ukusamfino okufana njenge foolish, radish, turnips, mustard kanye neconola kanye nama “chenopods” njengembuya

Okudingayo

- Imvula engaphezulu kuka 150 mm ngonyaka kodwa engaphansi kuka 1200 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 5 % - 25 %
- Umhlabathi- zonkke izinhlobo nakuba umhlabathi osasihlabathi kakhulu noma salubumba kakhulu ungaba nzima ukulawula

Ukwenza

- Ezingadini nasemasimini
- <0,1ha, 0,1-1ha, >2ha indawo enngaohansi kuka 0.1 ha indawo ephakathi kuka 0.1 kuya ku 1 ha, nendawo engaphezulu kuka 2 ha
- Indleko ziphansi, izinsisa zitholakala endaweni
- Inomsebenzi omningi



izindumba nexhuthswe nommbila



uLablab utshalwe njenge green manure endimeni okulandelaniswa kuyona izitshalo



Izitshalo eziyisembozo, ebusika, saia oats, fodder rye kanye ne fodder radish



Ama broad beans, oqatha imbuya, iLuseni kanye ne clover ebomvu

4.6 IMIBHEDE EJULILE

Lawa ama-bed okutshala okukhulu / ama-intensive gardening beds, akhishwe emhlabathini futhi agcwaliswe ngezinto zokwenza umquba ngendawo (in situ composting).

- I-bed ikhishwa emhlabathini ibe njenge-60–80 cm ukujula, ububanzi obungaba cishe 1 m, nobude obungaba 1–10 m.
- Igcwaliswa ngohlobo lwezinto eziphilayo: umquba wezilwane, izinto zomile, izinto eziluhlaza, kanye nomhlabathi.
- Ezinye izingqimba zingafaka amathini phansi ukuze kube nensimbi futhi kugcinwe amanzi, noma izinti / izigxobo.
- Uthuli lwamathambo (bone meal) kanye nelime (lime) lungangezwa ukuze kuthuthukiswe ukuvunda komhlabathi.
- Amathambo, izikhumba nezimpaphe zingangezwa ukuze kufakwe i-phosphorus (P).
- Uthuli lwamalahle (ash) lungangezwa ukuze kufakwe i-potassium (K).
- I-bed yakhiwa ibe yisikhala esincane, izitshalo ziyasetshenziswa futhi kugqunywe utshani / mulch.

Okudingayo

- Imvula engaphezulu kuka 350 mm nginyaka
- Amazinga okushisa nkubanda angaphezulu kuka 5°C
- Topography: 0,5%-5% Ubume bendawo 0.5 % -5%
- Soil: all types

Ukwenza

- Ezingadini
- Indawo engaphansi kuka 0.1 ha
- Izindleko ziphansi, izinsiza uzithola endaweni
- Kulula ukuyinakekela, inomsebenzi omningi



imibhede ejulile imbiwa ukujula okusukela ku 60 cm kuya ku 1 m. Ubhede undlalwa ngamathini madla namagatsha phansi



Izendlalo zokubolayo kube sekufakwa njenge zinsalela zommbila, amacembe, ukhula kanye no tshani



Bese kufakwa ingqimba yomquba, bese kulandelwa umhlabathi ongaphezulu. Imanziwe futhi inqubo iqala kabusha.



I Uma kukhona, isendlalo sokuluhlaza okubolayo njengo khula, amacembe, amakhasi amaveje nezinsalela ziyafakwa emva kukofakwa kokomile



Imibhede ejulile yakhiwa emgodini ongajulile ebese kuba khona ukusandishi phakathi embhedeni lapho kuthalwa khona izimbewu nezithombo.

4.7 IMIBHEDE ENGAJULILE

Imibhede egujwe ayangajula iyindlela elula yokwenza imibhede egujiwe. Lembhede imbiwa ngokujula okungango 30 cm ebese igcwaliswa ngokubolayo, umqhuba, isinsalelela zezitshalo ezomile noma ezimanzi

Lemibhede ijwayele ukusebenziswa kakhulu uma kwenziwa imisele nemibundu eyakha indawo edle ngobude enmhlabathi ovundile- ilungile kakhulu izingadi ezithe ukuba nkulu kanye nama simu. Kulemibhede ukwemboza kubalulekile kanjalo nokuxubanisa izitshalo kanye nokuzishintshanisa. Lemibhede ingathatha iminyaka esuka kweithathi kuya kweyisishagalombili ukuze uphinde uyigcwalise Okudingayo

- Imvula engaphezulu kuka 350 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 0.5-5%
- Umhlabathi-zonke izinhlobo

Ukwenza

- Ezingadini
- Indawo engaphansi kuka 0.1 ha
- Izindleko eziphansi, insiza zitholakala endaweni
- Kulula ukyinakekela, inomsbenzi omningi



Ukumbiwa komsele ongajulile 30 cm ububanzi no 15 cm ukujula phezu kwekhontolo nsimini



Ukuqala ukugcwaliswa komsele ngomqhuba, ukuluhlaza kanye nezitshalo esezomile



Ingadi emibhede engajulile nejulile kwatshalwa izinhlobonhlobo zezitshalo kwase kwembozwa

4.8 INDANDATHO YEMVELO YOKULIMA NEYOKUGCINA AMANZI

Lena imibhede emincane eziyizindilinga embiwe yaphinde yakwakwa umquba noma ikomposi. Ama Indandatho yemvelo aniselwa kancane kancane mgokusenbenzisa isgubhu esingu 2 amalitha esibhobozwe ezimbobo emaceleni, lesi sigubhu (2 L) "sitshwala" phakathi nendawo nombede.

Indandatho yemvelo alungele kakhulu izingadi ezincane kanti futhi iphinde ibe indlela yoqalisa ukufunda ngobuhle bokujula komhlabathi ukuze izimpande zijule, ukubaluleka kokubolayo engadini, ukwemboza kanje nendlela ehlelekile yokunisela.

Okudingayo

- Imvula engaphezulu kuka 350 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 0.5%-5%
- Uhlobo lomhlabathi- zonke izinhlobo

Ukwenza

- Ezingadini
- Indawo engaphansi kuka 0.1 ha
- Izindleko ziphansi, izinsisa zitholakala endaweni
- Kulula ukuyinakekela, inomsebenzi omningi



Ukumbiwa kwama indandatho yemvelo ukubamazi kusukela ku 1 m kuya ku 1.5 m, ukujula 30 cm, kwengezwe ngomunye u 15 cm kuxhutshwa khina nomqhuba., ngaphambi kokubuyisea inhlabathi ixhutshwa nomqhuba noma ikhopmosi



Indandatho yemvelo esiqediwe yase ijikelezwa ngamatshe. Unxantathu oyizinkuni usebenzisela ukutshala izitshalo izikotelayo ezifana no bhintshisi notamatisi



Indandatho yemvelo emboziwe kwase kufakwa esingu 2L phakathi nendawo kwatshalwa izitshalo zokunonga

4.9 UKUFAKWA KWAMANYOLO KANYE NOKELIKA

Omanyolo bafakwa ngokwezingcomo zemiphumela yokuhlolwa komhlabathi, ufakwa duzane nezitshalo ezikhulayo kunokuba ufazwe noma ufakwe ebandeni. lokhu konga umanyolo kuphinde kwenze umanyolo ukuthi ufakwe lapho odingeka khona kuphela, okukhuphula uzinga lokusebenza kwawo. Ukelika ufakwa emahholweni noma emiseleni phezulu kwenhlabathi- lokhu kwenzelwa ukunciphisa isimuncwana enhlabathini, ukelika ungaphinde ulinyelwe ensimini noma endimeni ngaphambi kokuqalisa ukutshala ngokonga

Okudingekayo

- Imvula engaphezulu kuka 450 mm ngonyaka
- Amanzinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo 1.5 – 10 %
- Umhlabathi: zonke izinhlobo- kulawulwa izingcomo zemiphumela yomhlabathi

Ukwenza

- Ezingadini, emasimini
- Indaawo engaphansi kuka 0.1 ha, kuya endaweni esukela ku 0.1 ha kuya ku 1 ha nasezindaweni ezingaphezulu kuka 2 ha
- Izindleko eziphakathi, kunciphisa ukusebenza kwenzisa kulima ngokuzisebenzisa ngendlela.
- Inomsebenzi omningi



Ukuphendulwa kuka kelika ngaphambi kokuqala ukulima ngokonga



Ukufakwa kuka kelika emiseleni ezotshwalwa



Ukufakwa kuka kelika emahholweni/imigodi kusebenziswa isivalo njengsikali



Ukubekwa kuka manyolo (ibanda) bengezansi ngokuqelelana okungango 2 cm nembewu



Ukusebenzisa umshini wokutshala okhipha umnyolo nembewu ngesikhathi esisodwa



Ukukala umanyolo kuseneziswa Isipuni esincane.

4.10 ZAI PITS / UKUTSHALA EMAHHOLWENI

I-zai wumgodi wokutshala ojwayele ukuvuleka kangango 20cm kuya ku 40 cm ebese ijula okungako 10cm kuya ku 20 cm. I zai ibamba imvula knaye namanzi agelezayo ivikele imbewu kanye nokulayo ekugugulekeni. Aphinde alekelele ukuhlaliseni amanzi nemisoco edingwa izitshalo. Imigosi imbiwa ngesikhathi lingani izulu. Umhlabathi osuke usimbiwe wenziwa imibundu sakujikeleza umgodi ukuze ukukhuphuke izinga lokubambeka kwamanzi emgodini. Emva kokumbiwa kwemigodi, ikomposi yezinto ezibolayo iyafakwa ngesikali esingango 600 g umgodi ngamunye ebese emva kwezimvula zokuqala emgodi ebese uyambozwa ngomhlabathi imbewu ifakwa phakathi nendawo nomgodi.

Okudingayo

- Imvula engaphezulu kuka 350 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo : 1.5% -25%
- Umhlabathi zonke izinhlobo (5%-30% ubumba) kanye nokujula ukungaphezulu kuka 30 cm

Ukwenza

- Ezingandini, emasimini
- Indawo esukela ku 0.1ha kuya ku 1ha
- Izindleko ziphansi izinsiza zitholakala endaweni
- Kulula ukuyenza nokuyigcina, inomsebenzi omningi



Ama "zai pits" ezweni lase Kenya, kutshalwe ummbila wase wembozwa ukuze kukhuphuke izinga lokubambeka komswakamo nomnotho womhlabathi (sithathwe permies.com,2017)



Ama"zai pits" ensimini egugulekile, nekhomposi esilungele ukufakwa (sithathwe Chris Reij,2010)



Umbila otshalwe kuma "zai pits" ezweni lase Kenya (sithathwe Inadesforum.net)

4.11 UKULIMA NGOKONGA

Indlela yokutshala emasimini esebenzisa lemigomo:

- Ukuphazanyiswa okuncane komhlabathi, akulinywa, kuvulwa imigodi, amahholo kanye nemisele.
- Ukumbozeka komhlabathi, insalela zezitshalo zishiywa ensimini ukuze zizoba isembozo somhlathi, izitshalo zishiywa ensimini esikhathini eside ukuze zizositha izitshalo ezisaphila.
- Ukuxuba izitshalo: ukuzihlanganisa, nokuzishintshanisa ebesekekufakwa zitshalo eziyizembozo sasehlobo kanye nesasebusika

Ukulima ngokonga kuphucula impilo yomhlabathi, ukunotha kwayo, isivuno kanye nokubambeka kwamanzi enhlabathini. Kunciphise amanzi agelezayo, ukuguguleka kanye namazinga okushisa nokubanda emhlabathini. Kuphinde kunciphise ukuqhekeka nokugqisheka komhlabathi

Okudingayo

- Imvula engaphezulu kuka 350 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo: 1,5%-15%
- Umhlabathi: zonke izinhlobo (5%-35% ubumba)

Ukwenza

- Ezingadini, emasimini
- Indawo engaothansi kuka 0.1 ha, indawo ephakathi kuka 0.1 kuya ku 1 ha nendawo engaphezulu kuka 2 ha
- Izindleko ziphakathi (imbewu, umanyolo, imithi) imishini yokutshala, izinsiza esisendaweni
- Inomsebenzi omningi

Umgomo 1: Ukuphazamiseka okuncane komhlabathi



Ukutshala emiseleni nase ma hholweni kusebenziswa igeya ezandla kanye nimishini yokutshala 'MBLi' ngale kokulima.



Ukusebenzisa iHaraka –isondo. Lomshini ukwazi ukutshala izimbewu ezahlukene, kodwa awukwazi ukufaka nomanyolo ngesikhathi esisodwa.



Izinhlobonhlobo zimishini yokutshala, MBLi(ozenza sageja) Haraka (isondo), Matracca(uyaphonsa) kanye nemishini edonswa izinkabi (knapik) ngezansi



Umshini ondoswa uganda ganda otshwalo olwayini amabili ungalimanga.



Ukusebenzisa umshini odonswa izinkabi otshala ungalimanga.

