

CHAPTER I

COMPONENT 1-2:

1. VERMI COMPOST PIT.

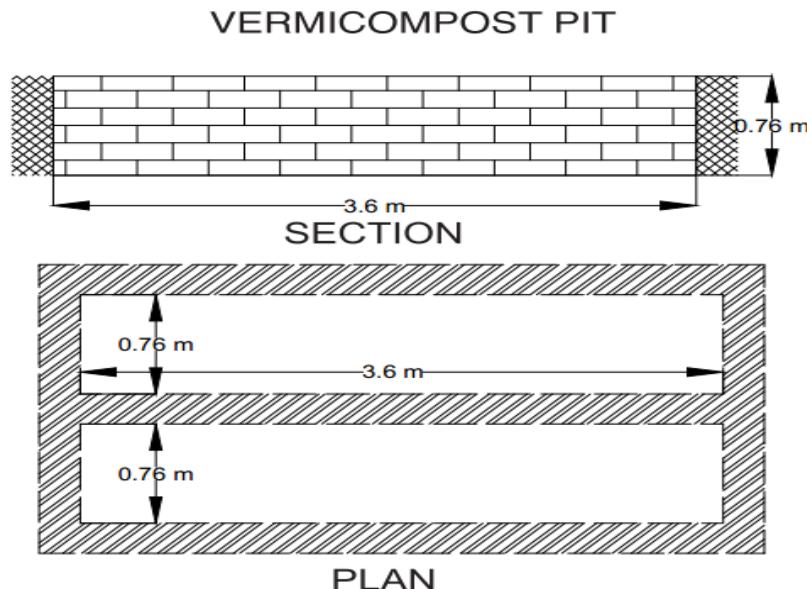


Figure 1:
Vermicompost pit

Vermicompost pit pakhatah hian Leitha Kg 150 zel a chhuak thei a, chu chu 0.25 hectare a zau chawm thei tawk khawp a tam ani.

A hmun thlan thu (Site Selection): A siamna hmun tur thlan dan turah chuan NADEP in a lo duan sa tawh ang khi a ni.

A siam dan tur: A tlangpuiin Vermicompost pit hi Khur khat, hmun hniha thenhran/pindan a ni a, a Pindan pakhat len zawng tur chu 3.6m X 1.5m X 0.76m (A sei zawng 3.6m, A zau zawng 1.5m leh A thuk zawng 0.76m) a ni. Pindan pahnih te daidan na hi tiphui vek lovin, pindan pahnih a kalkual vel theihna turin Changpat vah tlang theihna tur kua siam tur a ni.

A siam man (Estimated Cost):

Vermicompost pit siam man hi Pindan pakhat ah Rs 9150 hisap a ni a. Unskilled labour leh Material ratio chu 25:75 a ni.

Beneficiaries te tana hriat tur:

- *Changpat chaw:* Thlai thar seng tawhna chuangbang te, Thing hnah leh Ran Ek te hi hi Vermicompost pit atana kan mamawh bulpui ber an ni a. Fu her tawhna fe (Fu-fep) te, Thlai chi hut (chhia), hedge cutting (Pangpar chehrual leh Thing zar thlakna nawi te), Phuai te, Favai te, Ran ek te, Bio-gas plant thli te, Beram, Sakawr leh vawk zun leh ek te, Ar ek (tlem te) leh Thlai rah tawih te **te** hi Changpat chaw tha tak an ni.

A sawngbawl dan tur (Preparation of Vermicompost bed):

- Step 1: A hnuailam 10cm a chhah chu Favai, Fu-fe leh Buhpawl (Agricultural Waste) ang chi chawhpawlh a chap tur a ni a. Chumi chungah chuan Lei phul chhuak veikin Tui a tih huh thet thet tur a ni.
- Step 2: Thlai hnah leh rah bangnawi (Organic Waste) te chu Bawng Ek leh Tui nena inchawhpawlh tawk chauh a siam tur a ni. Bio-gas plant atanga tui/thli lo chhuak hi Vermicompost siamna atana pawlh tur tha berte zing a mi a nih avangin hmuh mai tur a awm chuan tih tel ngei ngei tur a ni. Ni 4 atanga Ni 5 dan zelah vawi 2-3 chawhlet thin tur a ni.
- Step 3: Khur ah chuan Changpat dahluh tur a ni a, Organic Waste chawhpawlh chuan vur tur a ni. Duhthusamah chuan, a chaw Kg 400 zelah Changpat 2000 dah tur a ni.
- Step 4: Buara in khuh tur a ni a, a khat tawkin Tuia tih huh reng thin tur a ni. Tichuan ni Sawmruk (60) hnuah chuan thil chawhpawlh te kha Vermicompost ah an lo chang tawh ang.
- Step 5: Vermicompost chu lakchhuaha, Sarang/Thelretpuan chunga chap darh a, Darkar 2-3 chhung pho ro tur a ni. Tichuan Changpat te chu a hnuai lamah an lut anga, changpat awm lohna a chunglang chu lakkhawm tur a ni. Changpat te chu uluk taka lakkawm leh bawk tur a ni.

Fimkhurna tur te (Precautionary Measures):

- Khur chu a hnuai lam/mawng lamah Tui a lut thei a, a huh leh lutuk emaw, Tui a tam lutuk emaw a nih chuan Boruak tha a awm lo anga, chu chuan a chhunglam boruak nihphung pangai tur chu Acid emaw Base level (pH) ah a siam anga, Changpat rihna te ti tlahniamin an nih tur ang a ni thei lo thin a ni. Khur chhunga Tui lut tur ven nan hian Tuiluankawr tha tak siam tur a ni a, tin, a khur ko tihsan hret emaw pawh a pawi lo ani.
- Khur chu Fangmir te, Tlumpi te, Tit/Ketaminu te, leh Utawk te, Sazu te, Zawte te, Uí leh Ar te an luh lohna tur leh an tihchhiat loh na turin ven tur a ni.
- Bawng Ek tharlam chuan Lum leh Sa a siam theih avangin Mit lawnga hmuh theih loh Rannung (Micro-Organism) te tan harsatna a siam thei a, hman miah loh tur a ni.

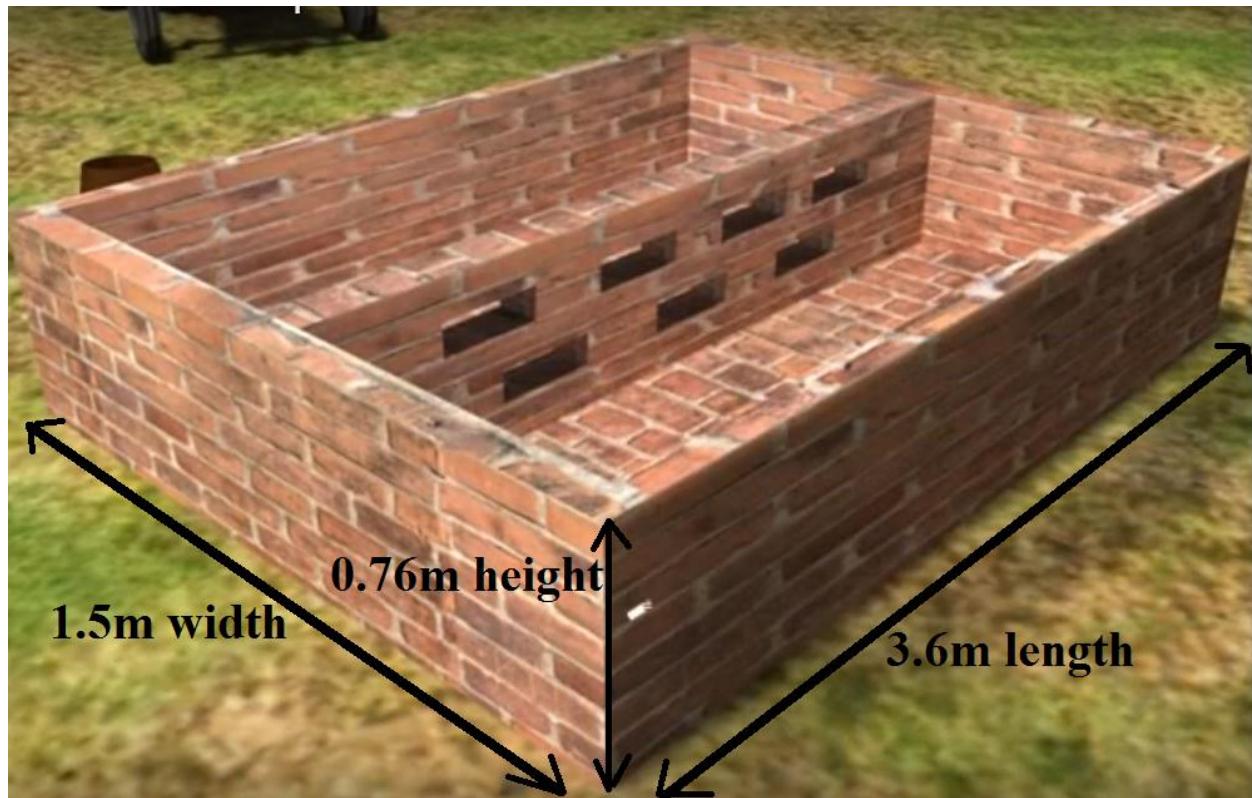


Figure 2: Vermicompost pit.

2. NADEP COMPOST PIT:

NADEP COMPOST PIT

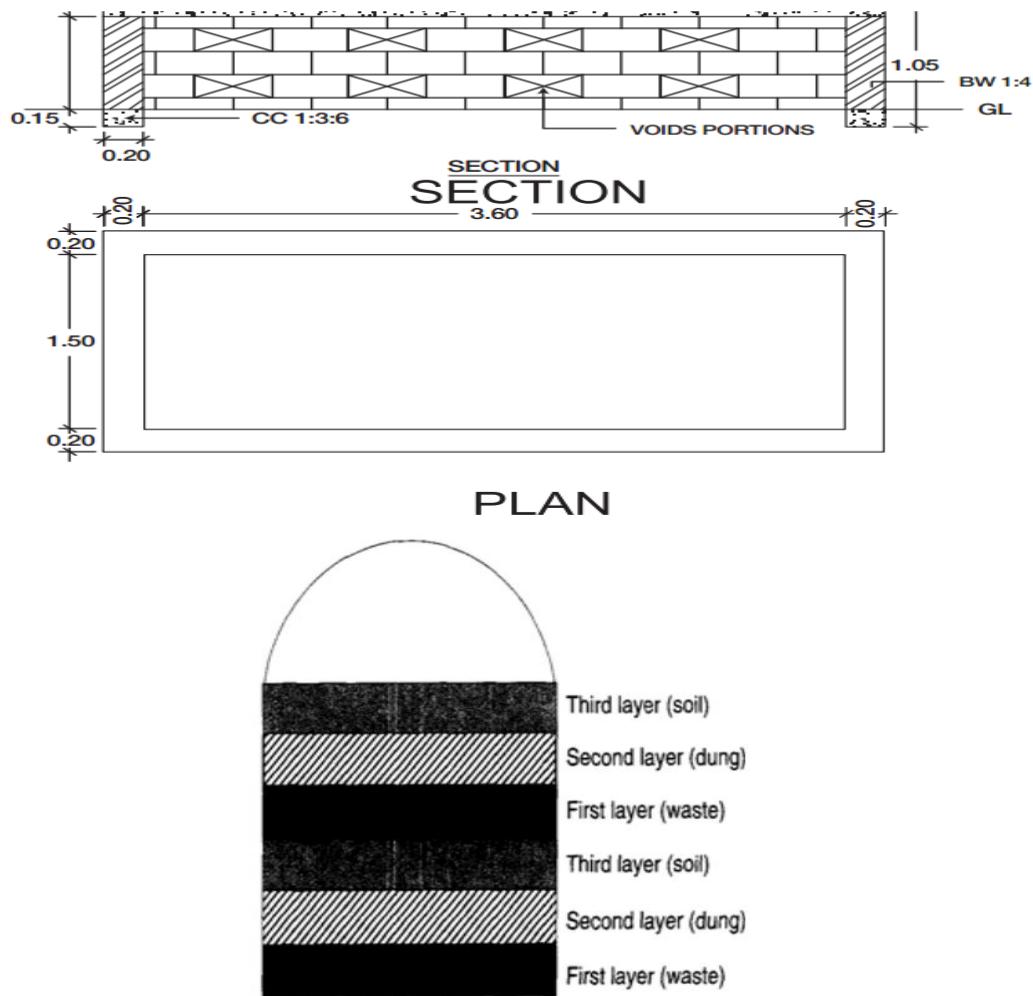


Figure 3: Nadep compost pit

Site Selection:

- A awmna hmun chu Tui awlsamana hmun leh Thlai hnah leh hnime hnah tawih thei te, Ran ek leh thli awlsam taka hmuh theihna hmun a ni tur a ni.
- Ram buai leh midang hmun hma nilo, A ram neitu emaw Gram Panchayat/ Village Council emaw ten an remtihpuina hmun a ni tur a ni.
- Ruah sur lai leh Fur laia Lei chet theihna hmun, hmun nghet lo a ni tur a nilo.

Design and Estimate for NADEP Pit:

- NADEP Pit len zawng chu a len zawng 3.6m X 1.5m X 0.9m (A dung x A Vang x A san zawng) a ni tlangpuia, a bang chu Brick (Leirawhchan) nghet taka rem a ni a, a tawih hma theih nan boruak mumal taka dawng thei a ni bawk tur a ni.

- Estimated cost: NADEP Pit siam nan hian Rs 8000 vel a ngai a. Unskilled Labour leh Material Ratio chu 25:75 a ni.

Instructions for the Beneficiaries:

- Huan thlai rah leh hnah tawih (A ro emaw a hring emaw) Kg 1300-1500 lak klhawm tur a ni a, Bawng ek emaw Biogas ekchhia emaw Kg 100, Lei dip tha Kg 150 – 180, leh Tui Litre 1200-1400 te chawhpawl tur a ni.
- Khur Hnawkhah dan(Pit Filling): A lem a lantir ang hian Agricultural waste, Bawng ek leh Lei dip te hi a indawt dan zel hian a inchhawk in rem chhoh tur a ni. Ni 20 atanga Ni 30 ah chuan a lo tawih tan tawh a. Chutiang hunah chuan nem muk a, a chunga sawi taw hang tho khian hnawh khah leh vat thin tur a ni. Hetiang hian thla thum chhung thleng chu a tih theih a. Ni 7 atanga Ni 10 inkar vel apiangin Tuiin tih huh thin tur a ni.

Hriat tur pawimawh te:

- A hu kalral nasa lutuk tur ven nan Di emaw, Buhpawl emaw in a chung siam tur a ni.
- Khur chu hnawh khah hmain a chhung lam bang chu Bawngek tuia zut chhuah vek tur a ni. Chu chuan a ei tawih tu tur hrik te inthlahpun ns tur a pui dawn a ni.
- Engvang mahin khi (Cracks) a awm tur a nil ova, chutiang a lo awm a nih chuan Tui nena chawhkawi in char phui vat thin tur a ni.
- Khur chu vawi khat chhilh ah (Ni khatah) chhilh khah nghal tur a ni a, Chhilh khah chhung hi Ni hnih (Darkar 24) aia rei a ni tur a nilo.