Umgomo 2: Ukumbozeka komhlabathi



Ukumbozeka okuhle komhlabathi ngezinsalela zezitshalo



Ukwembozwa kwendima elinywe ngokonga ukuze ithole ukuvikeleka



Amanzi Agelezayo (akhanyayo)- 42 mm



Indima elinywe ngokonga enesinsalela zezitshalo. Amanzi agelezayo awanakho okunacola



Amanzi agelezayo angcolile 195 mm



Insimu elinyiwe enganzo insalela zezitshalo amanzi agelezayo anokungcola



Indima etshalwe ummbila nezindumba olayini ngababili besondelene



Indima etshalwe ummbila nobhontshisi olayini ngababili besondelene



Izitshalo eziyizembozo sasebusika, saia, black oats, forage sorghum, kanye ne fodder radish



Izitshalo eziyisembozo sasehlobo, ujika nelnaga amabele kanye nosunhemp



Ulab-lab (dolichos)

4.12 UKULIMA NGAMAQEMBU EMIGQA

Ukulima ngamaqembu emigqa - indlela yokutshala lapho ezitshalo ezihlukene zitshalwa ngemicu ngokulandelana ukuvimbela ukuguguleka komhlabathi nokukhilisa izinga lothathwa kwezakha mziimba zezitshalo enhlabathini. Utshalwa kwemicu kumele kuvundle ikhontolo. i

Izitshalo zidinga ukukhethwa ngendlela yokuthi izimpande zijule ngokuhlukana nezidingo zezakha mziimba. Ukutshala ngemicu kwezitshalo ezimisebenzi eminingi enyahlukene kuwombono omuhle. Izitshalo ezinobuhle bezolimo nezamahlathi ezifana ne pigeon pea, moringa, sesbania sesban, leuceana zisebenza kahle. Utshani obunjenge vetiver, lemon grass, napier fodder nazo zingasebenziswa kanjalo ne Rhodes- smutsfinger (imxube ye digitaria, paspalum notatum kanye netall fescue

Okudingayo

- Imvula engaohezulu kuka 350 mm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo: 1,5%-15%
- Umhlabathi: zonke izinhlobo (5%-35% ubumba)

Ukwenza

- Ezingadini, emasimini
- Indawo enngaohansi kuka 0.1 ha, esukela ku 0.1 ha kuya ku 1 ha nengaohezulu kuka 2 ha
- Izindlekoziphansi (imbewu, izinsiza ezitholakala endaweni)
- Inomsebenzi omningi



Imicu yammbila kanye neLucerne noma lesopdeza



Imicu yammbila kanye nePaspalum ne Digitaria



Imicu yatshani phakathi nommbila phezu kwekhontolo



Imicu ye Pigeon pea/Leuceana kanye nommbila

5 UKUPHATHWA LWEZITSHALO (IZINDLELA ZOKUTSHALA, IMPILO YESITSHALO, UKWANDISWA, NOKUKHIQIZWA KWEZITHELO)

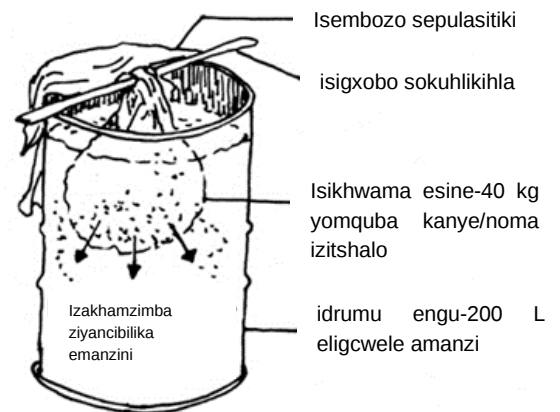
5.1 UMQHUBA WAMANZI

Umqhuba wamanzi umqhuba wezilwane ofakwe emanzini wase uqhunywa ebese uxhutshwa namanzi ngaphambi kokuthi ufuthwe ezistshalweni noma enhlabathini ezungeze izitshalo njengesengezo somnotho emhlabathini. Umqhuba wamanzi wengeza, uzinzise imisoco edingwa izitshalo ebese ifaka ixhube yezilwanyana eziliswana nezifo kanye nezilwanyana ezingadingeki

Umqhuba wamanzi ujwayele ukwenziwa ngomqhuba wezilwane(omusha, osanomcamo) njengezinkomo, izimbuzi, amahhashi, iziklabhu, kanye noqhuba wezinkukhu, kanye/noma nokhula oluhlaza satshani (isikhuthazi), iziqu zikabanana (potassium kanye nephosphate), comfreykanye nembati (izinika izitshalo izakha mzimba ezilekelela izitshalo zilwisane nezifo). Lenxube ixutshwa ngokukodwa kokodwa kokune 1:4 ngaphambi kokuba uyisebenzise

Ukwenza

- Ezingandini
- Izindawo ezingaphansi kuka 0.1 ha
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Kulula kanni futhi kuyashesha ukuyenza



from: Production without Destruction



Ukuqotshwa kweziqu zika bhanana njenge tiye eliluhlaza noma njengomqhuba wamanzi ofakwe izitshalo



Ukuqotshwa kokhula oluzofakwa emqhubeni wamanzi



Umqhuba wezilwane ozosetshenziswa njengomquba wamanzi owezinkukhu, izimbuzi noma izinkomo muhle kakhulu, uma umusha muhle kakhulu



Izitsha izifakwe umquba wamanzi kumele zimbozwe ukuze kugwemwe ukuhamba nomaoya kwemisoco ebalulekile

5.2 IZIKHUTHAZI ZEZITSHALO EZITHAKWE NGOKWEMVELO

Izikhuthazi ezithakwe ngokwemvelo ziyizinto okuthi uma zifakwa embewini, ezitshalweni, noma endaweni yezimpande, zikhuthaze ukuqhakaza, ukukhula kwezitshalo nezithelo, umkhiqizo wezitshalo kanye nokusebenza kahle kwemisoco. Ziphinde zikwazi ukulekelela izitshalo ekumelaneni nencindezi engadalwa izinto ezahlukene njengokushisa okweqile kanye nesomiso.

Izithako ezidume kakhulu zihlanganisa izinsalela zezinto ezibolayo emhlabathini, izimila zasolwandle, amagciwane anenzuzo (njengalawo abuyisela isithako esiwu N emhlabathini) kanye nezikhunta ezilusizo (njenge Arbuscular mycorrhizal)

Lokhu ngokuvamile kuyathengwa, kuxutshwe namanzi bese kufafazwa emhlabathini noma ezitshalweni ngezikhathi ezithile Phakathi nesizini yokukhula kwezitshalo. Lezi zithako Zibalulekile ezindaweni ezinkulu, lapho abalimi sebeqala ukusebenzisa izinto ezithakwe ngokwemvelo futhi bekhathezekile nangempilo yomhlabathi.

I-Regen-Z (<https://regen.co.za>), iyibhizinisi lezinsiza zezolimo eligxile ezintweni zezolimo ezibuyisela umhlaba esimweni kanye nezixazululo ezintsha zokulima, futhi lenza imikhiqizo ethakwe ngokwemvelo ukuze kuthuthukiswe impilo yomhlabathi nokuvunda kwawo ngenhloso yokunciphisa ukusetshenziswa kukamanyolo onekhemikhali kugcine kesetshenziswa izikhuthazi lezi ezithakwe ngokwemvelo esikhundleni sawo ezinhlelweni zokulima ezilondolozayo.



Ngaphezulu: imigomo eyisithupha yokulima ngokonga/ngokuvuselela (Zylem-Regen-Z)



Ngaphezulu: izinhlobo zezikhuthazi ezithakwe ngokwemvelo ezikhiqizwa u Zylem (regen-Z) ukulekelela impilo yomhlabathi nokukhula kwezitshalo ohlelweni lokulima ngokonga/ngokulondolozayo.

5.3 UKUXUBA IZITSHALO

Ukuxuba izitshalo ezingadini kubandakanya ukulamanisa izitshalo, ukutshal izitshalo ndawonye, nokutshala izitshalo ngokuthi zihambiselana kanjani. Inhloso ukuba nezitshalo eziningi ezahlukahlukeneyo (kufakwa ezilaphayo, ezixosha izinambuzane, nezitshalo ezinemsisebenzi eminingi) engadini yakho yemimfini kanye nalapho utshale khona izithelo uma kuvuma, utshala unyaka wonke, ukuze uqinisekise ukuthi unomthombo onempilo wokudla, uphucule indlela olawula ngayo izinambuzane, iziifo kanye nokhula uphinde unciphise amathuba okushoda kanye nokungalungi kwetshalo

Ukukhethwa kwezitshalo kuncike kulokhu:

- o Ukukwazi ukuvuna ukudla engadini unyaka wonke. Lokhu kuqonde ukuthi kumele kugxilwe ezitshalweni ongakwazi ukuzivuna isikhathi eside ezifana nemfino, olettuce, spring onion kanye no leek, lokhu kwenza singaxili kakhulu ezitshalweni ezifana nama klabishi kanye no anyanisi esithatha isikhathi eside ngale kokukhiqiza ukudla.
- o Izitshalo ezinezakha mzimba (Vit A) njenge mfino enamacembe aluhlaza satshani (ispinashi, mustard, rape kanye nekale-ntufesh), okherothi kanye nembuya amacembe amathanga kanye nezitshalo eziyizinongo njenge parsely
- o . Izitshalo ezikwazi ukuxosha izinambuzane ezinjenge coriander, garlic chives nezinye ezifana no rosemary kanye ne thyme.
- o Izitshalo ezinemidumba njengo bhontshisi, u-peas kanye tenephu
- o Izitshalo ezikhula minyaka yonke ezinemsebenzi eminingi ezifana nomhlonyane, lemon grass, bulbinella kanye nocomfrey
- o Izimbali ezinjengo marigold kanye no -calendula

Ngaphezu kwalokhu kumele ugqikelele ukuthi awutshali izitshalo zasemndenini owodwa ndawonye ukuze unciphise ukubhebbetheka kwezifo eziwayelekile nokuncintisana ngokwemisoco. Ngalokho izitshalo ezifana notamatisi, ubrinjal, amazambane kanye no pepper akumele zitshalwe ndawonye kanjalo nezitshalo ezinacembe, klabishi, broccoli, cauliflower kanye neKale nezipinashi ngokuhlukana kwazo akumele kustshalwe ndawonye

Ukulaminisa izitshalo kufakwa nhezindlela ezimbili enye ibuka ukushintshanisa izitshalo ngokuthi ezidla kakhulu ezifana neklabishi zishintshaniswe nezitshalo ezingadli kakhulu ezifana no lettuce kuphinde indlela ejwayelekile yokulamamanisa efaka okusakhaba- okunemidumba - okunezithelo

Ikhanda okutshala asebenzisela ukuqhamuka nohla lwezitshalo ezilungele ukutshalwa endaweni ethile kubhekelelwe nesimo sezulu esishintshayo. Ngezansi sibona icalender yokutshala eyahlanganiswa ngokuthatha izimvo zabalimi basezi ndaweni Limpopo-lapho ubusika bufudmele, nehlobo lishisa kanye naba limi basezindaweni za KwaZulu Natal nase Eastern Cape lapho ubusika busuka ekupholeni buye ekubandeni. Ikhanda okutshala ajwayelekile nawo angasebenzisw

Singazitshala nini izitshalo zemifino?

Kushisa kakhulu ukuthi kungatshalwa

When can I plant vegetables?	Too hot to plant!											
	March	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												

Ukwenza

- Ezingadini, asemasimini
- Izindawo ezingaohansi kuka 0.1ha, ezisukela ku 0.1 ha kuya ku 1 ha, kanye nezindawo ezingaohezulu kuka 2 ha
- Izindleko ziphansi (imbewu nezitshalo), izinsiza zitholakala edaweni
- Kulula ukwenza



Mama Mcanyana (Gobizembe) – utshale ubroccoli, iChinese cabbage, ispinach, ucoriander kanye nemarigold



uMagdelina Malepe (Sedawa), utshale imarigolds, no thyme, iparsley, ispinach kanjalo ne kale



uChristina Thobejane (Sedawa) – ustshale ummbila, i-okra, utamatisi, ikale kanye nemarigold



Umbhede okujwe wajula ofakwe fennel, coriander, parsley kanye nama chives



uPhumelele Hlongwane (Ezibomvini) –utshale ubeetroot, imustard spinach kanye nespring onions ne parsley