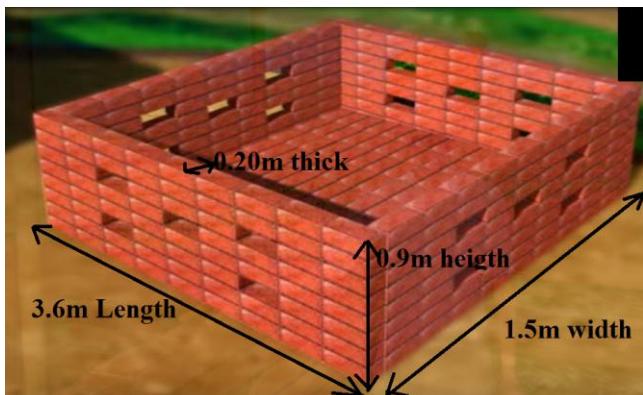
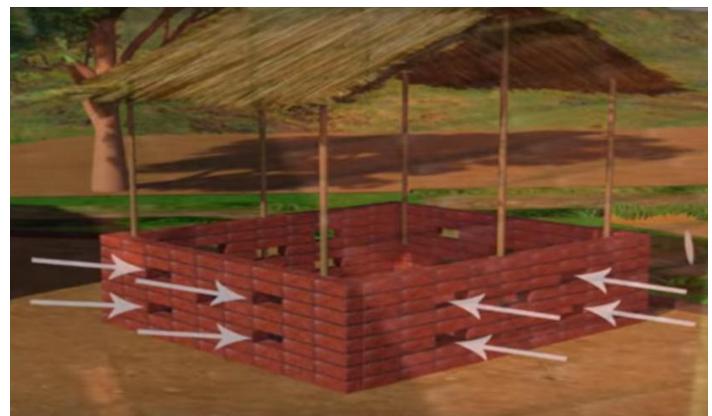


Figure 3: Nadep compost pit.



3. AZOLLA:

Ran chaw atana tha Azolla

Azolla chu Katchat chikhat, Tui chunglang a to thin a ni a, Patek ang deuh a ni. Amino Acid leh Protein a pai avangin Ran chaw atana tha tak a ni. Kuang a neih loh avangin Pai tawih a awlsam a, Protein a pai hnem avangin a hrisel a ni. Tin, Ran hnute leh Sa (15-20% in) a ti thianghlimin a ti tam a bawk a ni. Leitha atan hman a ni bawk. Khur 5ft X 8ft a zauah hian Azolla 1-1.5 Kg theng a awm thei a, chu chu Ran pakhat tan pawh a tawk hle a ni.

A siamna hmun tur: A awmna hmun chu Tui leh Ran vulhna atanga hla lo, Tui awlsamna hmun a ni tur a ni.

A siam dan leh Senso: A bang zau zawng chu pawnlam atanga tehin 2.75m X 1.75m X 0.75m a ni a, a bang chhunglam atanga teh chuan 2.5m X 1.5m X 0.6m a ni.

A siamna senso: Azolla Pit siamna man hi Unit khat zelah Rs 2,200 vel a ni a. Unskilled Labour leh Hmanraw man ratio chu 30:70 a ni.

Beneficiaries te hriat tur pawimawh: Azolla Tank siamna tura pawimawh te chu a hnuai a mi te hi a ni:

- A khur mawngah chuan Leitha dip 10-15 Kg rual taka chap darh hmasak tur a ni.
- Tui Litre 10 ah Bawngek Kg 5, Azophos 40 grams leh Azofert 20 grams te uluk taka chawhkawi tur a ni a, chu chu Khurah chuan leih luh tur a ni. A tih tam na turin Khurah hian Tui pawlh belh theih a ni bawk.
- Azolla chi tharlam leh hrisel tha, Kg 1 emaw Kg 2 emaw vel chu Khurah chuan kui tur a ni.
- Ni 10 dan zelah Khur chhunga Tui Hmun 4 a thena Hmun 1 vel chu paih chhuah a, Tui tharlam a thlak thin tur a ni.
- A chung a mi ang tho hian Thla hnih dan zelah a Lei (Sand) hmun 5 a thena hmun 1 chu paih a, a thar a thlak thin bawk tur a ni.

Jimkhurna tur thil te:

- Azolla chin na hmun chu Ni sa in a en tur a nil ova, Daihlimin a khuh kim vek tur a ni.
- Inchi khat vela Leitha dip chim tawkin Tui a tling reng tur a ni.
- Azolla chu rannung/hrik in a ei a nih chuan a vaiin paih vek a, a thar a thlak leh vek tur a ni. Thlai leh hnime dang tiak tur leh pung tur chu ven tlat tur a ni a, an puitling hman tur a nilo.
- Tho leh Rannung a tih pun loh nan Azolla chu Ran ei tir dawnah Bawngek rim a nam loh nan fai taka sil thin tur a ni.

Watch <https://www.youtube.com/watch?v=CTQ-pfmsD8o> for azolla tank

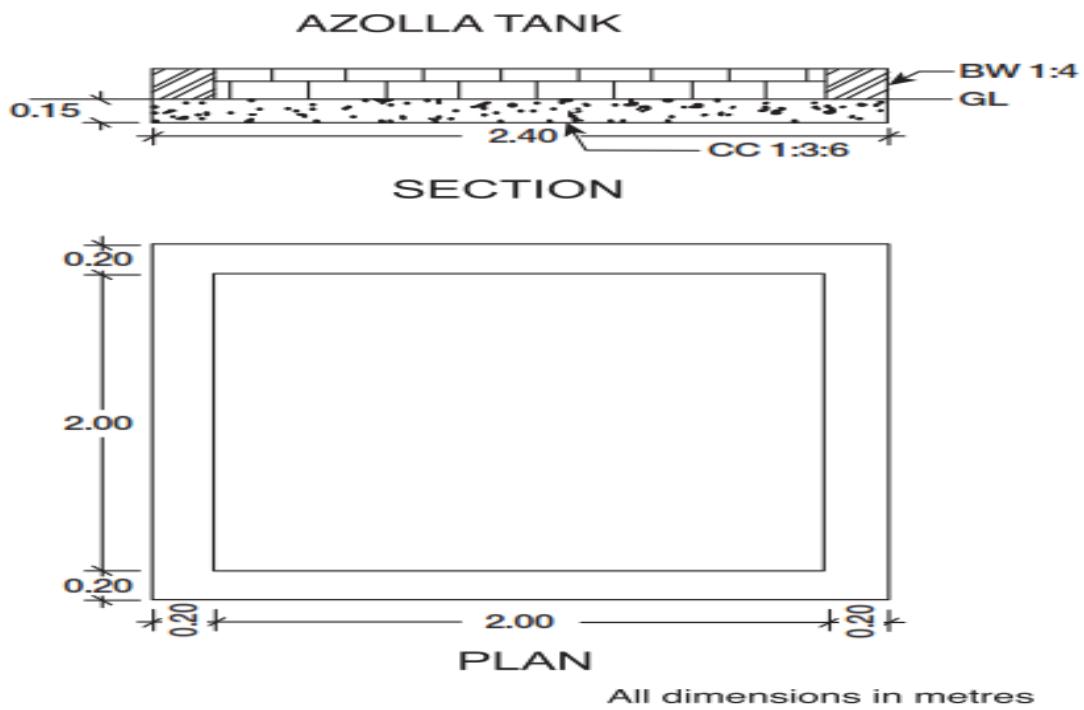


Figure 4: Azolla tank.

CHAPTER II

COMPONENT -3-4

1. FARM POND/DUG OUT/FISH POND:



Figure 5: Dugout Farm pond.

A hmun thlan dan :

- DOP chu huan khawihmunah pawh siam theih a ni a. Dil in tui a khawl theih zat chu ruahui tam zawng atanga chhut tur a ni a, huanthlai chawm zo thei tura ruahman tur a ni.
- DOP chu huan thlai hnai thei ang ber, tlawm si leh awlsam taka hman theih tur hmunah siam hram tur a ni.
- DOP laihna hmun chu 2% aiin a awih tur a ni lo.
- DOP laihna hmun chuan a tui dawn khawlna area chu 5ha aiin a zau tur a ni lo.
- DOP laihna hmun chuan tui hip theilo lung chhuat chu metre thum hnuai chinah a nei ngei tawh tur a ni.
- Tui 10cm a sang a hectare khat chawm tur hian 1000cum tui mamawh a ni a. Tui Mamawh zat = Tui in a chawm tur zau zawng x tui in a chawm thuk zawng = 1 hectare x 10 cm = 10000sqm x 0.1m = 1000 cum. DOP dimension tur chu 25m x 20m x 2.5m niin hemi size hian 1000cum tui a khawl thei dawn a ni. He DOP hian 25m x 20m = 500 Sqm hmun hectare khat **atang** a awh dawn a, hemi avang hian 5% model tih a ni.

DOP siam dan :

- A chunga **tar lan** tak ang hian a hmun thlan theih ni se.
- A hmun tur **thlan fel ah** chuan a laih dan tur ruangam fel taka duan ni se.

- Kan lei laih chhuah chu dil ko a atang meter 2 atang a metr 3 a hlaah dah ni se. Hemi hmun awl hi Berm tih a ni.
- Lei laih chhuah chu lei tha a nih chuan huan thlai hmunah theh darh emaw sem rual tur a ni.

Hriat tur tul te:

- Lei nawi tling khawm tur veng turin tui luankhawmna dil hnar te chu tha taka siam leh tih fai tur a ni.
- DOP chu tui luanglai emaw lui luang lai hmunah siam loh tur a ni.
- Loneitu tui lakna engmah dang neilo te chu ngaihpawimawh hmasak tur a ni.
- Tui dah khawl na atan chuan dil chu thuk apiang hi a tha a ni. Hei hian dil hmun luah a ti zim a thlai china hmun awl a tam phah zawk a ni.
- A chhuat, a bang leh a tui luan chhuahna te chu lung hmanga ven tur a ni a, hei hian lei luangral tur a veng dawn a ni.

DOP Ruahman dan:

Zawhna: Lo neitu huan chu 2 hectare a zau a ni a, thlai chin na atan a tha tak a ni a, thlai chawm khawp tura tui mamawh zat chu engtia tam nge ni ang?

Chhanna :

Huan zau zawng chu : 2ha

Tichuan 1 ha = 10000 sqm tih kan hre bawk a.

Chumi a nih chuan, 2 ha = 20000 sqm

Tui thlai kham khawp 10cm a thuk chawm tur chuan tui 2000 cum kan mamawh dawn tihna a lo ni a, a chhan chu

20000sqm x 0.1m = 2000cum

Tichuan DOP size chu 40m a sei 20m a zau leh 2.5m a thuk a trul dawn a ni.

2. COMMUNITY FISH:

VANTLANG RAM A HUNBIK NEI A TUI TLINNA HMUN A SANGHA KHAWI

Sangha khawi hi mirethei te tan eizawnna awlsam taka ni thei a ni. MGNREGA hnuai a tui khuah leh ruah tui khawlna siam hrang hrang te hi sangha khawina atan an tha tawk em em thin a ni. Hmun then khat ah chuan fur lai leh ruahsur hun lai hian tui a tling khawm tha thei hle a, heng hmun te hi sangha khawina tlak tur a, cheibawl niin vantlang ramah a sangha

zawrh chhuah tham tum 3 atanga tum 5 lai a thar thei a ni. Fisheries culture thiamna hmang tangkaiin tui 100mm chunglam ah sangha no 500 – 1000 chu hectare khat zelah dah theih beisei a ni. Heng tui tling te hi mumal taka enkawlin a tui luan chhuahna mumal tak siam bawk tur a ni. Dil 500cum leh 15000 cum dil sangha phorona hmun 30sqm hi Rs. 11 lakhs man vel a ni. A tlangpuuin he hna hi Rs 75 per cum zel laih man a ni. Labour : Material ratio chu 80:20 a ni.

He hna hi thil tih mai harsa tak a ni a, mumal taka ruahman a ngai a, vantlangah lungruual tak leh zirtirna mumal tak neih hnuah siam chi a ni.



Figure 6: Community fish pond.

3. STOP DAM:

Stop dam hi tui luang lai hnar nei tha kumtluana luang ang chi ah hian siam thin a ni. Fur ruah tui luang ral mai tur lo ti muang a, hun rei zawk hman theih tura lo dang chat tu a ni. Fur ruah tui tam lai chuan tui luan chhuahna gate chu hawn thin a ni a, hemi hian lei nawi tuikhuaah chhuata tling khawm tur a ti tlem a ni. Fur ruah tui a zawk hnu chuan gate chu khar leh niin, tui chu a in khawl tha leh in a lo khat leh mai thin a ni.

1 hectare ram a tan hian stop dam chu 20m a sei, 2.7 a thuk, a chung zawl 1.5m leh a bang slope 1:1 size hi a tawk thawkhat viau zel a ni. Hei hian Rs. 5lakhs vel man a ni. Tui a khawl atanga teh a Cum rate chu Rs. 90-100 a ni. Stop dam hi lung rem emaw brick hmanga siam theih a ni a, heng hmanrua te hi awlsam taka hmuh leh hman theih a n ni tur a ni. Gate atan hian Pre frabricated metal hman tur a ni. Labour: Material ratio chu 25:75 a ni.



Figure 7: Stop dam.

CHAPTER III

COMPONENT -5-6

1. TERRACE

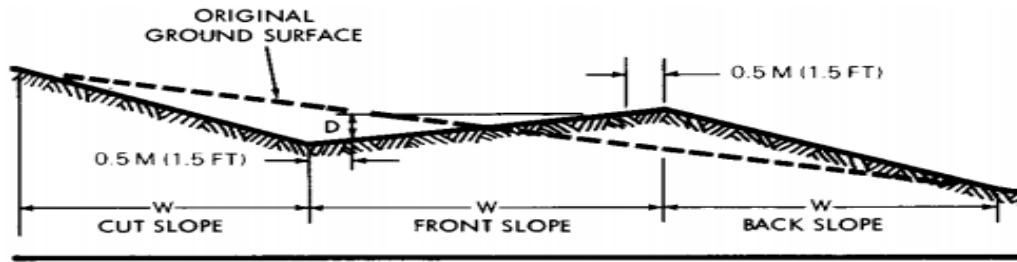


Figure 1 – Broadbase terrace cross section[†]

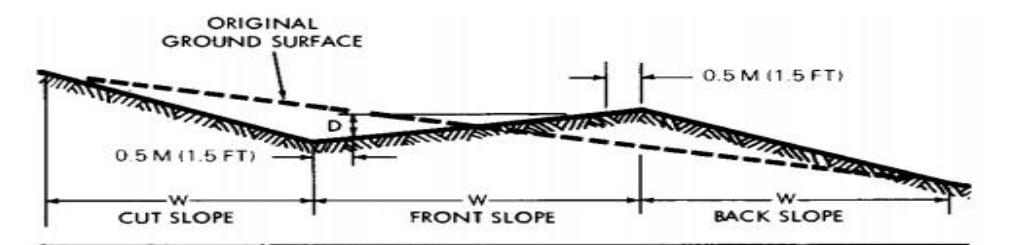
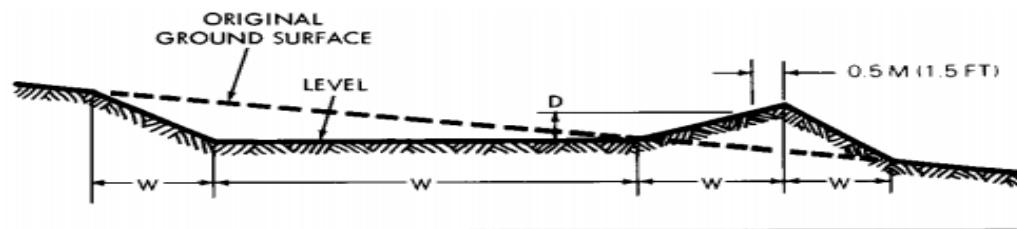
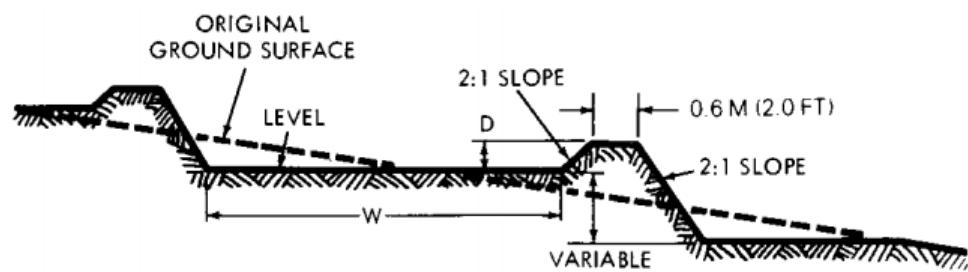
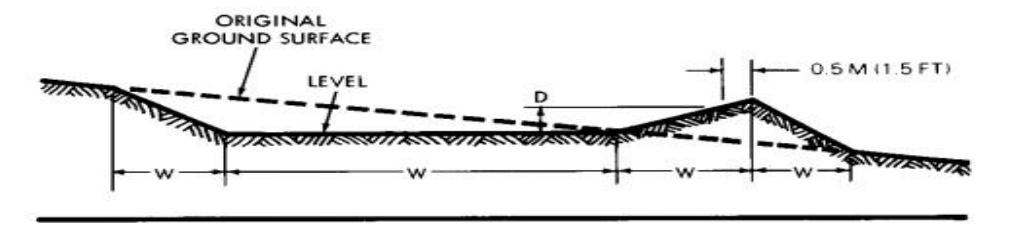


Figure 1 – Broadbase terrace cross section[†]



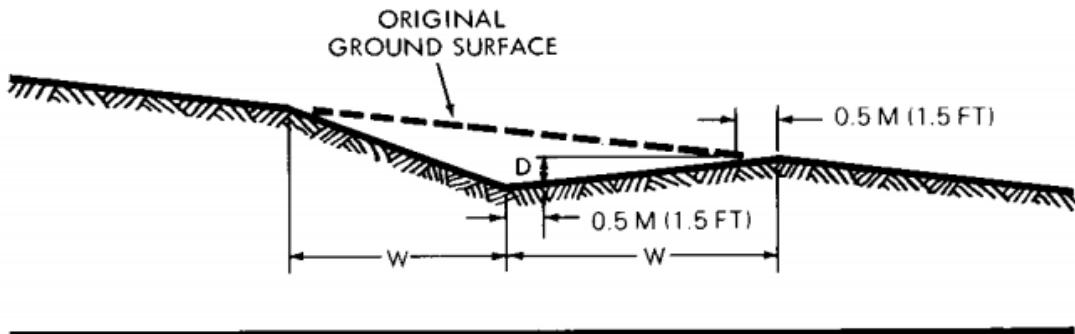


Figure 8: Different type of Terrace.

Terrace laihna hmun chu 33% aiin a awih tur a ni lo a, **amaherawh chu**, hmun thenkhat tlangram chhengchhe tak tak Himalayan region ang ah chuan bench terracing hmanna ah chuan 50% chin hmun awih ah pawh laih thin tho a ni.

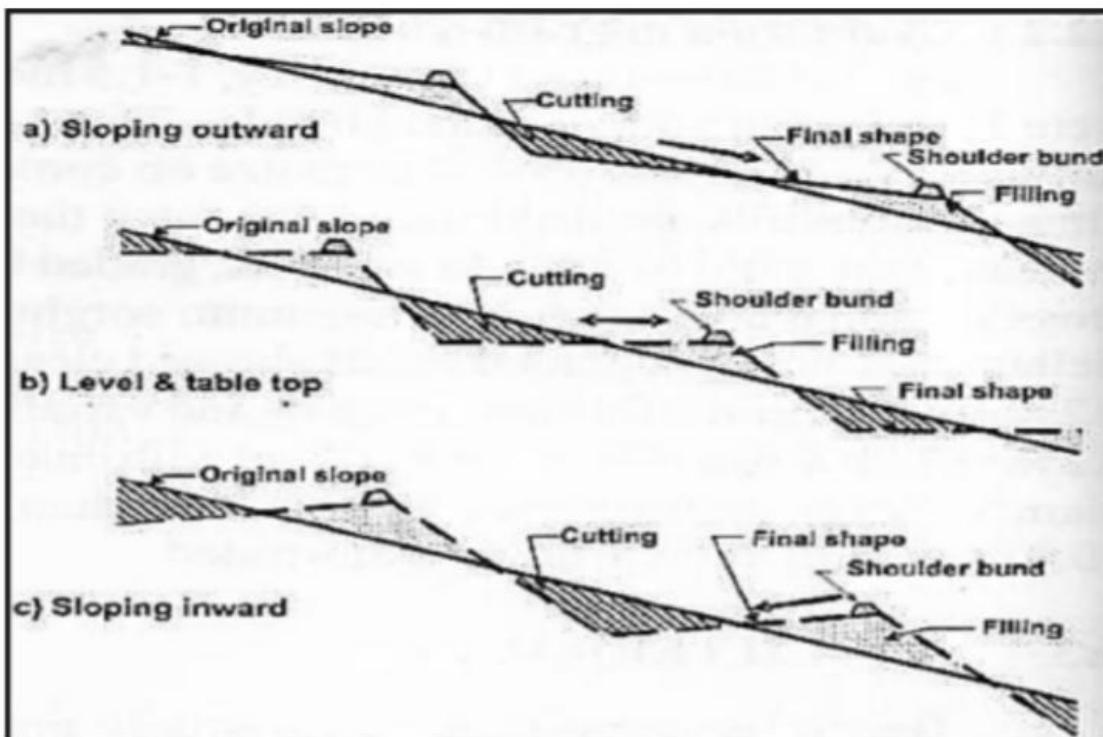
Bench terrace chu:

- Table top for buh tuhna hmun atan.
- Inward sloping (Chhung zawnga awih)
- Outward sloping (pawn lama awih)

Heng laih dan phung hi thlai chin tur a zir te, ruahrtui tam dan te, lei awm dan a zir te leh chindan thin te a zirin a danglam thei a ni.

- Table top te hi ruahrtui **pangai** tak a dawng, lei tui hip chak awmna hmun ah hman a ni thin a, buh chinna atan a tha a ni.
- Inward sloping (Chhung zawnga awih) ang te hi chu ruahrtui tam na hmunah hman an ni thin a, alu chinna atan hman thin a ni. Tui paih zung zung turin a chhung hawi zawngin a awih a laih a ni.
- Outward sloping (pawn lama awih) hi ruahrtui tlak tlemna hmunah a tha hle a, Lei tui hip chak leh pawnlang tak ah te siam a ni thin. Hmun thenkhatah chuan bench terrace te hi hmun awih phal chin piah lam 33% pelah te an siama, zir chianna atanga a land an chuan terrace te chu 50-70% slope ah pawn lama awih in an siam a, hei hian lei

chunglang lei hang tha a ei ral nasa hle a, heng te hi lung hmang emaw lei hmanga bial tlang siama dan tur a ni.



Terrace Laih dan:

Terrace chhuat chu zawl khata (contour line) awm tur a laih tur a ni. A inkar hlat zawng pawh a chhuat zau zawng tawp a tanga the a mumal taka vawn tur a ni. Terrace laih chu kawi vut emaw in elh lutuk a laih loh tur a ni. A ngil thei ang ber leh kual mumal taka laih tur a ni.

Terrace laih chu a tlangpui thuin a chung lam a tanga tan hi a tha a, mahse lei chung lang lei tha dah tur chuan a hnuai tanga tan vet hung tur a ni. Chumi a nih loh chuan lei chung hang tha chu lak khawm hmasak a, laih zah hnuah dah let leh mai tur a ni.

Spacing of terrace:

$$VI = \frac{S}{100} - \frac{Wb}{(S \times U)}$$

VI : vertical interval, in m

S : slope in percentage (%)

Wb : Width of bench (flat strip), in m

U : Slope of riser (using value 1 for machine-built terraces, 0.75 for hand-made earth risers and 0.5 for rock risers).

Example: Calculate the VI of 4 m wide, hand-made benches on a 30% slope with earth risers.

$$VI = \frac{30 \times 4}{100 - (30 \times 0.75)}$$

$$= 1.55 \text{ m}$$

2. CONTOUR TRENCH

a) Continous contour trench:

A thil tum te:

- Tui luang chak lutuk ti muang tu
- Lei luangral tur eng tu
- Lei hnawnna ti rei tura pui tu

A awmna hmun:

- Hmun 25% ai a awih ah chuan siam loh a tha. Hetiang ai a awih ah chuan thing phun, hnimhnah to tir emaw thing buk te phun hi lei luangral tur venna atan chuan a tha ber a ni.
- Hmun 10% ai a awih lo ah chuan contour trench siam hi a tul hran lo a, hetiang hmunah chuan contour bunding siam hian awmzia a nei thui zawk a ni.
- Contour trench chu hmun awih 10% atanga 25% slope ah hian siam a tha ber a ni. Contour trench siam tur chuan a chunga tarlan tak te hi hriat reng tur a ni.

Contour trench inkar hlat zawng(Spacing):

- Contour trench pahnih insan hleih na chu meter khat(1m) a ni. Hemi a nih avang hian 5% slope ah chuan contour trench inkar chu 20m a ni dawn tihna a ni. Chutiang zelin 10% slope ah huan 20m a lo ni dawn tihna a ni.
- Hmun awih zual lai ah huan contour trench te chu an in hlat turn a ni lo a, amaherawh chu 10m aiin an in hnaih tur a ni lo.
- Hmun awih vak lo ah chuan trench te chu inhlat deuhah an awm tur a ni a, amaherawh chu 30m aiin an inhlat tur a ni lo.

Contour trench design:

- Contour trench chu meter chanve a zau, meter chanve a thuk a laih a ni tlangpui thin a ni.
- A thuk lam: 50cm
- A zau lam: 50cm
- Berm: Lei laih chhuah sa chu khur atang 20cm a hla-ah khur thlanglamah paih thin ani. He hmunawl(gap) khur leh leivung inkar hi Berm tia hriat a ni a, hei hian khur chhungah leivung kha a tlak luh leh mai lohna tura veng tu a ni.

Contour trench ruahman dan(layout):

- Hmun awih dan (slope) chu mual pawng lai atang hmun hran hran ah the chhuah tur a ni.
- Hmun awih dan slope 10%-25% te chu chin chhiah la, contour trench ruahmann siam tur a ni.
- Mual dung sei theihna lai ber hmun chu chhinchhiah a, chumi atang chuan contour trench chu tan tur a ni.

A lem (Figure 9) a entir ang hian, contour trench chu section A meter 30 a sei atang a kan tan chuan trench inkar 15m kan hman bawk chuan row hnih chauh kan siam thei dawn tihna a lo ni. Amaherawh chu section B meter 90 a sei atang a kan tan ve thung erawh chuan row ruk lai mai kan siam thei dawn zawk a lo ni reng bawk a ni. Hemi avang hian contour trench chu mual dung sei lai ber atang a tan chu a fuh ber dawn tihna a ni. Hmun awih dan a zirin trench te pawh an inhnhaih a trul chang te inhlat a tul chang te a hmalama limit kan tarlan tawh ang kha erawh kan hriatreng a tul dawn a ni.

Staggered contour trench te chu contour line vawn dik a awl zawk avangin a him zawk a ngaih a ni. A lem a entir ang hian khur chu meter 4 a sei metre chanve a zau meter chanve a thuk in line khatah laih a ni a, a hnuai a khur laih chu a chung karawl zawn chiah ah laih tur a ni. Hei hian tui a khawl kawngah tui hlauh (loss) a nei tlem dawn a ni.

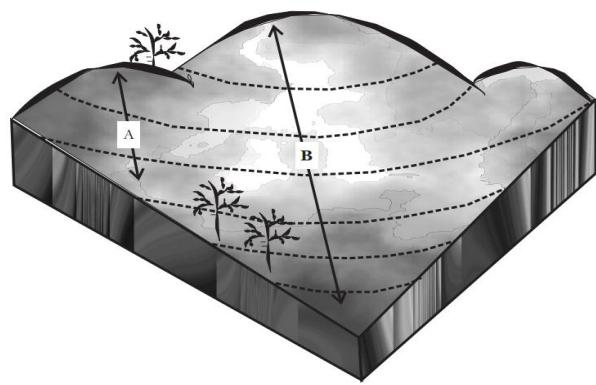


Figure 9: Contour Trench

b) Staggered Contour trench:



Figure 10: Staggered Contour Trench

3. EARTHEN CONTOUR BUNDS:

A thil tum te (objective):

- Tui luang chak lutuk ti muang turin.
- Lei chung lang luangral tur veng turin.
- Lei hnawnna vawngrei turin.

A awmna hmun tur(location):

- Slope 10% ai sang ah chuan siam loh tur a ni. A chhan chu tui luang a chak avangin bund chu awlsam takin a chhe mai dawn a ni.

- Slope 10% chin leh a hnuai lamah siam a tha ber a, contour bund ah chuan tui hi khur chhung chauhin dawng loin bunding pawh hian a lo dawn tho avangin hmun awih ah chuan a tih chi loh a ni.

Contour bund inhlat zawng:

- Meter khat hi a insan hleihna a ni tur a ni. Chumi awmzia chu 10% slope ah chuan contour bund inhlat zawng chu 10m tihna a ni.
- Hmun awih deuh ah chuan bund te chu an inhnaih tur a ni a, mahse 30m aiin an in hnaih tur a nilo.
- Hmun aih vak lo ah chuan bund te chu an inhat tur a ni a, mahse 60m aiin an inhlat tur a ni lo.

Design:

- A san lam: 60cm
- A tlakhniam theih chin: 20-25%
- Hemi a nih chuan bund san lam chu: $60 \times 1.25 = 75$ cm a ni dawn tihna a ni. Lei thil leh lung deuh hmun ah chuan a tlakhniam theih chin hi 10% vel tur a ni.
- Top width a chung zawl sua zawng: 20-30cm
- Bund chhunglam/chhaklam slope (Upstream Slope): 1:1
- Bund pawnlam/thlanglam slope(Downstream slope): 1:1.5. lei thil leh lung deuh ah chuan 0.75:1 a hman theih a ni.
- Tui chhuahna(exit): Tui luanchhuahna chu leichhuat ai sangah siam tur a ni a, tui te chu hun reilo te tling lai lawk tur a duan a nih hnuah a chuang liam chu exit ah an luang chhuak mai dawn a ni. Hemi vang hian exit chu uluk taka siam angai a, lung chhuat emaw tuiin a tih chhiat mai theih loh tur a siam tur a ni.
- Lei laih: Lei laih chu inzawm put a laih tur a ni lo a, a chhan chu kawr ang main tui kalna kha a awm theih vang a ni. Hei hian lei nasa takin lei a ti kal ral ve thei tlat a ni. Khur kan laih te chu inzawm loin meter chanve dan velah laiin lei laih chhuah te chu bunding siam nan hman tur a ni. Khur (trench) chu meter khat a zau hi a tawk thei mai a ni. Khur leh khu inkar chu tooth tia vuah a ni a, a lema entir ang hian a sei zawng chu meter hnih vel leh a san zawng chu 30cm niin lung hmanga siam tur a ni.
- Berm: khur leh leivung inkar hi Berm tih a ni. Berm hian hurrah leivung tla lut leh mai tur a veng a ni.
- Hnim hnah to tir hmanga bund venhim: Bund lei luangral mai tur ven nan hnimhnah to tire maw phun hi a tha hle a ni.