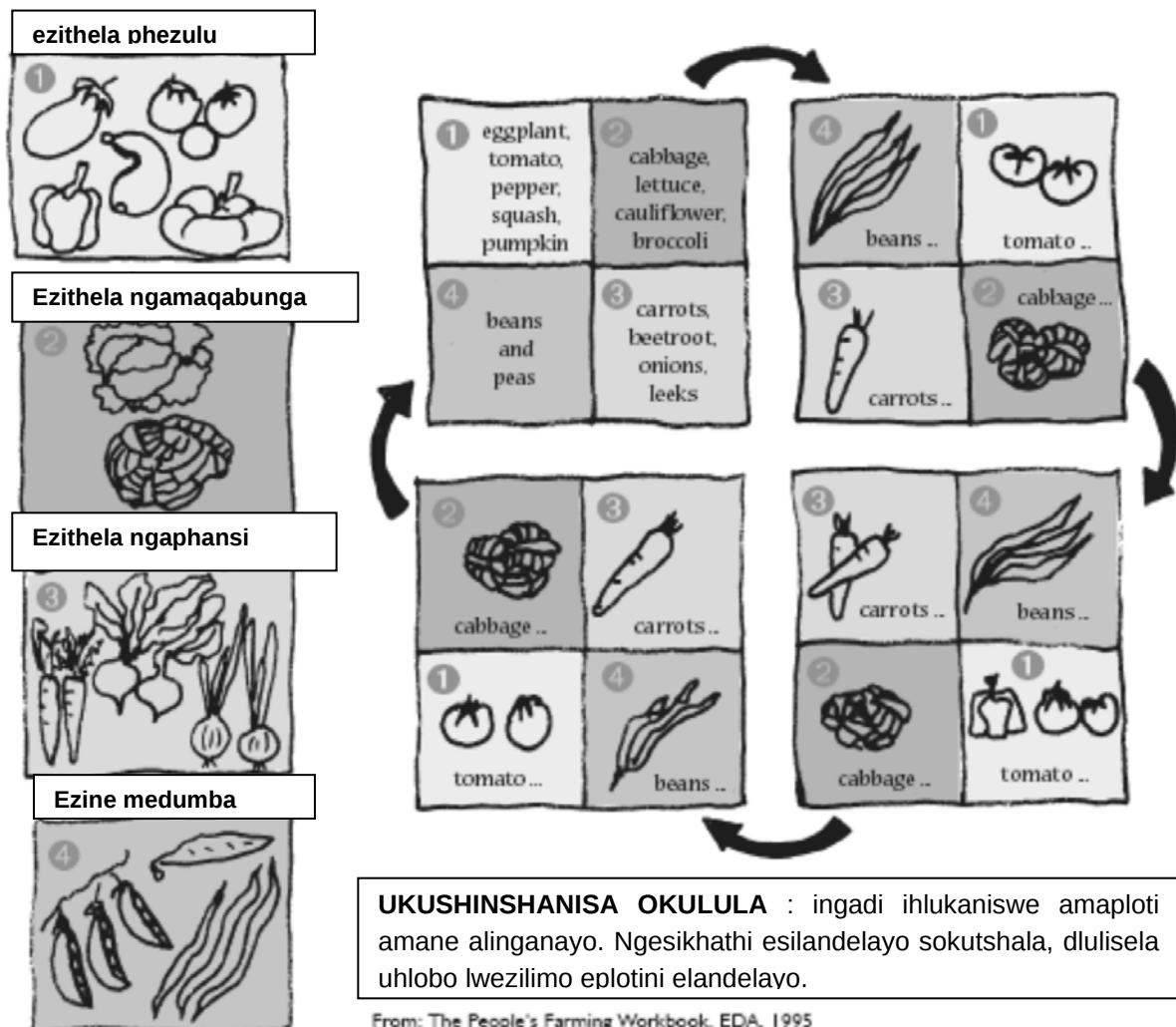
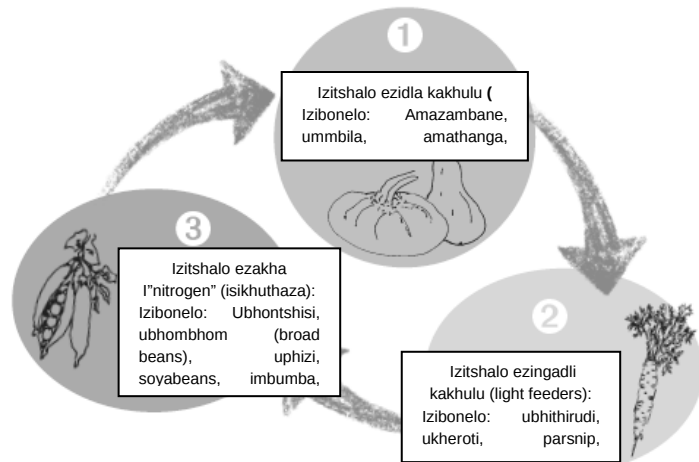


uAlex Makgopa (Sedawa)-utshale i spring onion, ispinach, iziqathi kanye nomarigold.

5.4 UKUSHINTSHANISA IZITSHALO

Ukushintshanisa zitshalo kuyindlela ebalulekile yokuphatha/ ukunakekela ingadi noma amasimu. Ukushintshanisa kwehlisa izinga lezinambuzane kanye nezifo ezakhela emhlabathi kuphinde kuzinzise izimo semisoco ephumayo emhlabathini zithuthukise nempilo yomhlabathi.

Sebenza ngesibalo zezitshalo ezintathu emasimini, Isibonelo Ummbila (udla kakhulu)ushintshaniswa nexhuba yezitshalo eziyisembozo njengo (sunnhemp, amabele, kanye no jika nelanga (ezidla kancane) nazo ezishintshwaa ngezitshalo ezinemidumba ezifana no bhontshisi, izidumba kanye nolab lab. Sebenza ngezitshalo ezintathu kuya kwezine uma ukhiqiza imifino. Enye indlela ulandelanisa embhedeni izithelo, okunamacembe, izimpande, nokusamdumbe.



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

5.5 IZINDLELA ZEMVELO ZOKULAWULA IZINAMBUZANE NEZIFO

Izindlela zemvelo zokulawula izinambuzane nezifo engadini yasekhaya yokukhiqiza okudla zibandakanya lezindlela ezine ezilandelayo:

- Ukuthuthukiswa komnotho womhlabathi, impilo yomhlabathi kanye zinga lomhlabathi lokubamba amanzi ukuze kukhiqizwe izitshalo ezikhangayo ezinempilo, kususelwa ekutheni izitshalo ezingena mpilo yizo esisemathubeni okuhlaselwa izifo nezinambuzane
- Ukuxuba izitshalo nokucina ingadi ihlanzekile ukunciphisa ukugcwala kwezinambuzane kanye nezifo ezijwayele ukuba kona uma kutshalwe isitshalo ngsasisodwa, kunjalo nathuba okuthaleleka kuphindelela ngosusa izitshalo ezihlaselekile ngendlela ephephile. Kuphinde kuqhuqhuzelwe nokukhona belwane ezidla izinambuzane eziluhlupho kanye nezinyosi ezidla izinambuzane ezijwayelikile zasezingadini.
- Ukutshalwa kwezitshalo ezinomsebenzi eminingi, ezishayo nezingashi, kufakwe nezitshalo ezikwazi ukuqhelisa izinambuzane nezikwazi ukuzilawula. Lokhu kufaka izibonelo ezinjenge:
 - o Izimbali marigold kanye ne calendula
 - o Amakhambi/ Izinongo lavender, rosemary, coriander, parsley, thyme, fennel, basil, rocket, lemon grass kanye ne garlic chives
 - o Ezilaphayo ezifana nomhlonyane kanye ne bulbinella, inhlabi, comfrey, imbati
 - o Izihlahla ezinedumba ezifana ne sesbania sesban, i-moringa, i-pigeon pea kanye ne Acacia
- Ukwenza izinxube ezikwazi ukuqhelisa izinambuzane kanye nezifo. Lapha kusethseziswa izinto zasendlini ezijwayelekile ezifana nopelepele, ugarlic, anyanisi, insipho elihlaza(ubulala kakhulu izinambuzane ezinemizimba ethambile), uparaffini kanye no anyansi(okulawula kakhulu izinambuzane ezinemizimba eqinile, kanye nogwayi ukulwisana nezinambuzane esezihluphile zasabalala kakhulu. Kepha zikhona futhi nezinye izindlela.

Ukwenza

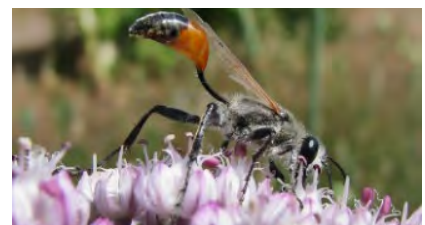
- Ezingadini, nasemasimini
- Indawo engaphansi kuka 0.1 ha, esukela ku 0.1 ha kuya ku 1 ha
- Izindleko ziphansi, izinsiza zitholakala endaweni
- Inomsebenzi omncane kuya kophakathi, idinga ulwazi



Indlela ehlanganisile yokunakekela ingadi, ukuphathwa kwamamanzi nomhlabathi, izitshalo ezihlukahlukene, izitshalo ezishayo nezingashi zixutshiwe ndawonye



Izilwane ezilawula izinambuzane ngokuzidla noma ukubekela amaqanda



Umbelliferae – njengo anyanisi kanye nama leek akwazi ukuheha izilwane ezidla izinambuzane



Izinxube zokulawula izinambuzane- inxube yensipho, pelepele, kanye no garlic- izilwanyana ezinemizimba ethambile, inxube yaparaffin no anyanisi- ukulawula izinambuzane ezinemizimba eqinile



Marigold uvikela ezifweni ezithikameza ukukhula kwezimpande



5.5.1 U- Garlic – Isibonelo

Indlela

Qoba izigaxa zibe ncane(izigaxa esikhulu esisodwa zibe mbili eziphakatho ngobukhulu) ugcwilise emafutheni aliningana namateaspoon amabili usuku olulodwa noma izinsuku ezimbili kuphalafini. Sebenzisa ujeke oyingilozi ayi ithayela.Xhuba namanzi anensipho angangohhafu welitha ebese eyasefa. Xhuba unxenye eyodwa yenxube emanzini ayizinxenye eziyishumi (1:10) ebese uyafutha. Xhukuza ngokwanele ngaphambi kokuba usebenzisa

Okuhlosiwe

Izinambuzane ezijwayelekile: Omiyane, izimbungulu zikakotini, izintwala zezitshalo, izimpukane, izibungu zamasosha, imikhaza, izintuthwane, amabhungane, izibungu, izimvemvane ze-diamondback, izimvemvane ze-false codling, izibungu zomhlabathi, izintwala ezincane, izibungu ezibhoboza izihlahla zama-peach, nomuhlwa.

Fungi: Isifo seqweqwe, isikhutha, ukugqwala kwamabhontshisi, isifo sokubola kukatamatisi.

Alternaria - Ukubola kwezithelo, isifo sokubola sokuqala, ibala elinsomi, amabala emaqabungeni.

Cercospora - Isikhutha samaqabunga, amabala emaqabungeni, isifo sokubola sokuqala, isifo samehlo esefudu.

Colletotrichum- Amabala emaqabungeni, i-anthraxnose, ukubola kwezithelo, isici.

Bacteria: *Xanthomonas* spp.



Izigaxa zagarlic



Uvemvane ezigabeni zalo zokukhula



Isifo esiba kuma strawberry esidalwa *Xanthomonas campestris*



Izinkomba ze Anthracnose edalwa *Collectotrichum* ezitshalweni zondeni watamatisi

5.6 IZINDLELA EZIHLANGANISILE ZOKULAWULA UKHULA

Ukhula izitshalo ezikhula unyaka owodwa noma ezikhula ezikhathi eside ngale kokuphazamiseka, ziphinde zikhule ngamandla emasimini nasezingadini, luphinde luncintisane nezitshalo ngemisoco, indawo kanye namanzi lzinhlubo ezihlukene zomhlabathi kanye nesimo sezulu, izindlela zokutshala kanye nezindlela zokulawula ukhula zivamise izona ezilawula ukuthi iluphi ukhula olunamandla kulezindawo. Izibonelo, zifaka inqonqodwane kanye nonqhunga oluthanda izindawo ezinombumba oluningi, lezitshalo zingakwazi ukugcwala yonke indawo uma ngaphezulu kuphela, lokhu esikwenza ngegeja. Ukhula lwanda kakhulu ngezigaxa eziba ngaphansi komhlabathi Ukhula olunolaka olukhula minyaka yonke njengocadolo knaye nembuya luvala kakhulu uma ukhula olugcinile lungakhishwanga, njengiba imbewu yazo ishesha okukhiqizeka iphinde ibekezelele izikhathi ezinde ezingena mvula

Izindlela ezihlanganisile zokulawula ukhula zifaka izinto ezahlukahlukene ezifana nokuthuthukiswa kokwakheka komhlabathu nempilo yayo, ukwemboza, izitshalo eziyizembozo, ukulamanisa izitshalo, kanye nokutshalo usondelanise. Kuphinde kufake nezindlela ezisebenza nemishini kanye nemithi ukulawula ukhulula. Kwenza ikhomposi nakho kuyalugqilaza ukhula uma kwenziwe ngendlela efanele, lokhu kuphinde kunciphise izinga lembewu yokhula egcwele kwemvelo. Ukulawulwa kokhula sekuhambe ishashana kutshaliwe kusiza ukunciphiseni imbewu yokhula oluvela minyaka yonke nokuyinto ebalulekile ekumele yenziwe.

Ukwenza

- Izingadi, amasimu
- Izindawo zingahansi kuka 0.1 ha indawo esukela ku 0.1 ha kuya ku 1 ha
- , Izindleko eziphansi, izinsiza zitholakala endaweni
- kunomsebenzi ongemuningi kakhulu, kudingeka ulwazi oluningi



Ukulalulwa kukhula kuwukusiza okukhula

Insimu ehlaselwe inqonqodwane ngenxa yokuphindelela kuhlakulwa ngegeja kushaywa ngaphezulu



Indima exhutshwe ummbila nobhontshisi, lapha ukhula sevale yonke indima luhlula izitshalo



ukutshala usondelanise lapho oxube khoba izitshalo ukuze uzivikele ekuqilazweni ukhula, ngakwesokunxele ummbila ongalakulelwanga kwesokudla indima exube izitshalo yase izisondelanisa eyatshalwa ngesikhathi esisodwa kepha kube kuhlakulwa ngendlela efanele



Ikhomposi iyakwazi ukubulala imbewu kanti iyindlela enhle yokubheka umqhuba ngaohambi kokuthi usebenze njengoba ikhomposi ikhuphula izinga lemisoco etholakala emqubeni



Dock (ngezansi izikhomba zomhlabathi onesimuncwane, amaranthus (ngenhla kwesokunxele) umhlabathi ovundile kepha ongakhekile kahle kanjalo nocadolo (ngenhla kwesokudla) udla imisoco izitshalo ezinnakwazi ukuvithola



Inqonqodwane iyizinkomba zokushoda komoya emhlabathini, ngenxa yokugqisheka nokungakheki kahle kwawo umhlabathi

5.7 IZIKHUNGO ZOKUKHULISA IZITHOMBO NOKUSABALALISA

Inkulisa yezitshalo amancane akhiwe emnakhaya ukuze kukhiqizwe izitshalo (izithelo, izinongo kanye nemfino) kanye nezinye izitshalo ezinemisebenzi eyahlukahlukene (ezilaphayo kanye nezi llwawulwa iziilwanyana ezingadingeki) kususelwa ezimmbewini ngokuhlukana kwazo kubalulekile ukuze ingadi ibe nezenhlobonhlobo zezitshalo. Akudingi uze ubenemishini esezingeni eliphezulu ngaphandle nomhlabathi, nokusamhlabathi okuzotshalelwa kukho, izikhwama zokutshala kanye nezitsha zokukhulisa izithombo ezingabekwa ngaphansi kwehlahla esinomthunzi ekhaya.