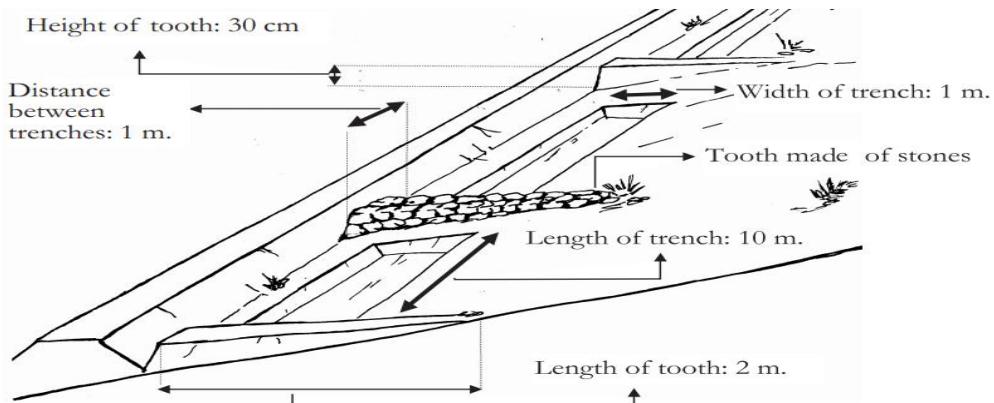


Figure 10: Earthen contour bund.

4. SOAK PIT:

Soak pit chu lei chhuat hnuai lama khur, tui lei hnuai a lut thei tur a ruahman hmanrua hi a ni. Hei hian lei hnuai tui inkawl chu tipungin tangkai taka hman theiha siam tu a ni. Soak pit hian rannung mihring tana hlauhawm tak tak tui luang sawn lo tling reng atanga lo piang thei tur a ti tem bawk a ni.

A hmun tur thlan dan: soak pit chu tui chhunchhuah, tui pump emaw tui pipe hmanga lei hnuai a mi lak chhuahna hnai ah siam tur a ni.

Design Drawing leh pawisa ngaizat: Pit size (2mx2mx2m) chu 2m a sei, 2m a zau, 2m a thuk a ni a, a mawng atanga teh in meter khat chin chu lung leh brick hmanga thun khah tur a ni. Chumi chung metre chanve (0.5m) chu tiau lung hmanga thun khah hnuah 0.25m vel chu balu hmanga thun khah tur a ni. A bak 0.25m la awm chu tui dawng khawl tu tur a tan dah awl tur a

ni. Ti hian tui chu lei hnuiah bawlhhawh telloin a lut tawh mai dawn a ni. Khur khat atan pawisa ngaizat hi Rs. 2,200/- bawr vel a ni. Labour : material ratio chu 40:60 a ni.

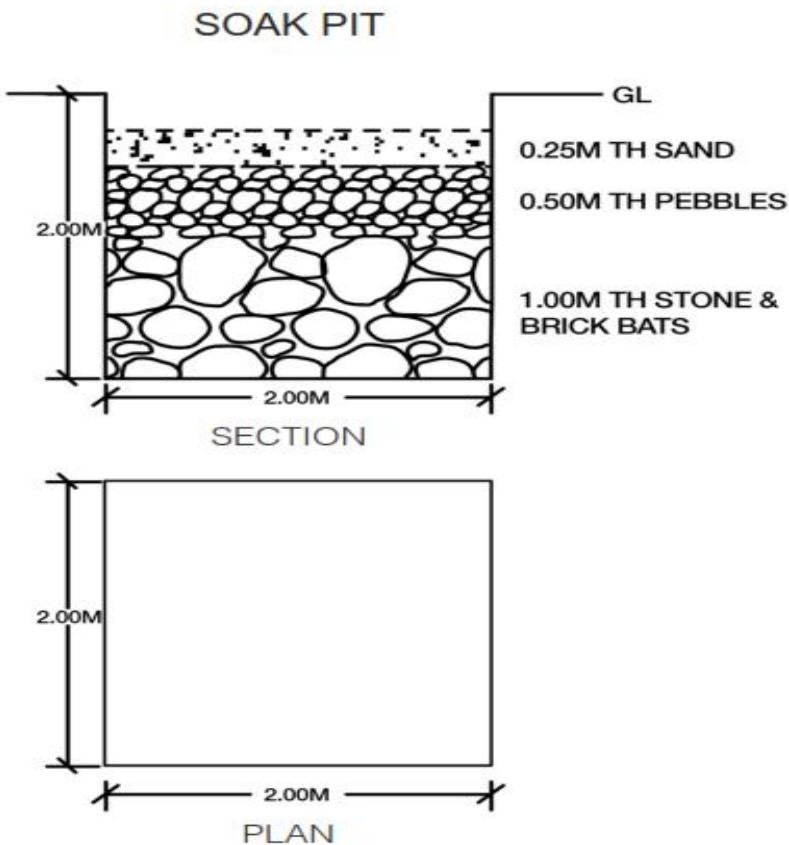


Figure 11: Soak pit.

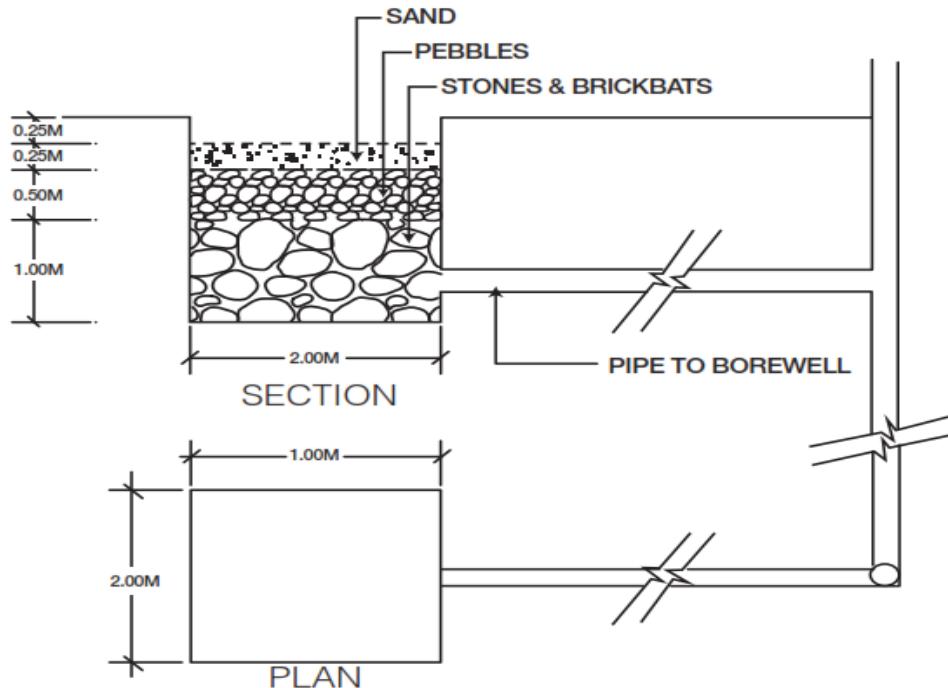
5. RECHARGE PIT:

Recharge pit chu lei hnuai tui ti tam tu a ni a, lei hnuai tui pipe hmanga lak bore well, tui chhunchhuah, tui kut hmanga pump chhuahna lei hnuai tui ti tam tura a bul hnai a siam tur a ni. A chunga tar lan tak soak pit nen a function chu angkhat reng a ni.

A hmun tur thlan dan: soak pit chu tui chhunchhuah, tui pump emaw tui pipe hmanga lei hnuai a mi lak chhuahna hnai ah siam tur a ni.

Design Drawing leh pawisa ngaizat: Pit size (2mx2mx2m) chu 2m a sei, 2m a zau, 2m a thuk a ni a, a mawng atanga teh in meter khat chin chu lung leh brick hmanga thun khah tur a ni. Chumi chung metre chanve (0.5m) chu tiau lung hmanga thun khah hnuah 0.25m vel chu balu hmanga thun khah tur a ni. A bak 0.25m la awm chu tui dawng khawl tu tur a tan dah awl tur a ni. Ti hian tui chu lei hnuiah bawlhhawh telloin a lut tawh mai dawn a ni. Khur khat atan pawisa ngaizat hi Rs. 5,000/- bawr vel a ni. Labour : material ratio chu 15:85 a ni.

RECHARGE PIT



SPECIFICATIONS

SAND: The sand should be free from clay particles

PEBBLES: Before filling in the pit pebbles should be cleaned properly and the over aged pebbles should not be used.

STONE AND BRICKBATS: The hard stone, properly cleaned should be used and the brickbats should be of properly burnt bricks.

NOTE: It should be ensured that the filling material is cleaned properly and hygenic.

Figure 12: Recharge pit.

Watch <https://www.youtube.com/watch?v=6FYIMj0o3-A> for soak pit and recharge pit



Figure 13: Recharge pit & Soak pit preparation.

6. PUBLIC GARBAGE PIT:

Vantlang bawlhlawh sakhat tawih thei lam chi sawngbawlna hmun hi mimal tin tan tih theih loh a nih chinah hian hman a tul thin a ni. Vantlang tana hetiang bawlhlawh sakhat tawih thei sawngbawlna hi public garbage pit tih a ni. Public garbage pit chu vantlang tan a siam a nih dawn chuan gram panchayat/VC ten a hmun tur hi uluk takin an thlang tur a ni. A hmun chu thli thawt dan hawi zawng te ngaihtuah ran chungin thlan tur a ni a, a chhan chu a rim kha vantlang tan rimchhia leh hnawk lo a ni tur a ni. A hmun chu bawlhlawh leh leitha phurhna awlsam inkalpawhna tha hmun sang lai tuiin a chim mai theih lohna hmun a ni tur a ni.

Pit size: a sei lam 3m, a zau lam 1.5m leh 1m a thuk a ruahman ni se. bawlhlawh te hian thla 4-6 tawihral nan hun an mamawh a ni. Hemi avang hian pit mamawhzat tur chu uluk taka chhut angai dawn a ni. Pit pahnih inkar chu 1.5m aiin a zau ngei tur a ni. Khur laih lai hian a pan na kawng a tha ngei em tih te, bawlhlawh leh a hnua leitha thar chhuah thiar leh purh kual awlsam thei tur a ni ngei em tih chu uluk taka ngaihtuah lawk tur a ni.

Compost pit siam hi hman nuam tak leh hman awlsam tak a ni a, Gram panchayat/VC ten awlsam takin technical support pawn lam mi puihna in an siam thei a ni.

A hman theihna te:

- Thingtlangah ruahui tlak tam lohna hmunah.
- Thingtlangah hmun chep avanga mi malin compost pit siam theih lohna hmunah.

A nih phung:

- Pit engemaw zat chu 3mx1.5mx1m in mamawh zat bawlhhlawh nitin mimalin a paih zat atanga chhutin laih tur a ni.
- Khur tlang chu lei hmanga hungna siam tur a ni a, muk taka siam tur a ni.

A hman dan leh vawn dan:

- Khurah chuan bawlhhlawh tawih thei chi chu a khah hma chu paih luh tur a ni.
- A theih chuan bawlhhlawh dah khawm ah chuan a tawihral chak theih nan bawng ek telh ni se.
- Chumi chungah chuan lei pan te in tho leh a rimchhe chhuak tur ven nan karkhat danah dah leh ni se.
- A chunga mi ang hian a khur khah hma chu tih chhunzawm ni se. lei chhuat chung lamah 30cm vela sang thleng a chhun khah a pawilo a ni.
- Ni 3-4 hnuah a tlahniam thin a ni.
- Lei hmangin plaster hnan tur a ni.
- Tichuan khur chu a tawihral nan thla 3-6 chhung nghah tur a ni.
- Thla 3-6 nuah chuan leitha chu lak chhuah a, huan thlai chawm nan hman theih a ni.
- A man chu: khur khat laih nan labour nit hum chhung chhawr a ngai a ni.
- Ruahtui tlak tamna hmunah chuan siam chi a ni vak lo a ni.

CHAPTER IV

COMPONENT-7-8

1. RAN VULHNA HMUN.

a) VAWK IN:

Principles of Design

Vawk In chu a ek leh zun lakkhawm awlsam tura sak nise, a upat dan azirin dah hran emaw huang hran siam emaw ni bawk se duhthusam a ni. Vawk In hi a rimchhiat avangin Chenna In hnung lamah sak thin tur a ni a, chu chuan Vawk In rimchhia lakah min ti ziaawm thei a ni. Vawk In chu hetiang hian pindan thin a ni:

- *Boar box (A Pa huang)* – Hei hi zau tha takin siam a ni a, Chi thlah a ngaih huna a nu nena khung len theihna tura siam thin a ni.
- *Farrowing box (A note huang)* – A pui che vel leh bawk velin a delh loh nan dahhranna tur pindan tha tak siam a ni.
- *Gestating box (A pui rai lai awmna)* – Hei hi Vawkpui rai lai khung hranna a ni a, A No ten Hnute an nghei tantirh, chaw tak an ei tantirh lai vel, ven an la ngaih lai hun vela khung nan hman thin a ni bawk.
- *Finishing box (A no rual awmna)* – Hei hi Vawk no thang lian tawh, buaipui vak ngai tawh lo dah na a ni.
- *Finishing box (A puitling huang)* – Hei hi chu Vawk puitling tawh, hrallh rual ni chho tawh ho dahna a ni.