Imibhede yezithombo yenziwa ijule okusukela ku30cm kuya ku 60 cm ebese ifakwa okubolayo okufana nekhomposi nomquba, kumele ibe sendaweni enethunzi ukuze imbewu ihlale iswakeme(kepha ingabi manzi) ngalesikhathi kumele iqhume iqhale nokukhula. Ama nursery asebenzisa izithombo ezisheshayo adinga okuphathwa okusezingeni kanti futhi kunzima uzenza lezithombo uma ungenazo izinsiza zazo. Kungono kanti futhi kulula ukuzikhulisela ezakho izithombo ebese uyazikhipha uzifae lapho ofisa khona uma sezilungile

Ukwenza

- Ezingandini
- Indawo engaphansi kuka 0.1ha
- Izindleko eziphakathi(imbwu, izitshalo, kanye nezitsha) izinsiza zitholakala endaweno
- Anomsebenzi omningi



Ukukhiqizwa kwezithombo imbhedeni efakwe ikhomposi yaphinde yambozwa ngopulasitiki ukuze kuvikeleke izithombo



Amanursery amancane enziwe phansi kwezihlahla ukuze kukhiqizwe izithelo. Izihlahla ezinemisebenzi eyahlukahlukene kanye nezihlahla ezincanenamakhambi. Lapha zibona umango kanye nemoringa itshaliwe



Izakhiwo ezakhiwe ngamanethu ukuze kukhiqizwe imifini kanye nakhambi(iziningo)



Ummoba kanye nommango okhiqizelwa emhlabathini kuma nursery amancane



Nezindishi zingasebenziswa, kulula ukugudluzisa uphinde uzinakekele

5.8 UKONGIWA KWEMBEWU

Ukongiwa kwembewu kuyindlela abalimi abalimi abayisebenzizayo kepha eya ngokwehla. Imbewu igcinwa unyaka nonyaka kepha ngenxa yobunzima bezimo ezilima ngaphansi kwazo abantu abaningi babika ukulahlekelwa imbewu eningi okumele ngabe bayigcinile. Liyangokunyaka inani labalimi bathenga izimbewu ebese begcina izimbewu uma sekuvuniwe, okuchaza ukwehla kwezinga lokutholakala kwembewu yezitshalo zomdabu. Ukongiwa kwembewu indlela ebalulekile yokuvikela izimbewu zezitshalo zomdabu njengoba abalimi bakhetha izimbewu ezimpova evulekile (sezizulu) kunalezo zesilungu, ezikwazi ukumelana nesimo sezulu, izinambuzane kanye nezifo ezihlasela ezindaweni ebazakhele.

Izinto okumele sizigcine emqondweni uma songa izimbewu ilezi ezingezansi:

- Kubalulekile ukuququzela izilwanyana ezifafaza impova ngokutshala izinhlobonhlobo zezitshalo eziifaka izimbali uphinde ugcine ingadi kanye namasimu enezitshalo eziningi izihlukene ukuze kugcine nesidingo sokusebenzisa izibulala zinambuzane.
- Gcinaimbewu evela ezitshalweni ezikhombisa impilo kuphela, ungalinge ugcine imbewu ezivela ezitshalweni ezinezikhomba zokungakhuli kahle.
- Ketha izitshalo esiyisithuoha kuya kwezingama shumi amabili nane (6-24) ozogcna imbewu yazo
- Ungalinge ugcine imbewu evela ezitshalweni ezinezifo
- Imbewu kumele kube eseyikulungele ukuvunwa, yomela ezitshalweni isikhathi esifanele kanye
- Nezitshalo okulula ukuthi zithengane kumele ziqhelelaniswe (izibonelo, okusamfino kanye no mmbila, upepper kanye no pelepele, amathanga kanye no lettuce) ngokwendawo, iskhathi noma zifakwe ema khejini

Ukwenza

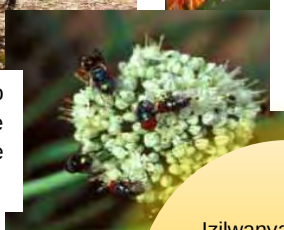
- Emasimini nasezingadini
- Indawo engaothansi kuka 0.1 ha, esukela ku0.1ha kuya ku 1 ha nezindawo ezingaphezulu kuka 2 ha
- Izindleko ziphansi, ziyatholakala endaweni
- Kulula ukwenza nokunakekela, kepha idinga umsebenzi kanye nolwazi oluthe thuthu



Ingadi ekhiqiza izithombo, enesakhiwo sekheji, lapho isitshalo ngasinye zibalelwa esithupheni kuya emashumini amabili nane ukuze kugcinwe imbewu- izitshalo ezinemndeni ehlukeneyo zitshalwa ngandawonye ukunciphisa izinga lokuthengana



Izimbali nezitshalo ezikhuthaza ukufafazwa kwempova yizinyosi, amahornets kanye namavemvane



Izilwanyana ezifafaza impova ziyazithanda izimbali ezihlukahlukene



Ukufafazwa kwempova ngezandla emmbileni okuzokhethwa kuwo imbewu



izitshalo sikapelepele esifakwe ekhijini ukugcina imbewu iyiyo ingathengwanga ezinye.



5.8.1 Ukucutshungulwa kwembewu

.Ngaphezu kwakho konke imbewu idinga ukuphola, ubomnyama, kanye nokoma ukuze ihlale izisimweni iskhathi eside. Uma imbewu ibekwa endaweni enesifudumezi nokushisa, iyashesha ukulahlekelwa amandla ayo okuqhuma. Ngezansiimiboo ebalulekile mayelana nokubekeka kahle kwembewu

- Isifudumezi, imbewu izomunca umswakamo emoyeni. Imbewu indinga ukubekwa endaweni enomsawkamo ongaphansi kuka 10%, eyomile engangenwa umoya
- Avoid plastic packets and containers Kwema opulasitiki kanye nezitsha ezakhiwe ngawo.
- Ukukhanya kuncphisa impilo yembewu, imbewu kumele igcinwe emabhodlelno emnyama kumbe indlini emunyama. Kudingeka kuhlale kumnyama.
- Amazinga okushisa nokubanda, imbewu ihlale iskhathi eside uma ihleli endaweni ebandayo kepha eyiqwa. Imbewu yezitshalo ezifana no cucumber, kanye no yamatasi ziyambezwa ngento esa jelly evimbela mbewu ukuba iqhume. Lo jelly kumele ususwe ngaphambi kokuba imbewu ibekwe kanye nokuqhuma kwayo. Ujelly uyavutshelwa ngokuhlakaniswa namanzi noshukela kugezweimbewu ebese iyomiswa.
- Ukuquba ukomiswa kwembewu ungasebenza isilica gel
- Ukugcinwa ngomlotha, ukelika kanye amacemebe omile agxotshiwe ezinye izitshalo ezinjenenge nhlaba kuyakhuthazwa ukugwema omonakalo ongenziwa izilwanyana zihlasela uuma imbewu isibekiwe.



Ukuvutshelwa kwamatasi kanye ne gooseberry ukuze kubekwe imbewu inhinde ikwazi ukudhuma kahle



Uma izinga lomswakamo lehla ngo 1% impilo yembewu iyaphinda phindeka

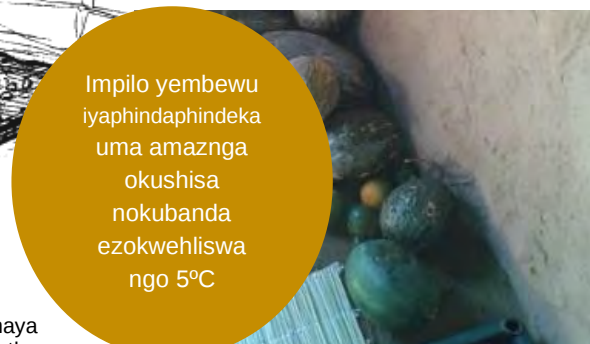


Gcina imbewu ezitsheni ezingamabhodlela



Ukusebenziswa kuka silica ukumunca amanzi embewini kanye nomlotha okusebenziswa uma kubekwa imbewu esiyomisiwe

Indlela yokubekwa kwembewu ekhaya usebenzisa amashalofu, amaphakethe amaphepha kanye nojeke abangamabhodlela



Impilo yembewu iyaphindaphindeka uma amaznga okushisa nokubanda ezokwehliswa ngo 5°C

Gcina imbewu endawni epholile, eyomile futhi emnyama

5.9 UKUKHIQIZWA KWEZITHELO

Ukukhiqizwa kwezithelo ezahlukahlekene ekhaya, ezizovuthwa ngezikhathi ezahlukene zonyaka kubaluleke ngokuthi ubenezinhlobo nlobo zezithelo uphinde ukwazi nokumelana nezimo ngohlukana kwazo. Izithelo ungakwazi ukuzikhiqiza ususela embewini, kanye namagatsha asikiwe, izimpande kanye nezisthelo uqobo. Izihlahla zezithelo kumele zitshale inhlabathini ejulile evundile ziphinde zidinge nokuniselwa ikakhulukazi umazisencane. Zidinga ukuvikela zingalimazwa umoya ziphinde zisuselwa amagaya ebusika (amapetsisi, amaplamusi kanye nama aphula) ukuze zizokwazi ukukhipha izithelo (izihlahla izihlae ziluhlaza njengezo mango nokwatapheya) Izindlela zemvelo zingasebenziswa ukulawula izinambuzane ezifana ne nezimpukane zizthelo, izintuthane, aphids kanye nama scale) kanye nezifo.

Izinhlobo ezihlukene zezithelo zenza kahle ezindaweni ezihlukene. Ikakhulu, lezi izindinga ubusika obubandayo (Izithelo zasemazingeni ashisayo aphakathi (subtropical fruit). Lokhu kubhekisela ezithelweni ezikhula kahle ezindaweni ezinesimo sezulu esiphakathi nendawo phakathi kwezindawo ezishisayo kakhulu nezibandayo. Lezi zindawo zivamise ukuba nokushisa okufudumele unyaka wonke, kodwa zingaba nezikhathi ezithile ezipholile. Izithelo zasemazingeni ashisayo aphakathi zidinga amazinga okushisa angaphansi kancane kunezithelo zasemazingeni ashisayo (tropical), kodwa zisadinga ilanga elanele ukuze zikhule kahle. Izibonelo zalezi zithelo zihlanganisa amawolintshi, amagilebhisi, ama-avocado, namalamula.) njema aphula, amapheya, amaplamusi, amapetsisi kanye nelezi zingakwazi ukubekezelela ubusika obubandayo njengo bana, mango, ukwatapheya kanye nama litchi. Okusa olintshi kukwazi ukumela nezimo zokushisa nokubanda ezihlukahlukene, kepha kumele zinisekele kahle

Ukwenza

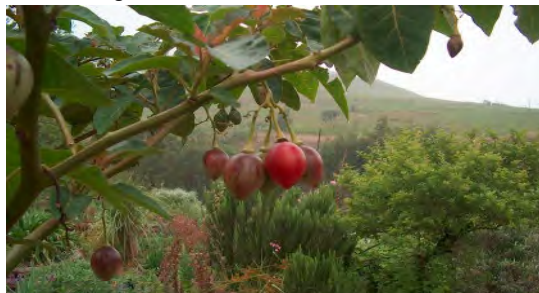
- Ezingadini noma engadini yezithelo
- Indawo engaothansi kuka 0.1 ha indawo esukela ku 0.1 ha kuya ku 1 ha kanye enzindawo ezingaphezulu kuka 1 ha.
- Izindleko eziphakathi (imbewu nezitshalo) izinsiza zitholakala endaweni
- Inomsebenzi kuphinde kudingeke ulwazi



Izindlela zemvelo ezifana ne Ipayirethramu, uwoyela wamaminali, isulfure ye-lime. Ukusebenziswa kwapowder wezimpende uma kukhiwa amagaya okutshalwa



Ukuniselwa kwezihlahla zama orange, ezindishini ezihambe amanzi



Utamatisi wesihlahla okhiqizwe kususelwa embewini uba nomsoco uVit C omningi uphinde uthole phakathi kuka March kuya ku May ngesikhathi sezinincipha ezinve izithelo



Ukukhiqizwa kususelwa embewini kwa; granadilla, kwatapheya, umango, gooseberries, kanye no tamatisi wesihlahla



Ukusebenza kwemibundu kanye nezindishi ukuseenza amanzi omula ezihlahlani



Indela yase khaya yokubamba izinambuzane izhlasela izihlahlazezithelo ezifana nepukane yezithelo eyinziwa ngokufaka ama rrinag noshukela emanzi



Ukutshalwa kwezihlahla imigodini ejulile egcwaliswe ngekomposi kwaze kuba nesakiwo esisandishi sokubamba amanzi uma kunikekwa ege ege

5.10 UKUKHIQIZWA KOMANGO NGENDLELA YEMVELO

Lokhu kusho ukulinywa nokukhiqizwa komango kusetshenziswa izindlela zemvelo, ngaphandle kokusebenzisa amakhemikhali ayingozi afana nezibulala-zinambuzane zokwenziwa, izibulala-zifo zokwenziwa, noma izivundisi zokwenziwa. Ekukhiqizweni komango ngendlela yemvelo, kugxilwa ekusetshenzisweni kwezivundisi zemvelo, ukulawulwa kwezifo nezilokazane ngendlela yemvelo, nokuvikelwa kwemvelo nomhlabathi ukuze kugcinwe impilo yawo isikhathi eside.