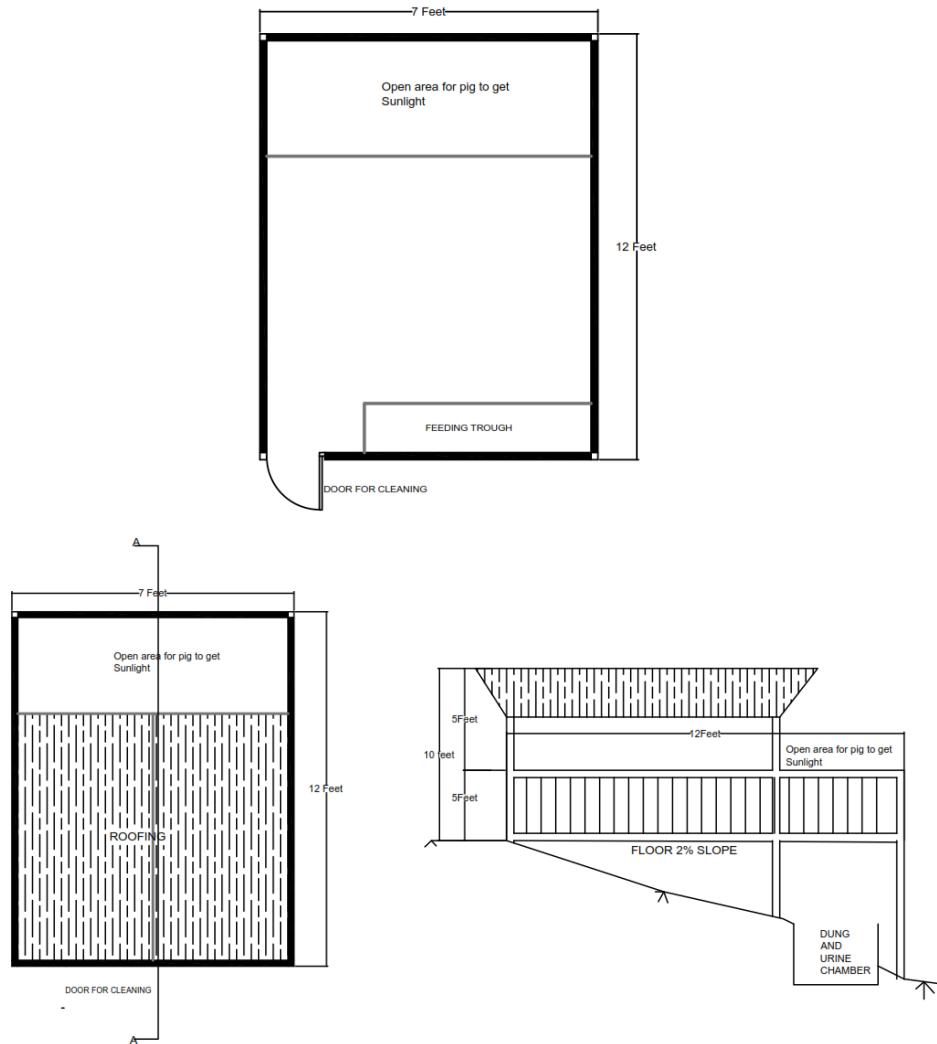
Vawk huang/pindan tinah hian hmun fai lai bik, an mut chawlhna tur te, a Chaw Kuang dahna tur bik te, an zun leh ek thiarna lai tur bik te a awm a. An zun leh ek thiarna lai hmun bik te chu bang ti pawpin tihzawm tur a ni a, chu chuan Vawk In tihfai a tiawlsam bik a ni. Vawk hian hmun thawl tha leh boruak danglam nasa lo (Vawk puitling chuan 15^0 C aia vawt lo, a Note in 22^0 C aia vawt lo) an mamawh a. Chuvangin Vawk In chu 1.5m chin a sang chu phui takin siam tur a ni a, a chhuat atanga 1.8m-2.0m ah a chung chih tur a ni.

A sak dan tur

Vawk In chhuat chu a zun leh ek paihna corridor lamah 2% in a awn (slope) tur a ni a, chutiang bawkin corridor atanga a zun leh ek thli khawlina hmuna a luanthlakna tur awn zawng pawh 2% tur a ni. An zun leh ek in luanpawh tawnna tura siam Compartment bang a kua/kawngkhar siam te chu tihfai lain hawn a, tihfai zawh hnuah khar leh thin tur a ni.

Beneficiaries te chu Vawk In lian tha tak (Vawk pakhat tan 40 Sq.ft vel zel) sa tura fuihin tihipur tur an ni a, a In lian tha chu Vawk tan a tha em em a ni. Vawk In chu chenna In hnung lam, hmun ro tha leh Ni eng hmu tha, thli luankawng mumal taka siam, Leitha khur pahnih siam a, chuta Vawk ek leh Zun te luanglut thei tur a sa turin hrilh hriat tur an ni. Vawk In sakna hmanrua atan chuan a remchang ang apiang (duhthusamah chuan Thing leh a chung atan Di emaw, Buhpawl emaw) a hman theih a. A chaw kuangah an

bawh loh nan a chin siam tur a ni a, a Kuang chhuat lamah a chawnawi thuahfai na tur kua/pipe siam bawk tur a ni.



SECTION

Figure 14: Typical Pig Sty Design for tow pigs with floor area of 84 sqft.

b) AR IN

A hmunhma thlan thu (Site Selection):

Ar In chu enkawl a buaithlak loh nan Chenna In atanga hla lovah sak tur a ni. A hmun chu Tui tlin theihlohma hmun, hmun sang lam a ni tur a ni. A hmun zau lamah chuan Ar vulh zat azirin a danglam thei a. Duhthusam a Ar an tlat theihna tur khawpa hmun zau tha a ni tur a ni a, Ar vulhtu in a duhthusamin a siam thei ang.

Ar Vulhtu in a hriat tur:

Ar 100 zel atan a In len zawng tur chu 7.50 Sq.m (A dunglam 3.75m leh A vang lam 2m) hi a tawk vel a. A dung zawngin plinth level tlengin 30cm a sang, 20cm a chhah in Brick bang rem tur a ni a. Plinth level atanga a chung tlengin Thirlen (wire mesh) in pin tur a ni a, Thirlen inkaih marna turin Brick karah Pillar (Size=30cmX30cm) dah mai tur a ni. A vang lam Bang san zawng chu 2.20m vel ni se, Brick hmangin 20cm a chhahin rem tur a ni. A chung atan chuan Rangva hman mai tur a ni a, Inchhun (roof truss) atan chuan Steel hman tur a ni. A chhuat chu chuan Lungthil chang tha hmangin chhun rual a, a chungah chuan Brick (1:6 Mortar hmangin) rem mai tur a ni.

A sak man:

A chung a kan sawi tak ang Ar In sak man hi Rs 40,000 (Singli) vel a ni a. Unskilled Labour leh hmanraw man ratio chu 20:80 a ni.

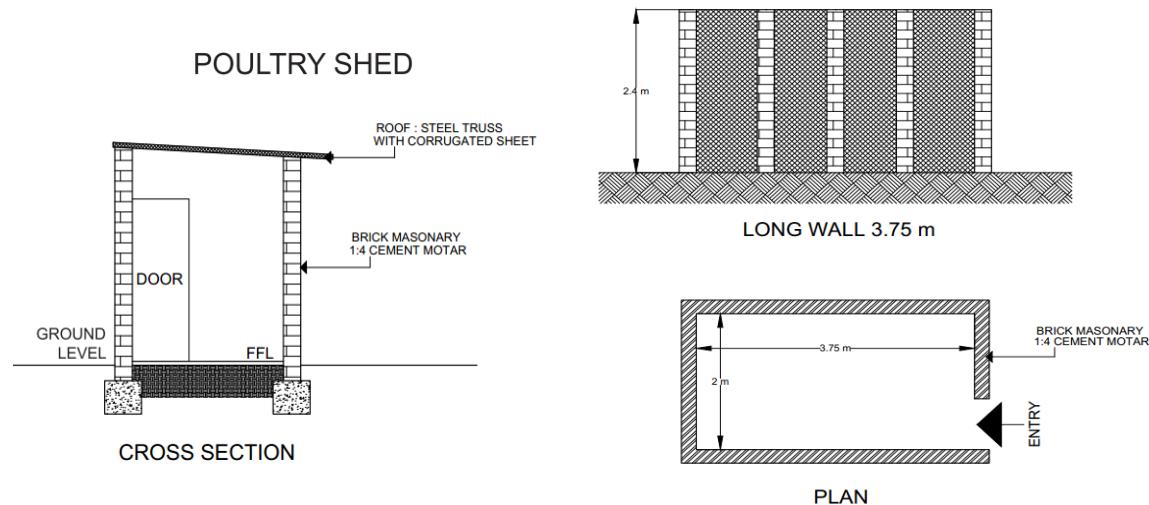


Figure 15: POULTRY SHED

c) BAWNG IN:

A hmunhma thlan thu (Site selection):

Bawng vulhna hmun tur hi a thar sak tur a nih chuan enkawl a awlsam zawk nan Chenna In atanga hla lovah ni thei se a tha. Fur laia tui tlinkhawl theihna tur hmun nilo, hmun sang lamah a ni bawk tur a ni.

Sak dan tur :

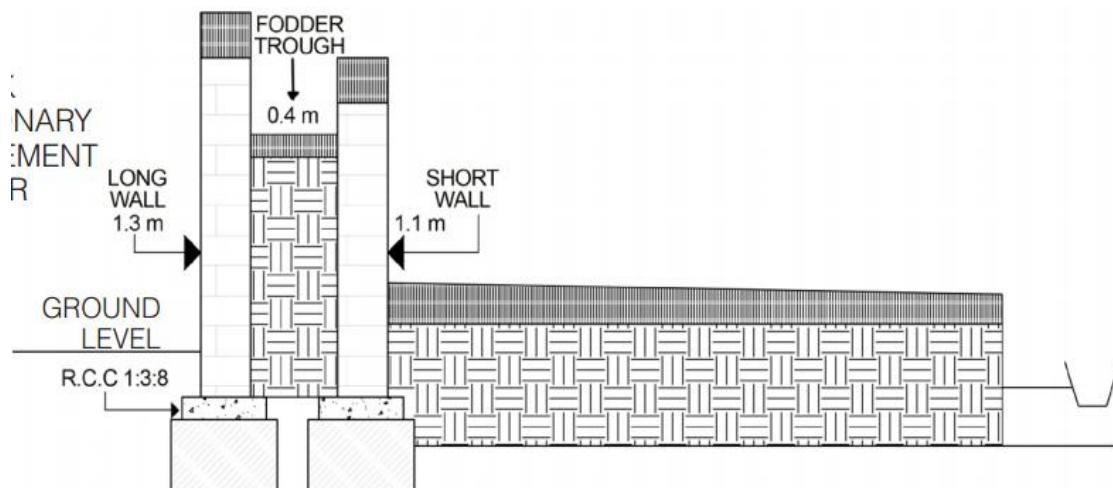
Bawng In zau zawng atan chuan, Bawng 6 zelah 26.95 Sq.m (7.7mX3.5m) a ni a. Bawng chhuat Concrete a chhunah chuan a Chawkuang 1 Cu.m dawng (7.7mX0.4mX0.65m) siam tur a ni a, A zun dahkhawlna tur 250 litres dawng Khur siam bawk tur a ni.

Sum senso ngai zat:

A chunga kan sawi ang Bawng In, a chhuat Concrete, a Zun khawlna leh Chawkuang te hi a siam man chu Rs 35,000 vel a ni a, Unskilled labour leh hmanraw man ratio chu

Bawng Vulhtu hriat tur:

- Chhuat rualrem lo taka awm hi a hrehawm ang bawkin ran tan a hrisel lo a ni. Chuvangin Bawng In chhuat awih (slope) dan pawh hi pawh titoh nuai lovin ngil zaihin a awih tur a ni.
- Chhuat hnawng leh nalah chuan Ran an tlu palh thei a, chu chuan hliam na tak, ruh tliak, Thahru chat, Ruh pelh leh No chhiat (Nau chhiat) thlengin a thlen thei a, chuvangin Bawng In chhuat chu thap deuh hraiha siam tur a ni a, a nal tur a nilo.
- Chinai phul hian natna hrik inthlah pung tur a veng ve thei a ni.



All dimensions in metres

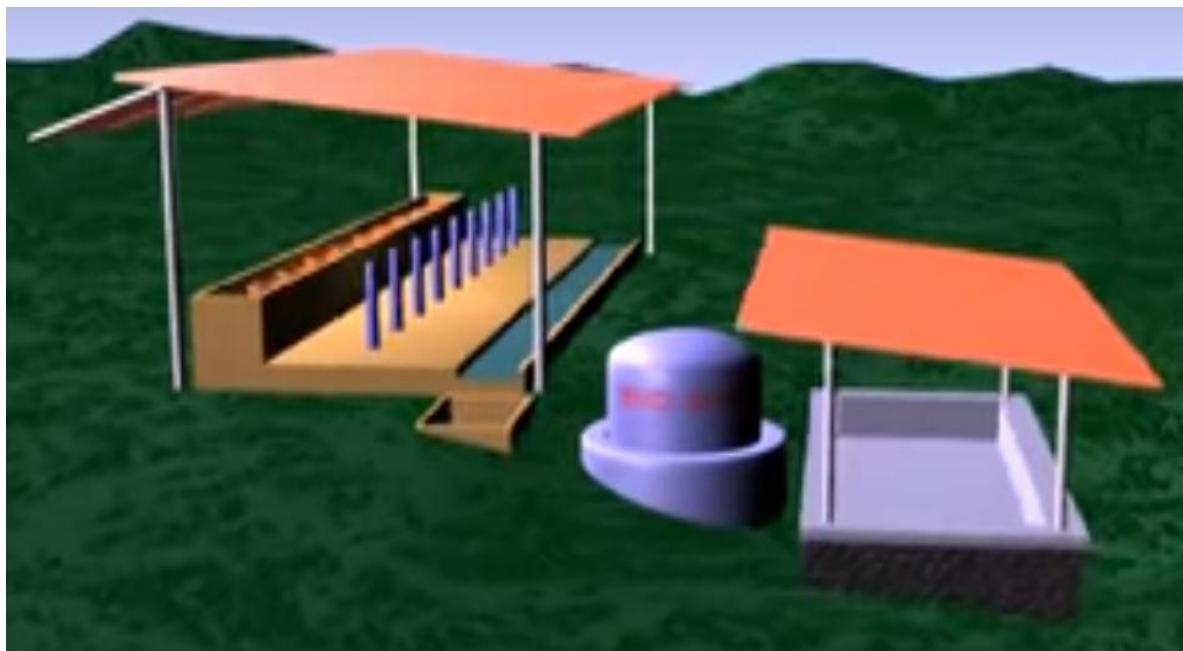
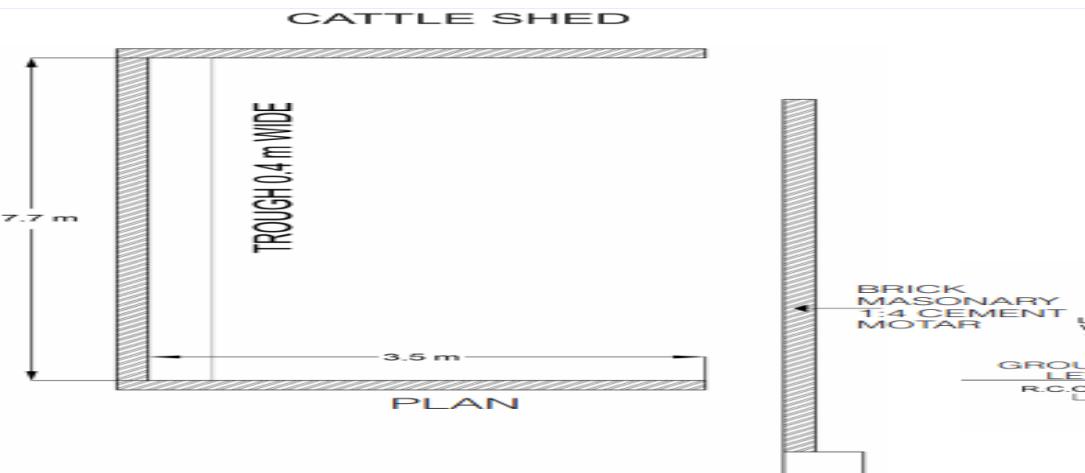


Figure 16 : CATTLE SHED

d) KEL IN

Khawsak harsat deuhna thinglang hmun thenkhatah chuan Ran te deuh (ruminants) Kel leh Beram te hi Sum lakluhnha atan vulh thin a ni a. Central India vela Tribal khawsak harsa ho phei khu chuan Lo neih aiin Kel leh Ar vulh hi an ei hmuh na ber atan an hmang a ni tih pawh kan hre theuh awm e. Amaherawh chu an Ran vulh te In sakna tur pawisa te an neih loh avangin anmahni hriselna in a tuar a, an damlo reng mai a ni. Hetianga an ran vulh te chenna tur pawh mumal taka an siam theih loh avang hian an ran Ek leh Zun te pawh a lakkhawm hleihtheih lohva, Lo leh huan siamtu te tana Leitha tangkai em em, awlsam leh man tlawm bawk si chu an chan teuh teuh tihna a ni. Chuvangin hetiang Ran vulh te tana In tha leh mumal tak siam sak hi Ran leh mihring tan a hrisel chauh ni lovin,

Sum tam tak senga Lei tihthat ngai tur kha man tlawm awlsam tein kan tit ha thei tihna a ni.