Umango uyabekezela wenza kahle ezindaweni ezinobusika obuphakathi nase zindaweni ezifudumele kuya kweshisa kakhulu ehlobo. Kukhona nezhlobo zikamango ezikhulula endle ezingakwazi ukukhuliswa kususelwa embewini. Izinhlobo zesimanje zikhuliselwa ukuba nkulu, zibe noshukela omningi zingabi nezintambo ngokushikwa kwenxenywe yamagatsha elumbaniswa nenxenywe yokusazi mpande okuphilile okungenazimpawu zokungaphili. Izibonelo eziwayeleleke zifaka keit, kent, shelley kanye ne tommy atkins. Lezizinhlobo zidayoswa njengezithelo, amajuzi kanye no mango owomisiwe nezikhumba zikamango. Ngezansi izindlela ezimbalwa zokuzikhulisela umango:

- Enza ikhomposi okungenani izinyanga ezine kuya kweziyisithupha ngaphambi kokuba utshale
- Ukusthalwa kwezihlahla ezisanda kutholakala entwasa hlobo emigodini engu 60 cm* 60 cm egcwaliswe ikhomposi, inhlabathi kanye nokelika noma ibone meal. Akha indishi yokunisela uzungeze isihlahla ebese uyamboza
- Ikhoposi ifakwa minyaka yonke, emva kokuthi isihlahla sithele
- Ukususelwa kwesihlahla amagaya kweniwa minyaka yonke emva kokuthi isihlahla sesithelile, ukuze isihlahla zivuleleke nezithelo zikwazi ukuthola ilanga kanti
- Nezihlahla ezisencane zidinga amanzi angango 20 l- 40 l ngesonto.

Okudingayo

- Imvula engaphezulu kuka 350 mmngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka >5°C
- Ubume bendawo- indawo ezinzile
- Umhlabathi: noma onjani
- Ukunisela- uyadinga ukuba namanzi okunisela

Ukwenza

- Ezingadini, Ezingadini zezithelo
- Indawo engaphanzi kuka 0.1 ha indawo esukela ku 0.1ha kuya ku 1 ha.
- Izindleko eziphakathi, izinsiza ezithola ngaphandle kwazendaweni nangaohakathi endaweni, nokutholakala kwezihlobo ezintsha
- Kulula okunakekela nakuba kudingeka ikhono nolwazi



Ukwengezwa ngokubungakho ngokwenza ama juzi, nokomiswa kuka mango



Isihlahla sika mango esisikelwa amagaya esesinezikhomba sokukhula okusha, ikhomposi ifakwe endishi yokunisela kwase kwembozwa



Ingadi yesithelo yomlimi omcane endaweni yase Limpopo, lapho uphaathi wengadi ezithelo eyihlola



Ukusikwa kwamagaya, ukufakwa kwekhomposi kanye nokunisela okwenziwe esihlahleni esidala sika mango ukuze siphinde sikwazi ukukhiqize futhi.

6 UKUBANDAKANYWA KWEMFUYO

Lezi izindlela zokuphathwa kwemfuyo ezingenelela ezitshalweni noma eziyi nxenye yokuzama ukuhlenganisa ukuphathwa kwemfuyo kanye nokwezitshalo ukuze kukwazi ukusebenzisana. Lapha zisobheka izindlela ezingasi siza sikhuphule siphinde siphucule ukudla kwemfuyo kanye nezinhlobo ezahlukeni zokudla kwemfuyo

6.1 EZOLIMO EZIBADNAKANYA EZAMAPHLATHI

Izihlahla zixhutshwa emasimini ngezindlela eziningi okungaba okutshalwa zodwa, , noma zitshalwe phakathi kwezitshalo ezikhula minyaka yonke (ngokujwayelekile zivame ukuba imihhube phakathi kwezitshalo). Izinhlobo zezihlahla eziwukudla kwemfuyo njenge pigeon pea- (udali), acacia species(umhlalankwazi), Sesbani, sesbani (umsokoko), Moringa olifeara kanye ne leuceana spp zonke zijwayekile

Okudingayo

- Imvula engaphezulu kuka 350 mmm ngonyaka
- Amazinga okushisa nokubanda angaphezulu kuka 5°C
- Ubume bendawo: 1,5-15%
- Zonke izinhlobo



Izibonelo zokutshalwa kwezihlahla ngezihlahla ezihlukene endaweni onayo

Ukwenza

- Ezingadini nasemasimini
- Indawo engaphansi kuka 0.1 ha indawo esukela kuka 0.1 ha akuya ku 1 ha nendawo engaphezulu kuka 2 ha
- Izindleko eziphakathi (imbewu/ okutshala) izinsika zitholakala endaweni
- Kunomsebenzi



Isihlahla sika sesbania sikhula njengo hesho ensimini



Izimbuzi zidla lapho kuthalwe khona udali



izihlahla zemoringa zitshalwe zalandelana ensimini encane



Leucaena tshalwe sa heshi ensimini etshalwe ubhontshisi (ngapahmbili) knaye nommbila (ngemuva)

6.2 EZOLIMO EZIBANDAKANYA (IZIHLAHLA, IZITSHALO KANYE NOTSHANI NDAWONYE)

Lendlela ibandakanya ukusebenziswa kwezolimo oluxhutshwe nezamahlathi kanye nezolimo, fukakwa izitshalo kanye nezihlahla zezithelo ngenhloso yokukhuphula ozokuzuzwa endaweni onayo. Izindlela zokwenza ezitholakala kule ndlela yokwenza ilezi:

- iAlley cropping- lapho kutshalwa izitshalo esizakhuni njengohheshi okanye izinhlobo zezitshalo phakathi nednadwo nezi tshalo ezitshalwe sahsheshi
- Ukuphucula izinga noma kungatshaliwe- izitshalo ezisakhuni ziyatshalwa bese zishiywa uma ngabe sekungasatshaliwe. Lezi zithalo ezisakhuni yizo eziphucula izinga lomnotho emmhlabathini ziphinde zikhuphule nezinga lokubambeka kwamanzi.
- Ezingadini esisemakhaya, izihlahla ezisondelene ezihyanayo ngobude zitshalwa zizungeze ikhaya ezinemisebenzi eyahlukene ebandakanya ithunzi, amakhambi, izithelo, kanye nokudla kwefuyo
- Izihlahla ezinemisebenzi eminingi endaweni etshaliwe: izihlahla eziqagene noma eziqoqelene ndawonye ukuze zime ngendlela ethile ezindaweni ezizungezile zoma ezivulekile. Lezi zihlahla zikhethwa ngokufaka kwazo isikhuthazi kanye nokuletha izithelo, izinkuni zokubasa kanye nokudla kwemfuyo

Ukwenza

- Ezingadini, emasimini, nemfuyo
- Indawo engaphansi kuka 0.1 ha, indawo ephakathi kuka 0.1 ha kuya ku 1ha indawo engaphezulu kuka 1 ha
- Izindleko eziphakathi (imbewu nezitshalo) izinsiza zitholakala endaweni
- Udinga ulwazi kanti iyasebenzisa



Utshani bohlobo isesbania sesban-butshalwe ngohlelo lwe Alley cropping endawweni yakwa KwaZulu



Umbila utshalwe emuva kweminyaka emibili kwakukade kutshalwe udali



Izihlahla ezincane ezinemidumba ezitshalwe emadlelweni ukuze imfuyo



Indlela ephucukile yokulalisa insimu-udali otshalwe unyaka owodwa kwase kwangatshalwa lutho emuva kwawo



Ingadi yasekhaya endaweni yakwa Mhlabyalingana,, KwaZulu Natal: Inxube yezihlahla zezithelo,, imifino kanye nezitshalo



Amadlelo atshalwe phakathi nezihlahal engadini yezihlahla zama kinati ukuze imfuyo ikwazi ukudla iphinde ithola

6.3 UKULUNGISELELA AMANKONYANA UKUKHUNYULWA KONINA KANYE NOKWENGEZA UKUDLA

Ukwengezwa kokudla indlela ebalulekile ekuphathweni kwefuyo esebenziselwa ukunikiza imfuyo imisoco eyidingayo amadlelo angasenayo. Loku kubaluleke kakhulu ebusika, lapho sekushoda khona ukudla emadlelweni noma madlelo esengena msoco. Izindlela zokwengeza ukudla ilezi

- Ukudla okunesakhamzimba iprotein iziwukudla okanye amanzi njenge Voermol Premix 450 (esampuphu) kanye ne LS 33 (engamanzi)
- Okusanhlamvu kanye nembewu njengo mmbila ogqakaaaziwe, amabele njalo njalo
- Izitini zimisoco kanye nezakhamzimba zemfuyo

Ukwengeza kungaphinde kube ngendlela yokutshalwa kotshani obungu kula kwemfuyo. Lokhu kufaka ukukhuliswa kwezitshalo ezinomspco ongaphezulu kwalowo ukungaba ukhona ngalesosikhathi. Iningi lalezitshalo litshalelwa ukunikeza ukudla okuseluhlaza ngasekupheleni kobusika. Izibonelo zifaka: Lucerne, fodder rye, black saia oats, vetch, teff, fodder radish, Japanese radish, kale, turnips. Izinhlobo zotshani ezingashi noma ngabe isebusika zifaja ukukuyu, kanye ne tall fescue nayo iwumqondo omuhle. Ukuphakela kancane kancane kuyindlela elula yokuphatha imfuyo yakho ikhakhlu amankonyane ukuze athole ukudle ngokungena mkhawulo ngalesikhathi esancela. Amankonyane athola lokhu kudla ngokuncusha phansi kocingo oluvulekile noma isango elivuleke ngokwanele ukuthi amankonyane akawazi ukudla kepha amabe mancane ezinkomeni ezincane zingakwazi ukungena

Ukwenza

- Imfuyo
- Indawo engaphansi kuka 0.1 ha noma indawo esukela ku 0.1 ha kuya ku 1 ha
- Izindleko ziphakathi, izinsiza zitholakala endaweni



Izitini zokudla kwemfuyo zokuzenzela ezifakwe imolasses, urea protein meal, isakamzimba esingu phosphorus, amamanzi ucemente omncane kanye nosawoti



.Isibonelo sendlela yokuphakela amankonyana emapulazini amakhuluse creep feeder



Japanese radish



LS 33 and premix 450



Ukudla kwemfuyo okwenziwe ngamacembe sesbania eyomisiwe, agqotshwa kwafakwa umgqakazo wommbila kanye nosawoti



Izitshalo okwendulelliswe ngazo ivetch kanye ne saia oats lapho kutshalwe khona ummbila ukuze imfuyo ithole ukudla kwasebusika

6.4. UKUPHAKELWA KWEMFUYO EZIBAYENI NOKWENZIWA KWAMABHELE

Lendlela iyindlela yokusika nokubbhekwa kotshani ukuze kuphakelwe imfuyo lapho edlela khona kungaba isezibayeni noma ama stalls, lokhu kunciphisa umonakala okungenzeka wenziwe infuyo emasimini kuphinde kuqinisekise ukuthi imfuyo zithola ukudla ezikudingayo

Utshani buyomiswa ukuze kuphakelwe imfuyo lokhu kungenziwa ngenkotha, utshani obuthile obuna nolucerne, izindumba, uteff noma izinsalela zezitshalo. Ambhele osthani angenziwa emahaya kusebenziwa umshini osebenza ngezandla owenza amabhele. Olungele abalimi basebancane

Ukwenza

- Imfuyo
- Indawo esukela ku 0.1 ha kuya ku 1 ha nenzindawo ezingaphezulu kuka 1 ha
- Izindleko eziphakathi, izinsiza zitholakala endaweni
- Udinga ulwazi, kuyasebenzisa



Ibhele lika Eragrostis Teff



Ibhele laLucerne



Sukuphakelwa kwemfuyo ezibayeni



Izinhlanga zombila



Umshini wezandla wokwenza amabhele, bebhele lenkotha eliziwe ngawo lomshini



Okusamdumba: Izinhlanga zika ndumbanjane

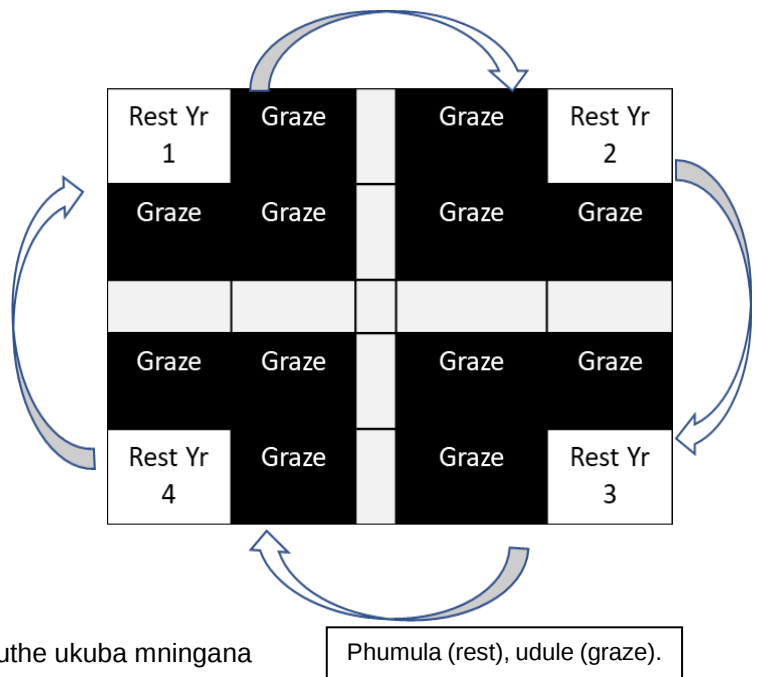
6.5 UKUSHINTSHANISA AMADLELO

Ukudliwa njalo kosthani obumnandi imfuyo kubenza bubentekenteke kuphinde kwenze ukuthi inkotha okuyiyo engalungele ukudliwa imfuyo kube iyo eningi. Ukuze amadlelo akwazi ukukhiqiza ukudla okudingwa imfuyo kubalulekile ukuthi enye inxenye iphunyuzwe ngesikhathi kudliwa ngalowonyaka. Lokhu kwenza ukuthi izitshalo zatshani zikwazi ukugcina imisoco ezimpandeni zazo okwenza utshani bube nomsoco omuningi