A hmun thlan thu (Site Selection):

Kel vulhna hmun atana tha leh thlan dan tur chu a hma lama kan sawi tawh Ar Vulhna hmun nen khan a in ang reng a ni.

Sak dan tur :

Kel 10 zelah 7.5 Sq.m a zau (A dung 3.75m, A vang 2m) hi a tawk viau a ni. A bang chu 2.20m vela sang, Brick hmanga rem, cement Mortar 1:4 hman ni bawk se a tha. A chungah chuan Rangya chih mai tur a ni a, a inchhun (roof truss) atan chuan Thir hman ni bawk se. A chhuatah chuan Lunghil chang tha (Hard Moorum) hman tur a ni.

Sum senso:

Hetiang Kel In pakhat sak man hi Rs 36,000 vel a ni a. Unskilled Labour leh Hmanraw man ratio chu 25:75 a ni.

Kel Vulhtu in a hriat tur:

- Chhuat rualrem lo taka awm hi a hrehawm ang bawkin ran tan a hrisel lo a ni. Chuvangin Bawng In chhuat awih (slope) dan pawh hi pawh titoh nuai lovin ngil zaihin a awih tur a ni.
- Chhuat hnawng leh nalah chuan Ran an tlu palh thei a, chu chuan hliam na tak, ruh tliak, Thahrui chat, Ruh pelh leh No chhiat (Nau chhiat) thlengin a thlen thei a, chuvangin Bawng In chhuat chu thap deuh hraiha siam tur a ni a, a nal tur a nilo.
- Chinai phul hian natna hrik intlah pung tur a veng ve thei a ni.

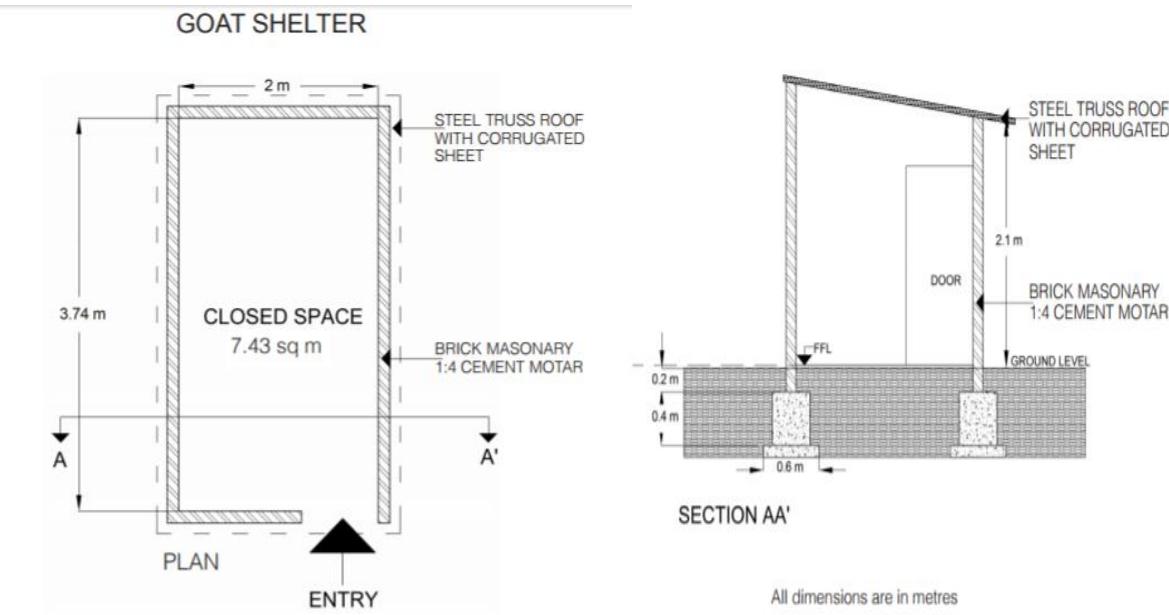


Figure 17: Goat Shelter.

1. RANCHAW THARCHHUAH (FODDER PRODUCTION)

Ranchaw hring tharchhuah chungchang:-

Rachaw hring hi ran hnute sawrchi tan a chaw \angkai zing a pawimawh tak a ni a, hnutetui an neih theihna tur leh an hriselna atan a pawimawh em em a ni. Ranchaw hring tharchhuah a awm hian ran chi hrang hrang vulh tum te tan an ranchaw mamawh tur phuhruk natur remchang a pe a. Loneitu \henkhat te phei chuan thlai dang ang maiin ranchaw chingin bazaar-ah te pawh an hralh \hin a ni. Phulleh di lampang chi ranchaw \henkhat te chu khawtual a hnim channa (local chop cutting machine) hmanga chan sawm in “silage” siamna atan hman theih a ni a, heng silage te hi kum khat lai a dah\hat theih in khawkhen leh \hal hunah te ranchaw mamawh phuhruk turin a hman theih a ni. A chi (hybrid variety) uluk tak a thlangin lo satliah ah pawh ranchaw hi awlsam tak in a chin theih a ni. Ranchaw \henkhat te chu tui ah lei tello a chin (hydroponics) theih te pawh an ni a ni.

Agriculture a ranchaw hring tharchhuah \hatna te:- A hnuai a tarlan te hi ranchaw hring chin \hatna te a ni:

- Ranchaw hring hian ran tan a siamchawp nilo chaw\ha a pai avangin ran \hanna leh hriselna ah nasatakin a pui a ni.
- Ranchaw hring hian ranchaw leina atan sumsen tur a ti hniam
- Ranchaw hring tharchhuah te chu Sillage siamna atan a hmangin nakin a ran pek atan a dah\hat theih a ni

- Ranchaw hring te hi a tlangpuiin a thar hunchhung a reilo in kumhlun chi an nih \hin avangin kumtluan a ranchaw mamawh a phuhruk thei a ni
- A chinna senso leh a enkalwna senso a tlem

Ranchaw hring chi hrang hrang te:- A hnuai a mi hi ranchaw hring chi hrang hrang te chu an ni:

- Be lam chi (Legume Fodder)
- Mim lam chi (Cereal Fodder)
- Phul lam chi (Grass Fodder)
- Thing lam chi (Tree Fodder)

Be lam chi ranchaw (Legume Crops):-

1) **Behlawi (Cowpea):**



- Behlawi hi thlai kumhlun a nilo a. Khaw lum na hmunah te a chin chi hle a ni.
- Behlaiw hi a hring a pek mai bakhah, a ro in emaw sorghum emaw vaimim emaw nen a chawhpawl in silage siamna atan a hman theih a ni
- Fur thlasik leh nipiiah te a chin theih vek a ni
- Kumtluan in behlawi hi a chin theih a ni
- Hectare 1 hmunah hian atlangpuiin a chi 40 – 45 kg tuh \hin a ni
- Tuh a\ang a ni 45 – 50 ah behlawi hi a seng theih a ni (an par hun lai tak a ni \hin)
- Hectare 1 hmunah tonnes 20 zet a thar theih a ni
- A kung hi 95cm a sang a ni tlangpui a zar peng 2 emaw 3 emaw neiin hnah 10 – 12 a nei tlangpui bawk a ni

2) **Stylo:**



- A tlangpuiin Stylo te hi 2 metres a sang an ni \hin a
- Stylo te hi khawkheng tuar thei tak thlai niin be lam chi ranchaw \ha tak a ni a, ruahktui a mawmawh tlem em em a ni
- Stylo te hi tropical khawlum a chin chi a ni a. Leichhia an ngam in lei tur leh tui kalral \halo pawh an tuar thei hle a ni
- Protein chaw\ha ngialngan a pai hi 16% a\ang a 18% vel a ni
- Stylo chin hun \ha ber chu June-July thla a\ang a Sept-Oct hi a ni
- A tlar a 30 x 15 cm a tuh hian hectare 1-ah a chi 6-7 kg vel mamawh a ni a, a theh a theh a nih chuan 10-11 kg/ ha a ni thung a ni
- Stylo te hi tuh a\ang a ni 70-75 ah an par hunlai takin a seng theih \hin a, a seng leh hun erawh chunan \han dan ah a inghat a ni
- A chin kumkhatna ah chuan a thar \hat vak beisei theih a nilo a, chin a\ang a a kumleh ah chuan a thar \ha hret ang a, a kum 3-na ah chuan kum khatah 25-30 tones /ha a thar thei a ni

3) **Desmanthus:**



- He thlai hi thlai kumhlun chi niin kumtluan in a \hang thei a, ruahchawm leh tuichawm a chin theih ve ve a ni

- Hectare 1 hmunah 18-20 kg thlai chi mamawh \hin niin thlai chi chu lei\ha phul vur hnan na pawng sir ah 2 cm vel a thukin tuh tur a ni
- A chi kan tuh te chu leichunglang \ha in a khuh ngeu tur a ni
- Tuh zawh veleh tui pek nghal tur a ni a, a ni thum ni leh a ni ruk ni leh a ni sarih ni in tui hi pek leh tur a ni. Fur lai chuan tui pek a ngailo a ni.
- Tuh a\ang a thla 3 hnuah, thlai chu 45-50 cm a sang a nih in a seng vawikhatna a tih theih
- A seng vawi hnihilna chu a seng vawikhatna nen a ni 35 – 40 a inkar hlat tal in, a \han dan a zir in en tur a ni
- Kumkhat chhung in ranchaw hring 80-90 tons/ha a thar theih a ni

4) **Lucerne:**



- Lucerne hi Ranchaw lalnu (queen of forages) ti a hriat lar \hin a ni a, he tlai hi thlai kumhlun, zung kaih thuk tak, ram vawt tak a\ang a ram lum tak thleng chin theih vek a ni
- Lucerne hi ranchaw hrisel leh tui an tih em em a ni a, a ro hian protein ngialngan 15% – 20% a pai a ni
- Ranchaw atan mai bakah hian lucerne hian lei ah Nitrogen hnutchhiah in lei\hatna a tipung thei a ni
- He thlai hi a tlangpuiin ranchaw hring atan te, a ro a pek tur te leh sillage atan te'n an hmang \hin a ni. Amaherawhchu heng thlai te hian ran in an peh hi an tuar theilo hle a ni
- Hectare 1 hmunah hian a chi 18 – 20 kg mamawh \hin a ni
- Co1 cultivar hi July-Dec thla chhung a chin chi a ni a, khawlum leh khawvawt lutuk a chin atan chuan a duhawm loh
- Tuh a\ang a ni 70-80 ah a hleh vawikhatna hi a hleh theih a, a hleh nawn leh na hi hleh vawikhatna a\ang a ni 21 -30 hnuah a theih tlangpui

Green Fodder Production from Cereal Crops:-

1) Vaimim (Maize):-



- Hectare 1 hmunah vaimim chi 40-45 kg mamawh a ni tlangpui a, 15cm (feet chanve) a inhlat in tuh tur a ni a, a tlar hi 30 cm a inhlat tur a ni
- Hectare 1 hmunah vaimim a\ang hian a hring in 45-50 tons vel a thar theih a, a ro erawh chuan 10-15 tones vel a thar theih a ni
- Hun reitak rin tur atan a kan ching dawn a nih chuan Staggered sowing hi recomen a ni
- Chin a\ang a thla hniih (2) hnu, vaimim vui in milk stage a thlen in ranchaw a tan a seng hun a ni

2) Sorghum – Jowar:



Sorghum Crop

- Heng thlai te hi ranchaw atan mai bakah ei atan chin \hin a ni
- Sorghum hi \hal ngam tak leh kumkhat thlai (annuals) a ni a, hmun lum 25-36°C temperature awmna hmunah chin chi a ni
- Ruahtui 300-400 mm vel an mamawh in lei chirang hrangah a chin theih a, amaherawhchu, balu lei lutuk erawh chu pumpelh hram hram tum tur a ni
- Hectare 1 hmunhah thlai chi 40-45 kg mamawh tlangpui a ni a, Co.F.S. 29 varieties bikah erawh chuan 12-13 kg lek mamawh a ni

- Heng thlai te hi a par zawk ah ranchaw atan seng \hin a ni
- Vawikhat chauh hleh tur a nih chuan tuh a\ang a ni 60-65 (50% flowering) ah a seng theih a, vawi engemawzat hleh tum a nih chuan tuh a\ang a thla 2 hnuah vawikhatna hleh tur a ni a, a hnu ni 45 dan zelah hleh leh tur a ni

Phul leh di lam chi ranchaw tharchhuah

1) Hybrid Napier Ran Chaw:



- Anihnatakah chuan, hei thlai hi hnim kumhlun ran chaw a hman chi a ni a, Napier hnim aiin kuang leh hnah a nei tam a, tha zawkin a lakkhawm tur pawh a tam zawk a, a chungnung zawk a ni.
- Taksa than nan a pawimawh protein la ngialngan 8% a\ang a 10% vel a awm a ni.
- A tlangpuuin a tiak 40,000 atanga 45,000 vel hectare khat a phun tur a ni.
- A lakkhawm hmasak ber chu phun atangin ni 70 atanga 80 velah tur a ni a, a hnu leh chu ni 40 atanga 45 inkar dan velah a ni tur a ni.
- Hybrid Napier hnim chu Desmanthus nen hmun thum a then a hmun khat a in pawlh mawitawkin a phun pawlh theih a. A seng rual theih in ran chaw ah a pek theih ve ve a ni.

2) Guinea Hnim:



- Heng hnime te hi meter 5 thleng a thang thei a, a buk in, hnime hring kumhlun, tuihnai leh thang chak tak a ni.
- A bulah tawite a zam in, phun mai theih leh a chi lak mai theih in a awm.
- Taksa \han nan a pawimawh protein ngialngan 4% a\anga 15% vel a awm a ni.
- Heng hnime te hi lei eng ang chi ah pawh tui tlithlawr \ha ah chuan a chin theih deuh vek a. Amaherawhchu, hlum lei emaw, tui lenna hmun emaw, tui tlin reng na hmun ah a \ha thei lo a ni.
- Heng tlhai hi a 1 hectare a ching turin a chi 2 – 2.5 kg a ngai a, a zar a nih chuan 50cm x 30cm vel a inkar hlat a phun in hectare 1-ah 65,000 nos. a ngai a ni.
- A tlang puiin, seng hmasak ber turin a \iah atanga ni 70-80 velah a a inpeih a, a kung phun a nih chuan ni 40-45 velah a ni thung. A seng nawn leh na chu ni 40-45 inkar dan velah a ni tur a ni.
- Kum 1 a \um 8 hleh in hnime hring ran chaw 17-180 tonnes vel kum khat chhungin a lakkhawm theih a ni.