Kungakuhle ukuthi inxenye eyodwa kwezine iphunyuze njalo emva kweminyaka emine. Kubalulekile ukuthi abanikazi bemfuyo basebenzisane ukwakakha indlela yokuphumuza amadlelo ngoshintshana kwawo

Ukwenza

- Imfuyo
- Indawo engaphezulu kuka 1ha
- Izindleko eziphakathi, izinsiza zitholakala endaweni
- Udinga ulwazi kanti kunomsebenzi uthe ukuba mningana



Inkotha yasemadlelweni edliwe khakhulu ebinakala ngokuthi yonke ibemfushane, nobufakai bokuguguleka (ekuqaleni kwesikhathi sokutshala)



Inkotha ephatheke kahle, enotshani obubomvu bo hlobo lwethemeda triandral) ukukhombiswa imbova enombala obuvu. Utshani busabalele kahle kanti futhi buhlukahlukene

6.6 IZINHLOBO ZEZINKUKHU EZISEBENZA NGEZINDLELA EZININGI

Kunesidingo sohlobo lwezinkukhu ezikwazi ukumelana nokushisa, nokumelana nengcindezi engavela kokunye okwahlukile, ziphinde zifeze umsebenzi ongaphezu kowodwa. Kudingeka futhi izinhlobo ezingakhiqizwa kabusha endaweni futhi zikhule kahle ngokudla okukhiqizwa ngabalimi. Inkukhu efeza imisenzi engaphezulu kowodwa inkukhu ekwazi ukuzalela amaqanda iphinde inikeze nenyama.

Izinkukhu okuthiwa ama Boschveld(www.boschveld.co.za) zingezokudabuka esifundazweni I Lompopo, zenziwa ngokuhlanganisa uhlobo lwezinkukhu zase Venda, Ovambo kanye nezase Matabele. Inhloso yokuhlanganisa lezizinhlobo ukuthola uhlobo lwenkukhu oluqinile, olukwazi ukumelana nezifo kangcono futhi olukhiqiza amaqanda nenyama kokubili. Ziyaye ziqhubeke nokuzalela amaqanda kuze kube iminyaka emibili nohhafu. Amaqhude alungele ukuhlathwa emasontweni angu-12, kanti izikhukhukazi ziqala ukuzalela emasontweni angu-18.

Lezi zinkukhu zikulungele ukuhlaliswa ngaphandle ziziqhwandele ukudla, ziphinde zikulungele nokuhlaliswa ngaphakathi endaweni elawulwayo. Zikhiqiza kangcono uma zihlaliswe endaweni evalelekile ekahle, ziphiwa ukudla ziphinde zigonywe. Uma ufuna zikhiqize kakhulu, kufanele uziphathise okwezinkukhu zamaqanda, zidle imeshi edliwa yizinkukhu zamaqanda, zibekelwe izilulu noma zakhelwe indawo yokuzalela ukuze zizalele kahle.

Okudingakalayo

- imvula: >250mm/ngonyaka, amazinga okushisa: >5°C, <40 °C

Ukusetshenziswa

- imfuyo, udinga indawo engaba u-0,1-1ha >1ha
- Izindleko eziphakathi nendawo, izinsiza ezitholakala eduzane/endaweni,
- kudinga umsebenzi omningi kanye nolwazi olwanele



Ama Boschvelders enza kahle kakhulu uma enakekelwe esendaweni ehlanzekile abuye akhululwe. Kufanele athole ukudla okusezingeni elihle. Inyama yalezinkukhu ithi mayifane nenyama yezinkukhu zenyama ezijwayelekile.



Ama boschvelders azalela njengezinkukhu zamaqanda uma enikezwa ukudla okufanele, amanzi, nendawo/izilulu zokuzalela, azalela cishe iminyaka emibili.

6.7 UKUKHIQIZWA KOKUDLA KWEZINKUKHU

Noma kubuye kube nzinyana ukukhiqiza nokugaya ukudla okunemisoco ephelele kwezinkukhu, kuhle ukulekelela ukudla okuthengiwe ngezinto ezifana nokusamatshe, okuyizinhlamvu, nokuluhlaza okutholakala emakhaya.

- Okusanhlamvu kufana namabele, I- oats, umbila noma izinhlamvu zika jika-nelanga. Okusanhlamvu okunezakha-mzimba eziphezulu kubalwa undumbanjane, I sun-hemp, izindumba, nobhontshisi. Umbila obomvu ukuqukethe loku futhi ubiza amanani aphantsi.
- Okusamatshe: loku okungamatshe amancanyana asiza izinkukhu ngokukwazi ukwetshisa ukudla. Lokhu kungatholakala esihlabathini, enkwalini ehlanzekile, njalonjalo. Izinkukhu ziyakwazi ukuzitholela lokhu ngokwazo uma zidedeliwe zikwazi ukuhamba-hamba ziqhwande.
- Okuluhlaza: izinkukhu zingaziqhwandela kona uma uzidedela zizihambe Emini, noma ungazipha ikhabishi, amakhambi ahlaza afakwa ekudleni, izinsalela zemifino kanye nezithelo.
- Okusanyama: izinambuzane nezilwanyana zinikeza izinkukhu umsoco eziwudingayo ukuze zikhule.

Amatswele nezinkukhu ezisencane zingaphiwa ukudla uma zikufuna, izikhukhukazi ezindala zona zidinga 1/4 wenkomishi yokudla okomile ngosuku, amaqhude woma adinga 1/3 wenkomishi ngosuku.



Ngenhla kusuka kwesokunxele uya kwesokudla: Okusanhlamvu: umbila, amabele kanye nojika-nelanga



Ngenhla kusuka kwesokunxele uya kwesokudla: Okuluhlaza I clover eno-vitamin A ophezulu, i-stinging nettle no luseni



Ngenhla kusuka kwesokunxele kuya kwesokudla: amakhambi aluhlaza oluhle ezinkukhwini okubalwa kuwo u comfrey, u phasli kanye no Khoriyanda.

6.8 UKUKHIQIZWA KOKUDLA KWEMFUYO

Indlela yokukhiqiza imfuyo ngokungapheli ifaka ukutshala ukudla kwemfuyo ukuze kulekelele imfuyo (izinkomo nezimbuzi) ezidla edlelweni elingenawo umsoco omningi/owanele. Idlelo elimuncu elisendaweni ephakeme nethola izimvula eziningi liba sezingeni eliphansi makuza kumsoco uma kuyisikhathi sasebusika kanti futhi nokudlisa imfuyo ngokweqile kunawo umthelela kuloku, kakhulukazi ezindaweni zabalimi abasebancane/emakhaya. Okulekelelayo ukufaka izinhlobo zokudla kwemfuyo emasimini lapho kulinywa khona ngokonga, ukuze kuzuze umhlabathi nemvelo futhi kube kukhiqizwa ukudla nezitshalo ezingathengiswa.

kunezindlela ezimbili ezikhona: ukutshalela imfuyo ukudla okutshalwa njalo ngonyaka noma okutshalwa kanye kuhlale isikhathi eside. Isibonelo sokudla okutshalwa njalo ngonyaka, kungaba ingxube ka sun hemp, ujika-nelanga, amabele, u lebhu-lebhu, izindumba, utheniphu, I radishi, I oats emnyama. Isibonelo sokudla kwemfuyo okutshalwa kanye kuhlale isikhathi eside kubalwa uLusine, uLesphedeza kanye no tall fescue okuzinhlobo zotshani.

Okudingekayo

- Imvula: >350mm <1200mm/ngonyaka
- Amazinga okushisa: >5°C
- Ukwenyukela/ukwehlela kwendawo: 5%-25%
- Umhlabathi: zonke izinhlobo – yize umhlabathi uyisihlabathi naloyo owudongo/obumbelayo kubanzima ukusebenza ngawo.

Ukusetshenziswa

- Imfuyo
- kudinga indawo engaba u- 0,1-1ha >1ha
- Izindleko eziphakathi nendawo, izinsiza eziseduze
- Amandla okusebenza kanye nolwazi.

Ngenhla: kusuka kwesokunxele kuya kwesokudla; isambozo sasehlobo (ujika-nelanga, amabele no sun-hemp), olayini bezindumba nombila kanye nesambozo sasebusika (saia oats, Ilayi ne redishi yefolishi).



Ngenhla ukusuka kwesokunxele kuya kwesokudla: amabele angathandwa yizinyoni kanye nolayini be lesphedeza.

6.9 UKUKHIQIZWA KWESITINI ESINEZAKHAMZIMBA

Loku kungaphiwa izinkomo ebusika futhi kungathengwa ngaphambi kwesikhathi noma ungazikhandela ekhaya. Imfolomo yokukhanda izitini iyaye isetshenziswe kakhulu ukwakha lezizitini zefolishi. Lezi zitini ezikhothwa yizinkomo zithuthukisa impilo kanye No kwanda (ukuzala) ngokulekelela ngemisoco esuke ingekho ngokwanele emadlelweni asuke omile. Loku kwenza inkomo ivuleke inhliziyi idle futhi kukhuphula ukudliwa kwefolishi kulekelele inkomo yetshise kahle. Loku kupha inkomo imisoco ebalulekile, kugwema ukuzaca, okwenza lezizitini zidlale indima ebalulekile kakhulukazi ebusika. Ukuzikhandela lezi zitini kushibhile kunokuzithenga, kodwa-ke kuyasebenzisa. Izinto ezihlanganiswayo uma zenziwa kuyaye kufanele zitholakale. Ngezansi itafula elikhombisa okudingekayo uma wenza loku. Lezizinto ziyaye zihlanganiswe ndawonye mese zenziwa isitini ngemfolomo. Emva kwamahora ambalwa, istini sisuke sesiqinile sesingathathwa siyosetshenziswa.

Isithako	incazelo	inani
Voermol Procon 33	Lesi yisithako esinganayo I urea esinenani lezakha mzimba eliphezulu, sikulungele ukufakwa uma kwenziwa ukudla kwemfuyo ekhaya.	32 kg
Usawoti omahhadla222	Loku kungathengwa ezitolo, kuwumsoco obalulekile ekudleni kwemfuyo.	4kg
Impuphu	ingathengwa ezitolo. Isiza ukugcina isisindo esifanayo uma inkomo incelisa.	14kg
i-Whitewash	ukelika owomisiwe –ungathengwa ezitolo ezidayisa izinto zokwakha. Esitinini semfuyo isiza ukwenza isitini sinambitheke kahle sidleke. iqukethe umsoco u-calcium futhi yenza isitini siqine.	8kg
i-Molasses	I Molasses ilekelela ekuvuleni inhliziyi nokwetshisa iphinde iphe imfuyo Amandla noma umdlandla.	16L



Ngenhla: kusuka kwesokunxele kuya kwesokudla: ukuhlanganiswa kwezithako ndawonye kanye nomkhiqizo oyisitini emva kukoba ukhishwe kwi-mfolomo.

7. IZINSIZA ZEMVELO

Lesi sigaba siqukethe okumayelana nokunakekelwa kwezinsiza zamanzi kanye nezinsiza zemvelo. Ukunakekelwa kwemvelo emoshekile kanye nokulawulwa kokuguguleka komhlaba endaweni kuyingxenye kanjalo nokutholakala kwamanzi eduze.

7.1 IMITHOMBO KANYE NAMAXHAPHOZI

7.1.1 Ukutholakala kanye Nokuphathwa kwamanzi

Umthetho wamanzi obuyekeziwe ka-2023 uvumela amazanga ahlukeni okuhlinzekwa ngamanzi azilawulwa umphakathi, ngokubambisana nezikhungo ezisemthethweni zamanzi, ukuze kube nokuhlinzekwa kwamanzi ezingeni lomphakathi wendawo. Ukusetshenziswa kwamanzi ngezindlela eziningi kubalulekile ngoba emakhaya asemaphandleni kudingeka okungaphezu kwamalitha angu-25 umuntu ngamunye ngosuku okuhlinzekwa njengamanzi okuphuza, okuyisabelo samanje esimahlala esibekwe iminyango yabalawula ukusebenza kwamanzi Amanzi ayadingeka futhi ezidingweni zempilo, ukuhlanzeka kanye nasekuzaleni inzuzo. Lezi zinhlelo kudingeka zisebenzise ukuhlungwa kwamanzi ekupheleni okwenziwa emakhaya ngqo.