3) Para Grass:



Fig: Para Grass

- Heng ran chaw hi a kumhlun a, duhthusam chuan hmun hnawng a chin chi deuh a ni
- Kum tin a tuilen \hinna phairuam leh hmun hniam ah te a chin theih
- tui tling leh hun rei tak chhung tui lenna hmun pawh a tuar thei hle a ni.
- Leilung ro na hmun ah chin tur a ni lova, heng lei ah te hian a tha thei lo a ni.
- Hmun vawt a ngeih lova, hmun lum lutuk ah pawh a \han a \ha lo bawk.
- Ran chaw tha tak thar tur chuan heng hnime hi tui tlinna hmun ah a \ha a, \iauvut hmunah pawh a \hang duang thei bawk.
- Heng hnime \hat lohna chu a chi insiam a chhia a, a tih pun nan a zar lak a ni deuh ber thin.

- Tui pek tur hnianghnar tak a awm phawt chuan engtik hunah pawh kumtluan in a phun theih reng a ni.
- Heng thlai ah te hian hybrid cultivar a awm velo a ni
- A \ang z n zaih kha phun atan chuan thlan tur a ni a,a zar mit 2-3 vel nei kha phun tur a thlan tur a ni. Tin, 45-60 cm a tlar in 20 cm inkar hlat tur a ni a, a zar chu lei hnawng ah nem lutin a hmawr tawp ve ve pahnih chu a lo lawr cho tur ani.
- Hectare khat a zau a phun turin a \ang 900-1000 kg vel a ngai tlangpui.
- A seng hmasak ber chu phun atanga ni 70-80 velah a theih a, a hnu leh chu ni 40-45 inkar dan velah a ni tur a ni.Kum khat a vawi 6-9 vel a lak theih a, 90-100 tons/ha. bawr vel ang ran chaw a thar theih tihna a ni.

1) Blue- Buffel Hnim:



Fig: Blue-Buffel Grass

- Heng hnim te hi ran tlatna hmun a chin atan a \ha bik hle a, a kumhlun bawk a ni.
- Tui in thlithlawr \hatna hmunah leh calcium tamna hmunah te a \ha duh.
- Hectare 1 hmunah thlai chi 5-7 kg vel mamawh \hin a ni.
- A tlangpuiin, a lakkhawm hmasak ber chu a tuh a\anga ni 70 -75 velah tur a ni a, a hnu leh chu a \han dan a zirin kumkhatah vawi 4-5 vel a lakkhawm theih bawk.
- Heng hnim hi kum khat chhung a vawi 4-5 lakkhawm a\angin hectare 1 hmunah 35 tons vel a thar theih a ni.

Thing a\ang a ranchaw tharchhuah:

1) Subabul Fodder:



- Ranchawah chuan thlai/thing thangchak ber leh a chi thar chhuak tam ber a ni.
- He thlai hi a chin hun tha ber chu June atanga July thla inkar a ni.
- He thlai hi a chi kan chin/tuh atanga thlaruk a tlin chuan a lak theih tawh a ni. mahse akung lenzawng hawlhtlanga 3cm emaw, a chi dang a thar hma chuan lak loh tur ani.
- A than chak dan leh sik leh sa a zir in, ni 45 atang ni 80 chhung hian a lak zel theih a ni.
- Hmun ro leh khawkheng ah chuan, a zung in thuk taka a zung akaih theih na tur in kum hnih tal zuah tur a ni.
- He Thlai/thing san zawng hi lei atangin 95cm atanga 100cm tal a ni tur a ni.
- Tui lakna siamna hmun ah chuan he thlai hian hectare khat ah ton 90 atanga 100 ton a thar thei a ni.
- Ruahtui chawm ringot a enkawlna hmun ah chuan hectare khat ah ton 40 vel a thar theih a ni.

2) Sesbania Fodder- Agathi:

- Agathi hnah hi tui tak mai a ni a, Kel in an duh hle ani.
- He thlai hnah hian protein za a sawmhnih atanga sawmhnih panga a pai a ni.
- Tui lakna tha a awm chuan he thlai hi kumtluan in a chin theih a ni.
- He thlai than duh dan ber chu kan chinna lei; organic matter pai tam leh tui inthlithlawr tha taka hmunah te a ni.



- Thlai chi hi 100cm dan zel a chin tur a ni a, a chi kg 7 atanga kg 8 chin nan hian ram hectare khat a ngai ani. (A chin na tur a lei kan tih pawn hi cm 100 dan ah nise, chuan a chi pawh hi cm 100 dan bawk a chin tur a ni.)
- He thlai hi a tharchhuah hmasak ber chu thla 7 atanga thla 8 chhungin a nithei a, chuan a tharchhuah dang leh chu a than duh dan a zir in ni 70 atanga ni 80 a ni thin.
- He thlai hian kum khatah, hectare khat ah, ton 90 atanga ton 100 tleng a thar theih a ni.

Ranchaw hmun siam hi Gram panchayat emaw Gram sabha thutlukna a zirin vantlang ram leh mimal ram ah te chin theih ve ve a ni.

3) Gilricidia Fodder:

- Thing te takte, hnah tlakawlh ve \hin leh a zar rawng da deuh bai a ni a
- He thlai chi ah hian Glyricidia sepium leh Gliricidia maculate chi te hi kan hmuh theih te an ni a, a bik tak in Gliricidia maculate hi a \angkai in a hnah hi leitha siam tu leh lei a nitrogen te khehdarh (fixed) thei thing zing a mi a ni.
- Glyricidia sepium hi sik leh sa chi hrang hrang ah a chin theih a ni. A than duh bik na chu ruah tui 850mm aia tam tlak na ah a ni a, tin, ruah tui 400mm a tlem tlakna ah pawh a chin theih tho a ni.
- He thlai hian lei chi hrang hrang a duh a, d lei deuh a\ang a balu lei tleng in a chin theih deuh vek a, lungphihrit hmunah pawh a chin theih lehzel a ni. Tui tling hi a ngeihloh zawng tak anih avangin tui pahna \ha tak siam hi a pawimawh em em a ni.
- He thing tangkaina te chu Tuahthing atan te, Ran chaw atan te, hnahriring lei\ha atan te, Daihlim atan te, thingkung min hualvel tu leh thlai dang zam vel na atan te a ni.
- He thing chin pun dan ber chu a chi tuh leh a\ang phun a\ang te in a ni.
- A hnah kan lak hian a hnah thar a rawn insiam leh vat a, tichuan thlaihnah a\anga leitha siam nan hectare khat ah ton 2 atang ton 2.5 tleng a a pui thei a ni.



Fig: Gilricidia

SOLID WASTE MANAGEMENT

The Steps in Solid Waste Management:

He chapter ah hian kan beisei tak- Gram Panchayat (GP) te tan a bawlhhawh sawngbawl dan tur (Solid Waste Management) kawng hrang hrang kan tarlang a. A in la lawn chho a ruahmanna siam a ni. Inruahmanna felfai tak a tan a ngai a, GP ten bawlhhawh an sawngbawl dan endik zui leh na in a chhunzawm leh a ni.

Step-I : Preparation

- 1) **Panchayat Functionaries Meeting:** Panchayat President, Vice President, Secretary leh ward member dangte chuan an inhuamna leh an thlawpna leh GP huam chhung a felfai taka thil a kal theihna tur in hun bituk chhung (Kum- 1) in a chinfel sak tur a ni.
- 2) **Gram Sabha Meeting :** Gram sabha chuan khaw fai neih theih dan tur an sawiho anga (Resolution an pass nghal bawk ang); chhungkaw tin ten an puihbawm dan tur leh thil dang an sawiho bawk ang. Heng thu rawt hrang hrang te hi a huam thei :
 - i) Polythene hmang loa lehkha a tanga siam bag hman uar.
 - ii) Thingpui dawr te steel atanga siam bungbel hman uar leh dispo hman tlem leh paikh mai mai loh.
 - iii) Hemi chungchang a dan awm hi siam a, passed theih bawk a ni.
- 3) **Community Education :** Khaw chhung a veng hrang hrang mipuite zirtirna pek a tul a. Hei hian chhungkua, SHGs, Dawr nghaktu/neitu, thingpui dawr neitu, khawchhunga restaurant te, sikul naupang, nupui/pasal nei tawh te a huam a ni. Heng mite hi a hlawm te te a zirtirna pek an tha ani. Khawtlanga zirtirna pek hian heng te hi a huam ngei tur a ni: Eng bawlhhawh nge tawih thei a, eng bawlhhawh nge tawih thei lo? Engte nge hman nawn leh theih a; Eng bawlhhawh te nge mihring tana hlauhawm thei; Eng bawlhhawh te nge chhungkaw tin ten an thliar hran tur?

- 4) **Identify Infamous Spots** : A tlangpui thu in kawthler a kawmkar te leh in leh in inkara hmun ruak te hi mihring te tan a chenna atana hmun hrisel lo ‘bawlhhlawh paihna hmun atana hman tur ni silo hmun’ a ni. Chhungkaw tin te hian heng lai hmun hi ngawi rengin bawlhhlawh paihna hmun a ngai in an hmang mai thin. Chung hmunah te chuan heng a hnuia kan sawi thil pathum te hi tih a ngai ani:
- A hmasa berah chuan hmuat lar loh hriatchhuah tum.
 - Chung hmuna hnawmhawnahk dah khawm vum hnur te chu bawlhhlawh paihna hmun panngai a pah leh
 - A hnu lehzel a hman zui a nih lohna turin a hungna tha tak a siam a, anih loh pawhin vantlang hmun in tawm anih chuan thingkung leh thlai dang te phun. Tanpuina sum a awm thei anih chuan naupang te tan an infiamna tur pipu siamsak a. Chu hmun chu luah zui a, a ruak a awm tir loh nise.
- 5) **Community Preparation:** Chhungkaw tin te hnenah bucket pathum theuh- a hring, a pawl leh a sen sem vek tur a ni.
- Bucket hring hi choka a kan duh tawh loh te leh chaw ei-na ning nawi bakah bawlhhlawh huh/hnawng paihna tur a ni.
 - Bucket pawl hi bawlhhlawh hnawng lo pah na tur a ni.
 - Bucket sen hi mihring tana pawi thei heng- battery te, bulb te leh thildang paihna tur a ni. Heng bawlhhlawh huh leh ro lo/ bawlhhlawh huh lo/ bawlhhlawh mihring tana pawi thei tarlan hrang hrang te hi Box- 2 (Waste Category) ah hmuh theih a tarlan a ni. Bucket hring a hnawmhawnahk huh pah te hi Gram Panchayat te thutlukna in zing tin emaw (zing leh tlaiah) lakkhawm thin tur a ni. Nitin zing leh tlai a lak hian lakkhawm hunah a ken vel a ti awlsam dawn a ni. Lakkhawm hun chu bawlhhlawh te a la thianghlim lai leh a rimchhiat hma te, thliar hran a la awlsam lai te leh bawlhhlawh a la tawih hma a ni tur a ni. Bawlhhlawh huh lo te chu a hran a lakkhawm leh mihring tana tha lo leh pawi thei hnawmhawnahk te chu chhungkaw tin te hnen atangin thlatin vawikhat tal lakkhawm thin tur a ni. Entirnan, thlatin ni 5- na apiangah heng te hi lakkhawm tur a ni. A aia tam a awm a nih chuan chawlhkar hniih chhunga lakkhawm tur a ni. Mahse, balhhlawh mihring tana hlauhawm hi a tam em em ngai lo a ni.

Step- II: Planning

- 1) **Area Survey:** A ram hlut zawng te, mi hrang hrang heng- chhungkua, thingpui dawr, restaurant, inneihna hmun, thlai thar zawrhna hmun, sangha zawrhna hmun, bus stand, temple, sikul leh a dangten a bawlhhlawh chi hrang hrang an siamchhuah leh an siam zat te hi a lakkhawm hun atan te, a veivahna te leh mihring tha ngai zat hriat nan te ruahmann fel tak siam a hriat lawk tum tur a ni. Chhungkaw tan chuan bawlhhlawh an siamchhuah/neih zat tur hi chhut thiam mai theih a ni. Mahse, sumdawnna hmun heng restaurant lte leh bazar ah te chuan a hmun a kalchilh in nitin a bawlhhlawh an siam

chhuah zat hi zirchian a ngai a ni. Bawlhhawh sawngbawl dan kalpui mek pawh zirchianna neih tur a ni.

- 2) **Material Planning:** Tri-cycle emaw solar battery (ni zung tha chakna hmang) chi lirthei (lirthei pakhatah bawlhhawh khawn tu 2 zel, chhungkaw 150 tan, entirnan) bawlhhawh lakkawm na tur te, uniform leh gears (jacket, gloves, lukhum, tui bottle, first-aid kit) hnathawktu te tan, bawlhhawh thliarhranna tur hmun, bawlhhawh huh dakhawmna tur, bawlhhawh huh lo dah na tur leh hmanraw tul hrang hrang te neih.
- 3) **Man-power Planning:** Solid Waste Management mihring tha ngai chi hna ani a. Chhungkaw 150 zel tan hnathawktu 2 kan mamawh a ni. Chumi awmzia chu lirthei pakhat hmanga bawlhhawh lakkawm tur in mi 2 zel chhawr theih anni, in puibawm tawn tur in. Chumi te chuan nitin chhungkaw 150 an tuam thei ang. Zinglamah (7am – 10am) chhungkaw 150 leh tlailamah chhungkaw 150 (4pm – 7pm) pawh an tuam hman ang. A pahna/thliarhranna hmunah darkar 2 – zing leh tlai ah darkar 1 ve ve bawlhhawh an lakkawm loh chhungin hun an hmang thei bawk ang. Hmun thenkhat ah chuan hmeichhe rethei zawk leh puuh ngai te hetiang hna thawk tur a zirtirna pek anni thin bawk. A hma a bawlhhawh lo sawngbawl tawh thin te pawh zirtirna pek a chhawr anni thin. A thlancchuah leh zirtirnsa pek hi a pawimawh em em a, a chhan chu hnathawktu thlan dik loh chu hnathawk tur lak nawn sek a ngaih thin vang a ni.
- 4) **Technical Planning:** Hemi chungchang hi chu bawlhhawh lakkawm sa sawngbawl leh dan a ni a. He guide hian bawlhhawh sawngbawl dan chipchiar a tarlang lo a. Bawlhhawh sawngbawl dan pangngai chauh a rawn ruahman a, a remchang anih chuan lei tha a siam dan tur a ruahman tel bawk a ni. Bawlhhawh huh lo te chu thliar hran a, hman nawn leh theih tur te chu sumdawng, he lama sumdawnna khawih thin te hnenah hun bi neia hrall chhuah leh thin tur a ni. A dang zawng chu bawlhhawh pahna hmuna pah tawh mai tur a ni.
- 5) **Financial Planning:** Financial Planning hi chi hnih a awm thei a:
 - a) Capital cost - hmanrua leh mamawh buatsaih na tur.
 - b) Operational cost – thla tin a sum hmanral phuhruk lehna tur.

Capital cost hian a chunga kan sawi Point No.2 hi a kawk a, Operational cost hian Point No.3 & 4 a kawk a ni. Financial planning ah hian sum hman dan tur ruahmmna pawh a tel tur a ni.