Ukuzihlinzeka ngamanzi kungenzeka ngezindlela ezahlukene:

- Ukuzihlinzeka ngamanzi kukhokhelwa ngokuphelele iloyomuntu osuke ezowasebenzisa, uyena onakekela ukusebenza kwawo futhi. Imvamisa kwakhiwa inhlangano engahlelekile esekelwe emphakathini, labo abasebenzisa amanzi bayazikhethela ubuchwepheshe obufanele, izindlela zokuxhasa ngemali, isu lokubuyisa izindleko, kanye nohlobo lwesevisi abayifunayo. Ukuvikelwa kwemithombo ephuma phansi kanye nezinhlelo ezincane zamanzi ezisebenzisa amandla adonsela phansi ukuhambisa amanzi kumathangi amancane, kuyizindlela ezincomekayo.
- Ukufakelwa kwamanzi okuhlanganisiwe kuwuhlelo lapho umphakathi usuke uzoxhaswa khona izinhlangano ezithile ngengama NGO noma izinhlangano ezingenzi-nzuzo, nabatshali zimali, ohlelweni lokufaka amanzi. Lokhu kwenza kube nenqubo ehlelekile yokubamba iqhaza komphakathi wonke, kanye nokuthuthukiswa kwamakhono ukuze bakwazi ukuthatha izindima zokuphatha iphrojekthi, kanye nokusebenza nokunakekela uhlelo ngemva kokuqedwa kwephrojekthi. Le ndlela ilungele kakhulu imiphakathi emincane, esezindaweni ezikude kancane.
- Ukuphathwa kwamanzi ngokubambisana Phakathi kwemiphakathi kanye nohulumeni kubukeka kuwumbono omuhle njengamanje. Kuloluhlobo, imiphakathi, neziphathimandla zikahulumeni ezibhekelele amanzi kanye nabahlinzeki bezinsizakalo zamanzi baxoxisana futhi bavumelane ngendima ngayinye ekunikezeni nasekuphathweni kwamanzi. Ngokujwayelekile umphakathi uthatha umsebenzi wokunakekela ukulawula, ukulungisa ingqala-sizinda leyo yamanzi uma ngabe izingxoxo zayo yonke imininingwane seziphathuliwe. Abahlinzeki abasegunyeni bamanzi bona bayaye benze umsebenzi wokulungisa uma kunomonakalo omkhulu nokuvuselela isakhiwo/ingqala-sizinda.

Ukuhlolwa kokuqala kusiza ukuthola imithombo yamanzi emphakathini, ukuqonda ukuthi asetshenziswa kanjani nokuthi ubani owasebenzisayo, kanye nokuhlonza izinselelo nezixazululo. Ukubekwa phambili kwemithombo kuncike emandleni ayo, indawo, ukuvikelwa nokuthi amanzi angahanjiswa kanjani. Njengoba imithombo ivame ukuba nemikhawulo, kubalulekile ukuhlela uhlelo olunezindlela ezincane ezihlangene ukuze wonke umphakathi uthole amanzi ngokulinganayo, kuyilapho kuvikelwa imvelo kanye nemithombo ukuthi ingasebenziswa ngokweqile noma ingcoliswe.

Umhlango womphakathi wokubheka izindlela ezehlukene zokuthola amanzi, owawuholwa yi-NGO



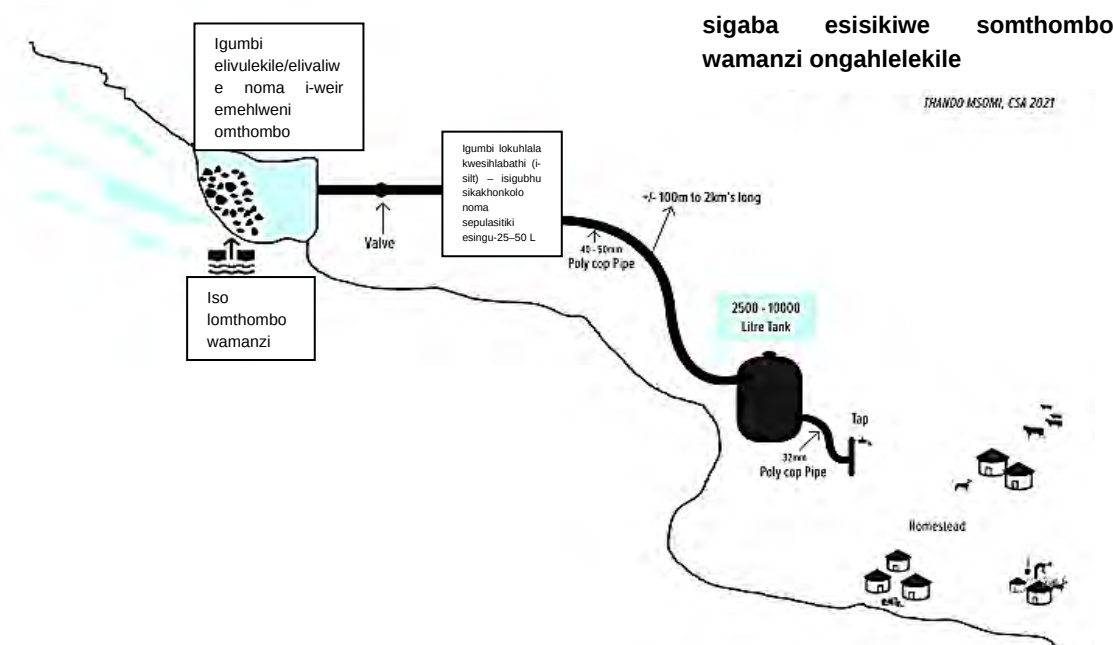
7.1.2 Izindlela zokuvikela imithombo ezingadingi ubuchwepheshe obukhulu

Imithombo/iziphethu zivela endaweni uma amanzi angaphansi ephusheka eza ngaphezulu. Lokhu kwenzeka kakhulukazi endaweni engasexhaphozini, emihosheni noma lapho kumfima khona amanzi. Iziphethu zingavela zibuye zinyamalale/ziphele, noma zihlale zikhona ubusika nehlobo, futhi zinamandla ngokungalingani. Ukuze uvikelwe umthombo, amanzi agelezayo kuwo kufanele angabi ngaphansi kwamalitha ayishumi-10 ngomzuzwana.

Ngokujwayelekile, imithombo evikelwe iba nalokhu: ihlo, indawo eyinzika, indawo lapho kuthathwa khona amanzi noma lapho egcinwa khona, impompi noma indawo yokukha. Izakhiwa zokuvikela ziyahluka-hlukana.

Ihlo ilapho amanzi ephuma khona emhlabathini. Indawo yokuthatha amanzi ivame ukwakhiwa eduzane nehlo. Indawo yokuzika ihlanza amanzi kunoma iyiphi inzika esuke ikhona. Ipayipi eliba maphezulu lithathe amanzi asehlanzekile liwakhipele ngaphandle, ipayipi eliba maphanzi lihlaza amanzi ethangini likhiphe inzika. Indawo yokugcina amanzi yona iyaye igcine amanzi noma iwayise ethangini elikhulu. Leli gumbi kufanele libe nokuchichima ukuze kugwemeke ukugcwala ngokweqile.

Zimbili izindlela ezingalandelwa, elandela uhlelo lokufakwa kuka V-box okuzodonswa kuwo amanzi , noma uhlelo lapho umthombo uvikelwa ngamatshe kuphela, kwakhiwe udonga okufushane lokugcina amanzi bese kuyabiyelwa.



Umdwebo olula okhombisa umthombo ovikelwe, indawo eyakhiwe lapho kukhona khona ihlo lomthombo, ilapho ehlanzwa khona inzika amanzi kanye nethangi lokuwagcina amanzi. (Rose, Mojela, Msomi, & Matandela, 2021)

Ukwakhiwa Nokuphathwa kwezinsiza zamanzi, nokusondezwa kwawo eduze nemizi kanye nezingadi kuyinto engenzeke nasemiphakathini emincane.

- Amaqembu asezingeni lomphakathi ayasebenzisana avumelane ngokuthi obani abazoba yingxeny (abangaphansi kwamashumi amabili-20), ekufanele babe ngabantu ababambe iqhaza ekulimeni futhi kube abantu abakhe ngokusondelana.
- Bayaye bakhombe isizinda samanzi esisendaweni, umthombo noma lapho kungambiwa khona ibhoholi bese becala kubahola bendawo ukusebenzisa leyondawo.
- Kube sekwakhiwa uhlelo lokuhambisa amanzi esuka esizindeni ayogcwalisa ithangi, bese ehamba ngokwehlela kwendawo aye emakhaya alabo abafanele kanye nasezingadini.
- Ikomidi lamanzi libe selikhanda futhi libeka imigomo yokuthathwa/ukukhiwa kwamanzi umuzi ngamunye, liphathe nokukhokhwa nokusetshenziswa kwezimali.
- Bonke abasuke beyingxeny balindeleke ukuth bakhipe imali yokuhlangabeza, balekelele ngokusebenza uma kufakwa amapayipi nokunye, futhi Bagade, banakekele lamanzi.
- Imvumo kufanele itholakale kubholi bendawo futhi kuhlelwe ukuthi ukunakekelwa nokulungisa kuzokwenziwa kanjani ukuya phambili.

Okudingekayo

- Imvula: >150mm/ngonyaka
- Amazinga okushisa: >5°C
- Ukuma kwendawo: noma eme kanjani
- umhlabathi: noma imuphi
- izizinda zamanzi; imithombi/iziphethu, amanzi angaphansi komhlaba

Ukufakwa/Ukwenziwa-

Imizi kanye nezingadi

- <0,1ha
- Izindleko eziphezulu, izinsiza ezitholakala endaweni nezivela ngaphandle
- Ukusebenza kanye namakhono; Isidingo soqeqesho nokwesekwa.

Ngezansi isibonelo sohlelo lokuvikelwa komthombo olwenziwa iqembu lomphakathi wase Ezibomvini e-Bergville. Kwagujwa idamu elincane lazungeza isiphethu, kwagqitshwa ipayipi ngaphansi kwalelidamu ukuze lidonse amanzi ahamba ngaphansi, bese ehamba ngamapayipi lamanzi (ahanjiswa ukwehlela kwendawo) ayongena ethangini elingezansi kwedamu.



isibonelo sethanga lapho kusuka khona amanzi aye emizini (ngokwehlela kwendawo)



Isibonelo somuzi oxhumile, leziziqomu ziixhumene futhi zinevalu emisa ukungena kwamanzi uma isiqomu sesigcwele kuloyomuzi.

Enye indlela ukwakwa u v-box Phakathi kodonga olwakhelwe ukuqoqa amanzi, kunokuthi kwakhiwe into evalekile ivalele ihlo lomthombo. Loku kuwumqondo omuhle uma ihlo lomthombo linokuqhamuka ezindaweni ezahlukane. Umsedlana wokuvimba amanzi agelezayo ukuthi angangeni angcolise amanzi ngaphakathi esizindeni uyaye umbiwe ngaphandle uzungeze umthombo. Lomsele kufanele uqhele ngamamitha ayisishiyagalombili noma ngaphezulu uma kwenzeka, ukusuka emthonjeni/emanzini. Lendawo kufane ibe isibiyelwa ukugcina izilwane kanye nabantu ngaphandle kwayo. ngezansi isibonelo sokuthi kwakhiwa kanjani, uhlelo lwalungela kanjani ukuvikela umthombo osexhaphozini, kanye nokusondezwa kwamanzi kubantu basendaweni yase Costone e Bergville, KwaZulu Natal. Kulesakhiwo, indawo yokuthatha amanzi yakhiwa yangaphakathi kodonga lokuqoqa amanzi, indawo engemuva kwaloludonga esadaminu yona yagcwaliswa ngamatshe yase ibiyelwa. Ngezansi isithombe esikhombisa lokhu



Ngenhla kusuka kwesokunxele kuya kwesokudla: umthombo ngaphambi kokuvikelwa e Stulwane e Bergville. Udonga lapho kuthathwa khona amanzi elino v-box ekhona elingezansi kwase kumbozwa ngamatshe nesihlabathi eduzane nehlo lomthombo. Ukwakhiwa kwamapayipi azokhipha amanzi ngaphandle uma sekugcwele, umthombo osuvikelwe wabiywa nangofenisi.

Ipayipi elithatha amanzi ku v-box owakhelwe odongeni oluqoqa amanzi liwahambisa ngokwehlela lize liyowafaka emathangini. Ziningi izindlela ezinga setshenziswa. Kulesibonelo sase Costone e Bergville, kwakhiwa ngokhonkolo indawo eyisendlalelo samathangi amabili awoJoJo axhumene, ayizi-2500 wamalitha. Amapayipi abe esehambisa amanzi kompomp abane, ukuze abantu abayingxenye yaloluhlelo bakwazi ukufinyelela kalula emanzini (bahambe ibanga elingaphansi kuka-200 wamamitha).



Ngenhla kusuka kwesokunxele kuya kwesokudla: ukwakhelwa kwamathangi indawo yokuhlala ngo simende. Amathangi amabili ayizi-2500 wamalitha axhumene, ukumbiwa kwemisele nokufakwa kwamapayipi aya kompomp. Isibonelo sompomp womphakathi uma sekuqediwe.

Lezi zinhlelo zamanzi ezibhekelelwe umphakathi (amanzi okuzifakela) zithintwa kakhulu ukuma kwendawo, Amandla esiphethu noma omthombo kanye nebanga phakathi komthombo nemizi. Kubalulekile ukuqinisekisa ukuthi lezi zinhlelo zakhiwe ngendlela yokuthi zinikeze umthamo owanele wamanzi (100–500 amalitha ngosuku) emakhaya abamba iqhaza, futhi umphakathi wonke uqonde ukuthi lo mbono uhlose ukwakha uhlelo lwezinhlelo ezincane ezihlinzeka amanzi emizini ethile kuphela – kodwa ngendlela yokuthi ekugcineni wonke amakhaya athole amanzi, kusetshenziswa imithombo ehlukenene. Loku kwenzelwa ukuthi kube lula ukulawulwa kohlelo, kunokuthi kube into kawonke-wonke. Imithombo esuke ivikelwe isala ivulelekile ukuze umphakathi ngobubanzi bawo ukwazi ukuyisebenzisa, lokhu kufanele kufakwe ohlelweni. Ngaphezu kwalokho, ukuhlelwa kwezindawo zokuphuza izilwane nakho kuyinto ebalulekile okumele ifakwe kulezi zinhlelo. Amakomidi amanzi adlala lendima ekubhekeleleni ukusebenza kwamanzi:

- ukungenelela kunoma iyiphi inkinga evelayo ephatha uhlelo lwamanzi
- Ukulungisa inkinga yalabo abangayilandel iimigomo nemibandela (ukubabuyisela endleleni)
- Ukulawula ukwabelana kwamanzi nokuqinisekisa ukuthi labo abafanele bayawathola amanzi.
- Ukuhlola njalo ukuthi ingqala-sizinda yamanzi isasebenza ngendlela futhi nangokufanele.
- Ukuvula i-akhwunti yasebhange ezogcina imali ezobhekela ukulungisa okungase kudinga ukulungiswa okuphathelele namanzi.
- Ukubiza imihlangano yokubika mayelana nezinto eziphathelele nokusebenza, izinkinga, ukulungiswa kwezinto zamanzi, kanye nokuthola imvumo yokusebenzisa imali yeskhwama ukwenza izinto ezithile zamanzi.

7.2 UKUVUSELELWA KWAMAXHAPHOZI

Ixhaphozi indawo ehlenganise indawo izinto zendawo eyomile kanye nezasemanzini, lapho khona amanzi ehlala phezulu/eduzane noma indawo ihlale imbozwe amanzi angashoni futhi kunezimila ezikhona.

Amakhosi omfula nalawo angaphandle komfula atholakala ezindaweni ezinezintaba. Amaxhaphozi angekho Emfuleni aba notshani nomhlanga nezinye izimila ezithambile koda awekho amanzi amile abonakalayo khona. Amaxhaphozi omfula wona atholakala emachibini amancane amanzi aseduze nezizinda zamanzi.



Isibonelo sexhaphozi elingeko emfuleni, elihlangene kahle futhi elincane- liba nezimila ezinhlobonhlobo kanye namanzi ngaphansi.

Amaxhaphozi abalulekile ngoba: ahlanza amanzi, agcina amanzi:

alawula izikhukhula kanye nesomiso kuleyondawo, avumela ukukhula kwezimila zemvelo abe yindawo yokuhlala yezilwane, Anezinsiza ezingasetshenziswa abantu futhi abalulekile ezintweni zenkolo kanye namasiko.

Ukusetshenziswa ngobuhlakani kufaka ukuwonga asebenze ngokwemvelo, ebe futhi esetshenziswa ngabantu endaweni. Kuba ukusebenziswa okunebhalansi okugwema ukuphazamiseka kwamaxhaphozi.

Isibonelo sodongwa olwakhekayo endaweni eyizintaba enamachitshana amaxhaphozi omfula ngenxa yokusetshenziswa ngokweqile kwayo kanye nokushiswa njalo ngomlilo.



Ukwenziwa

Ukulawulwa kwezinsiza zemvelo: ukulawula ukuguguleka komhlabathi

- 0,1-1ha >1ha
- Izinsiza ezitholakala endaweni
- Umsebenzi wezandla kanye nolwazi olwanele.

Imizamo yokuvuselela ifaka ukwenza izivimbelo lapho kugijima khona amanzi, izinto ezenzelwe ukuvimba ukuguguleka kwenhlabathi, ukususwa kwezimila zokufika, ukunciphisa ukushiswa komlilo nokudlisa ngokweqile emadlelweni. Ukuqala ngaphezulu/ngenhla exhaphozini kuwumqondo omuhle. Ngezansi isibonelo somhosha onechibi lexhaphozi ogugulekile, ozanywe ukuvuselelwa kusetshenziswa izindlela ezahlukene: amatshe atakwe ndawonye, udonga olwakhiwe ngamatshe, ukwembozwa kodonga ngokuyinethi njengengubo, kanye nokubiyelwa.

Lesthombe esiseceleni
sikhombisa
1.unqenqema
lomfudlana
olugugulekile
nexhaphozi elincane
ebusika, ukudlisa
imfuyo ngokweqile,
nomonakalo odalwa
ukshiswa komlilo.
2.ama eco champs
ekhanda unqenqema
lwamatshe
ongqengqemeni
lomfuna, 3.umphumela
oku amadanyana
anciphisa isivinini
nomfutho wamanzi
kanye nokumuka
kwamatshe aye
ezansi.



Ukwakhiwa kodonga
lwamatshe eduze
nodonga lomfudlana
ukuzama ukunciphisa
ukubhidlika
kwenhlabathi iwele
onqengqemeni
lalomfudlana.



Lesithome esiseceleni
(sokuqala) sibonisa
unqenqema
olubhidlikayo
lomfudlana,
esilandelayo sibonisa
umzamo wokuvimba
ukuguguleka-
ngokumboza
njengengubo udonga
lolu oluwayo ngenethi,
loku kunciphisa isivinini
samanzi, kugcina
inhlabathi ibambekile
endaweni eyodwa,
kuvikele nembewu
ukuthi ingamuki, futhi ibe
ivumela amanzi



nokukhanya ukuthi kungene ukuze izimila zikwazi ukukhula.
Lendawo yabe isibiyelwa ukuvimba imfuyo ukuthi ingagxobi yenze umonakalo.

7.3 AMADAMU OKUQINISA

Idamu lokuqinisa liyidamu elincane, elakhelwa isikhashana noma unomphela, elakhiwa ngaphesheya kwemisele yokudonsa amanzi noma emifuleni emincane, ngenhloso yokunciphisa ukuguguleka komhlaba, ngokwehlisa isivinini sokugeleza kwamanzi ukuze kube lula ukuthi udaka oluncane nenzika ihlale phansi. Loku kungakhiwa ngezinto ezahlukeni ezitholakala kalula ezifana nenhlabathi, amatshe, izinkuni kanye nezimila.

Njengoba udaka lwakhelana ngemuva kwedamu, kungakhethwa ukuphinda kuvuselelwe idamu, liphakamiswe idamu liye phezulu, noma kutshalwe utshani nezinye izitshalo kule ndawo eyakhela inhlabathi ukuze kuqine lezi zakhiwo. Amadamu okuqinisa akhiwa ngokubeka amatshe amakhulu ngaphansi ekuqaleni komsele oqala onqengemeni olukwesokunxele kuya kulolu olukwesokudla.



OKUDINGEKAYO

- Imvula: engaphezu kuka-150mm/ngonyaka
- Izinga lokushisa: elingaphezu kuka-5°C
- Ukuma komhlaba: phakathi kuka-5% no-25%
- Umhlabathi: zonke izinhlobo zomhlabathi – lapho amatshe nedwala kutholakala kalula

UKUSETSHENZISWA

- Ezingadini, emasimini
- <0,1ha; 0,1–1ha; >2ha
- Izindleko eziphansi, kusetshenziswa izinto ezitholakala endaweni
- Kudinga umsebenzi omningi wezandla

Izibonelo ezimbili zamadamu okuqinisa

1. Kubonisa ukuthi idamu lokuqinisa lakhelwa kanjani ogwini bese lakhiwa ngezikhawu ezilinganayo phakathi komsele omkhulu.

2. Kubonisa ukuthi inhlabathi yakhelana kanjani ngemuva kwedamu lokuqinisa, bese yenza kube lula ukuthi kutshalwe kabusha izitshalo.



7.4 UKUTAKWA KWEZINTING/KWAMAGATSHA EZIHLAHLA

Lena enye indlela yokwakha into yokuvimbela engenisa umoya kwikhontolo ukuze kuncishiswe ukuguguleka komhlaba. Le ndlela iyasiza kakhulu ezindaweni lapho amatshe engatholakali kalula. Uku izintingo kuhlenganisa ukusebenzisa izinto zokhuni ezindaweni ezigugulukile kanye nasemigqeni emincane (small gulleys) ukuze kuncishiswe ukugeleza kwamanzi, kwandiswe ukuqongeleka kodaka (sedimentation) futhi kuvumele ukutshalwa kabusha kotshani. Udaka luyaqongelela ngemuva kwezinqwaba zezintingo, futhi imbewu ingatshalwa kulezi zindawo ukuze kuqiniseke umhlabathi.

- Isinyathelo sokuqala ukulinganisa imiphetho yomsele/yodonga bese kususwa izihlahla ezincane nezihlahla zasendle.
- Emva kwalokho kusetshenziswa ithuluzi i-A-frame (unxantathu owenziwe ngamapulanga) ukumaka imigqa ye-khontolo, ngokuhlukana ngobude obungaba ngu-1m, ngokuvamile kuhlukaniswe ngamamitha angu-4 kuya ku-5.
- kufanele kusetshenziswe amagatsha omthola osusiwe. Kufakwa imigqa emibili yezikhonkwane emhlabathini, ngokuhlukana okungaba ngu-30cm phakathi kwazo, emgqeni we-khontolo osukaliwe. Lezi zikhonkwane zisetshenziswa ukubamba amagatsha, atakwa phakathi kwazo.



Ngaphezulu: Izithombe ezikhombisa ukulinganiswa komphetho wonqenqema, bese kufakwa umugqa wezikhonkwane kwi-khontolo, kugcwaliswe ngamagatsha avela ezihlahleni zomthola osusiwe. Isithombe esingezansi ngakwesokudla: Sibonisa amagatsha lawa atakwe ndawonye ngemva kwesikhathi esithile, lapho ukwakhelana komhlabathi sekuqalile.

7.5 UKULUNGISWA KWEZINDLELA

Izindlela ezisendaweni eyizintaba noma ezisemaxhaphozini zivame ukuguguleka ngokuhamba kwesikhathi ngenxa yokusetshenziswa kakhulu. Izixazululo ezingokwemvelo ekwakheni kabusha izindlela ukuze kuncishiswe/ kugwenywe ukuguguleka komhlaba zifaka lezi ezilandelayo:

- Ukubekwa kwamatshe: indlela iguqulwa ibe yizitebhisi ngokumbela amatshe kuzo izindlela, yenziwe ilingane ngaphezulu.
- Izindlela eziphendulelwe umhlabathi: Ezindaweni ezonakele lapho kwakheka khona izindlela eziningi ezincane nemisele, umhlabathi uyambiwa bese kubekwa owangaphansi phezulu, kwakhiwe umzila ophakeme onemisedlana yokukhipha amanzi ezinhlangothini zombili.
- Izivimbelo zamanzi: Lezi yizigodo ezifakwa ku engela ka-30° ngaphesheya kwendlela, futhi kwakhiwa umsele omncane wokukhipha amanzi ngaphezu kwazo, ukuze amanzi aholelwe ngaphandle kwendlela ngokuphepha.

Okudingekayo

- Imvula: engaphezu kuka-350mm
- Ukuma komhlaba: phakathi kuka-1,5% no-25%
- Umhlabathi: zonke izinhlobo zomhlabathi – nakuba imihlaba enesihlabathi esiningi kakhulu noma enodaka oluningi kakhulu kunzima ukuyisebenzisa.

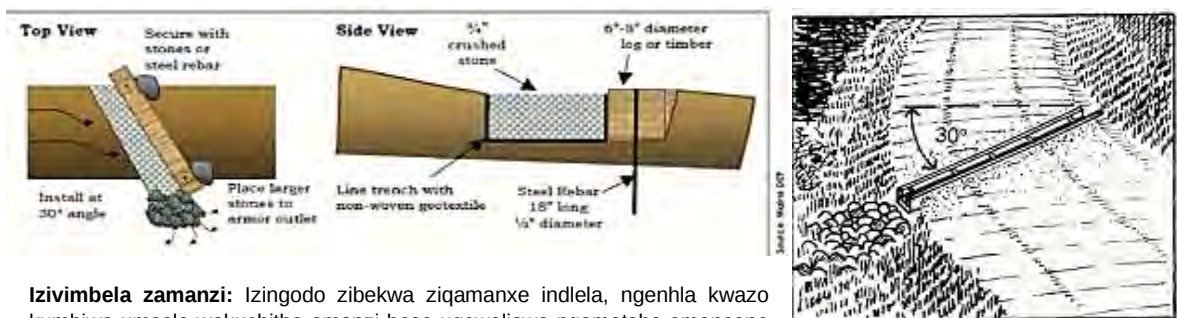
Ukusetshenziswa

- Ukuphathwa kwezinsiza zemvelo: ukulawula ukuguguleka komhlaba
- 0,1–1ha; >1ha
- Izindleko eziphansi, kusetshenziswa izinto ezitholakala endaweni
- Kudinga umsebenzi omningi wezandla

Ukubekwa kwamatshe- Ukwakhiwa kwezitebhisi ezindleleni ezigugulekile. Lokhu kungadinga ukuthi kucentwe kancane umhlabathi kanye nonqenqema lwendlela ukuze kwakhiwe indawo ecishe ibe bushelelezi, enokwehla okulingene, lapho indlela ehamba khona. Kumele futhi kususwe lezo zindlela ezincane ezisuke zakhiwe ngenxa yokuhamba kakhulu kwabantu noma izilwane.



Izindlela eziphendulelwe umhlabathi
Zakhiwa ezindaweni ezonakele kakhulu noma ezindaweni ezimanzi ngesikhathi esithile sonyaka



Izivimbela zamanzi: Izingodo zibekwa ziqamanxe indlela, ngenhla kwazo kumbiwa umsele wokuchitha amanzi bese ugcwaliswa ngamatshe amancane kanye negrabuli. Ngaphansi kwalesi sakhiwo kwakhiwa indawo eqinisiwe yamatshe ukuze amanzi ageleze ngaphandle komzila ngokuphepha.