Step- III: Organising

- 1) **Man-power:** Plan awmsa hmangin hnathawktu mamawh tur zat lak tur a ni. Tualchhung mi tlemte hi bawlhhawh sawngbawl chungchange hnathawk tur a in pe an awm thin. Hmeichhe chhawmdawl ngai zawk te leh hetiang lam hna thawk hreh lo lak hi thil finthlak tak a ni. Solid Waste Management (SWM) hlawhtling taka thawh tawh na

thenkhat a kan lehkhabus ziaktu in a tlawh tawh chin ah chuan hmeichhia- chhawmdawl ngai zawkte mahni khua atanga hmun danga thawk te leh mipa pawh hmun dang a thawk a hmu chhuak a. A chang chuan hmun hla zawk atanga hnathawk tura chhawr te pawh an awm thin. Chutiang ang chi ah chuan, Gram Panchayat ten a chenna hmun tur an pek ah an khawsa thin a ni. Hmun thenkhat ah chuan bawlhhlawh sawngbawl tu tur a an lak leh zirtirna an pek ve hrim hrim te pawh an awm bawk. Hnathawk tura an in peih theih nan zirtirna an dawng hmasa thin. Training neih lai hian hnathawk dan tur mil ang zel a zirtirna neihpui a pawimawh. Zangnadawmna chungchangah chuan hnathawk tu tin te chu a tlem berah nikhatah Rs.150 emaw Minimum Wage Rate, MGNREGS in a siam dan ang a pek thin tur a ni.

2) **Materials & Facilities:** Solid Waste Management hnathawk kalpui na tur atana hmanrua ngai te chu heng te hi anni. Heng thil te hi tha taka hnathawk anih theih nan ruahmanna felfai tak kan kalpui bawk tur a ni.

- Hmun hma- bawlhhlawh thliar hran na tur leh lei tha a siam leh na tur hmun
- Chhungkaw tin te tan a bawlhhlawh an pahna tur bucket chi thum- a hring/ a sen/ a pawl (bawlhhlawh huh; bawlhhlawh huhlo; leh bawlhhlawh mihring tana tha lo leh hlauhawm dahna tur)
- Chhungkaw 300 zel tan Tri-cycle pakhat zel
- Sanitation Worker (Janitor), chhungkaw 300 tan hnathawk tu 2 zel (zinglama chhungkaw 150 leh tlai lama chhungkaw 150 ve ve tuam chhuak hman turin)
- Uniform (lukhum, kutkawr leh hamrik)
- Hmanraw tul dang (hmunphiah,bawlhhlawh bawm, tin, sheet leh a dangte)

3) **Technology:** Solid Waste Management huang chhungah chuan thil chi thum a huam thei. **Pakhatna**, bawlhhlawh khawn khawm hunah eng motor te nge hman tur- Tri-wheeler pangngai nge battery hmang chi lirthei nge a chi dang? **Pahnihna**, bawlhhlawh tawih ral thei buatsaih zui nan eng thiamna nge kan hman ang- lei tha pangngai (simple compost) ah kan siam ang nge vermi-compost ah? **Pathumna**, Bawlhhlawh pahna hmun tur chu khawnge a awm ang a, engtin nge kan ruahman zui ang? Technology kan hman tur kan thlan dan a zirin hmanrua kan hman tur kan ngaiantuah anga,sum kan mamawh tur kan ngaiantuah tel bawk tur a ni.

4) **Funds:** State Sawrkar-in Centrally Sponsored Schemes heng Swachh Bharat Mission (Gramin) kaltlang te hian SWM hnathawkna kalpui na atana hmanraw mamawh hrang hrang te lei na tur tanpuina sum a pe thin a. Amaherawhchu, tanpuina sum an dawn an duh khawp loh chuan Gram Panchayat ten CSS atangin an dawr mai thin. Solid Waste Management hnathawkna tur sum hi District Administration leh DRDA atang te pawhin hmuh a ni ve thin bawk. Hei hi sum peipun in tan na a ni. A tak tak ah chuan thlatin a sum hmanral phuhrukna te, hnathawk tu hlawh pek te, lirthei hman man te leh thil dang ah te sum hi hman thin a ni.

- 5) **Coordination:** Solid Waste Management hnathawh kalpui hi hun duh rei tak leh thawh chhung rei tak a ni a. Vawikhat thawh tawh chuan a hna hi a kal a, a kal chhunzawm zel thin. Ni 4 vel inthlahdah chuan a tira a that loh ngai ang bawk in a tha lo leh nghal mai thin. Chuvangin, Gram Panchayat te chu khawtlang mipuite, sanitation worker te nen an thawh ho reng a tul a, SWM hnathawh a hlawhtlinna a awm zel theih nan an thawhho a tul a ni. Thawhho-na tha lo chuan hna a ti sawt lo a ni.

Step- IV: Implementation

- 1) **Segregation at Source:** Chhungkaw tin ten bawlhhawh tawih thei leh tawih thei lo an thliar hrang thiam vek tur a ni. Step- I ah khan khawtlang mipuite zirtirna pek an ni tawh a, an tel ve na tur leh an thawh tur te hrilhriat an ni tawh a ni. A hmasa berah chuan bawlhhawh thliar hranna hmasa ber chu chhungkaw tinah neih tur a ni a. Hei hi tha taka tih anih chuan bawlhhawh thliar hran vawihnih na ah hna a ti awlsam sawt dawn a ni. Chuti anih loh chuan darkar 8 – 12 inkar a rei te lo ni tawh bawlhhawh tawih leh rimchhe tan tawh khawih chu hnathawh nuam tak a ni tawh thin lo a ni. Chhungtin ten an choka ningnawi chu bawlhhawh bawm hringah an paih zel bawk tur a ni.
- 2) **Collection:** Bawlhhawh paih tu te chuan an lo thleng a ni tih mipuiten an hriat theih nan hamrik an ham tur a ni. Bawlhhawh bawm hring a mi chu tri-cycle a cabin ah an paih tur a ni. Bawlhhawh tawih thei te chu zing tin dar 7 – 11 am inkarah emaw tlai lamah dar 4:30 – 6:30 pm inkarah emaw lakkawm thin tur a ni. Bawlhhawh lakkawm anih lai hian a khawn tu ten mipuite hnenah chiang takin engte nge a bawm hring a paih tur, a bawm pawl a paih tur tih leh mihring tana hlauhawm leh hriselna atana pawi thei chi te khawiah nge paih tur tih chiang takin an hrilh hre tur a ni.
- 3) **Secondary Segregation:** Tri-cycle te chuan bawlhhawh thliar hran na hmun a thleng phei a, chutah chuan bawlhhawh te chu sawngbawl a, thliar hran chhunzawm leh a ni. Thliar hran vawihnihna ah chuan hnathawktu ten hman nawn (recycle) leh theih ang chi te an thliar hrang leh thin. Thliar hran bang zawng te chu a paihna tur hmun an siam ah paih a ni thin.
- 4) **Facility for Treatment & Treatment of Waste:** Brick hmangin leitha siamna tur hmun 3 x 5 metre a zau, 1 metre a sang an hung kual tur a ni. Lei chung zawl atangin a ni tur a ni. Zut mam (plastering) a ngai lo. Ruah laka a him theih nan rangva hmangin a chung chih tur a ni. Chumi awmzia chu leitha siamna hmun tur chuan a chungkhuh an in tawm dawn tihna ani. Composting yard (leitha siamna hmun) pakhat hi ni 60 -75 inkar chhung atan a hman theih a ni. Thla hnih vel a a khah chuan vaivut hmanga khuh a, a pahnihna zawk hman chhunzawm tur a ni. A pahnihna zawk a lo khah leh chuan, yard hmasa zawk a

bawlhhlawh te leitha ah a lo in siam hman tawh a, phurh chhuah theih a ni tawh a ni. Heng leitha siamna khur te hi septic tank anga hman nawn leh zel theih a ni. Vermi-composting siamna a ni lo a, hnathawktu pawh rawih belh anni lo bawk a ni. Gram Panchayat te chuan vermin-compost siam hi an duh zawk ngei ang, hun leh hnathawktu an neih belh thei anih chuan. Chung zawng zawng atan an mamawh te chu:

- i) Bawlhhlawh reng reng ni 10 dan zel a lakkhawm
- ii)
- iii) Rimchhe tur ven na tur.

Lei tha siam dan hrang hrang hriat duh chuan '*Government of India (2015), Technological Options for Solid and Liquid Waste Management in Rural Areas, published by MDWS, Swachh Bharat Mission (Gramin)*' hi a rawn tlak/ chhiar tlak hle a ni.

- 5) **Service Charge Collection:** Chhungtin te hnen atanga bawlhhlawh khawn khawm na man lak hi pawisa lo sen tawh phuhruk nan a tangkai hle a. Sanitation Supervisor (emaw Panchayat Secretary) chu Gram Panchayat Office a *Cash Counter* ah nitin darkar 4 tal pawisa dawng tur a mawhphurhna la tu a ni tur a ni (tui bill te, bawlhhlawh paihna man te leh ram/in hmun chhiah te). Hetianga pawisa pekna hmun hi chhun dar 12 – 2pm inkar leh tlai dar 5 – 7pm inkar thleng an siam thin anih chuan mipuiten ngai ah an neih ang a, pawisa pe turin khawtlang mipuite an kalkhawm mai dawn a ni. Hei hi tih reng anih loh chuan mipuiten rintlak lo ah ngai in pawisa an pe duh lo anga, Gram Panchayat office khar an chhuanlam mai dawn a ni.

Step- V: Monitoring and Correctives

- 1) **Household adherence:** Chhungkaw tin ten bawlhhlawh thliar hran hi tha takin an zawm theuh tur a ni. Hemi lamah hian in hrilhhriatna tha pek anni tur a ni. Thil kal tluang lo leh felhlel pawh a awm ve thei bawk. Bawlhhlawh lakhawmtu te chu mipuite thil hriat loh hrilh hre tu tur an nih avangin a tha thei ang ber a zirtirna pek anni tur a ni. Bawlhhlawh thliar hran vawikhatna (primary segregation) hi tha taka mipuiten an tih/zawm chuan bawlhhlawh lakhawm tu te hnathawh hunk an pawhtawi sak thei dawn a ni. Chhungtin ten bawlhhlawh tha taka an thliar hran theih nan tha takin an tih tur an zawm tur a ni.
- 2) **Feedback from Households:** Chhungtin ten GP Sanitation Supervisor/GP President mobile number an nei ngei tur a ni a, hei hi bawlhhlawh khawn tute an regular lo emaw an che mawi lo anih chuan rawtna an neih te leh sawisel duh an neih te an thlen theihna tur atan a ni.

- 3) **Feedback from Wage Collector:** GP President, GP Secretary leh GP Sanitation Supervisor te chuan sanitation worker emaw waste collector te chu titipuiin engnge an hmuh dan an zawt ang a, mipuite nena an thawhho dan chungchang thlengin hriat an tum tur a ni. Mipui/Chungkaw tin ten harsatna eng emaw an tawh thulhah leh mipui lam ten an tih ve tur an tih logh thuah pawh a tul a nih chuan harsatna chukiang turin an inrawlh ve tur a ni a, An ngaihvenin thiam takin/rualkhai takin an dawr tur a ni.
- 4) **Physical Verification:** Bawlhhlawh khawntu ten hna an thawh laiin GP Sanitation supervisor te chuan an vil reng tur a ni a, chu chuan harsatna tam tak a sukiang ang. Chuti ang bawkin, Hun a neih apiangin GP President chuan a vil ve bawk ang. A theih hram chuan GP President chuan veng/thler tina bawlhhlawh paihna hmun te chu tlawh chhuak se la, chu chuan mipui teah ronna a pe dawn a ni. GP President chuan veng chhung faina a ngaipawimawh em em a, a tak takin hna a thawk a ni tih mipui ten an hriain an ring thei dawn a ni.
- 5) **Corrective Measures:** GP hotute chuan system tha zawka kalpui a nih theih nan faina lama thawktute leh mipui/chhungkaw aiawh te chu an titipui ang a, hnasawnna tur awm thei te an ruahmanpui thin tur a ni a. GP ten bawlhhlawh tawih thei sawngbawlna kawnga tawnhriat an neih nasa ang zelin thla tinin hmasawnna hmuh tur a awm zel ang.

ALOE VERA

INTRODUCTION:

Damdawi atan a *Aloe vera* (*Aloe barbadensis* Mill.) \angkaina hi kum 1550 BC hunlai daih tawh a ziah Egyptian te lehkhaziak *Papyrus eber* ah chuan a lo chuang daih tawh mai a. He thuзиakah hian Aloe vera leh thildang chawhpawlh a taksa pawnlam leh chhunglam enkawl na damdawi siamdan chi 12 zet a inziak nghe nghe a ni. Aloe vera hi Afrca ram lum leh ro zet a\ang a rawn chhuak ni mahsela dawmdawi atan leh cosmetic atan a hman nasat a nih avang hian khawvel hmun hrang hrangah an ching fer fur tawh a ni.

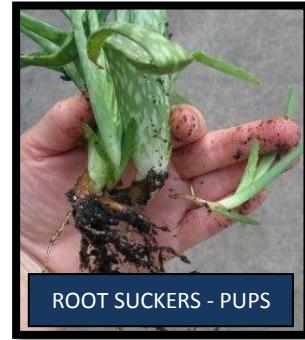


SIK LEH SA LEH LEILUNG:

Aloe vera hi sik leh sa eng ah pawh; ruahui tamna hmun a\ang thlaler hmun thlengin a chin theih deuh vek mai a. A tui mamawh tlem em vang hian khaw khen kumtluan na hmunah pawh \ha takina chin theih a ni. Lei engpawh ah a chin theih laiin lei in thlithlawr \ha leh thlai \awih tamna lei hi angeih ber a, ni eng \hatak hnuiah a \hang \ha duh bik hle bawk a ni. Daihlim hnuiah chuan natna leh rannung ten an bawm duh bik hle. Tuitling a ngaitheilo hle mai a, heivang hian hmun sang deuh leh tui luan ral zung zung thehna hmunah chin hram hram tur a ni. Tarlan tawh angin lei ro leh chhe tak ah pawh a \o thei a, amaherawhchu, lei dur balu lei lam deuh (sandy loam)alkaline lam deuh pH 8.5 thleng nei lei te hi angeih ber a ni. Aloe te hian 20-30cm aia thukah zung an kaih ngailoh avang in phun dawn pawhin lei chhung zuk leh thlen kher a \ul lemlo a ni.

CHIN PUN DAN:

Aloe vera hi atlanpuin a sir chawr (rootsuckers-pups) \angin an phun darh \hin a, a chawrno tan chhum pawh in a phun darh theih bawk a ni. A kung chawr 15-18 cm a sei emaw a bul tan emaw chu hmun thum a \hen hmun hnih lei a phum in phun tur a ni a, thlai kung leh thlai phunna tlar chu 60 cm x 60 cm a inhlat in siam tur a ni. Thlai phun thar chu a bul vel muk \ha tawk takin kan nem tur a ni a, tui tling tur venna atan tui paihna \ha tawk tak kan siam bawk tur a ni.



ROOT SUCKERS - PUPS

PHUN HUN:

A kung chawr (Suckers) te hi a nun \hat theih na'n leh a \han \hat theih na'n fur lai; July-August ah hian phun \hin tur a ni. Amaerawchu, tui chawmtheihna hmunah erawh chuan thlsiklai tihloh chuan kumtluan in a phun theih reng a ni.

INTERCROPPING:

Thlai phunkum hian ram 40% vel hi hman\angkai lohvin a awm \hin a, ram awl hmang \angkai thei tur a ruahmanna \ha tak neih hi a pawimawh hle a ni. Hemi atan hian, thlai puiber nen a in el vaklo tur chi thlai hrang hrang heng – Cluster bean-te, Badam-te, Coriander-te, Cumin leh adt. hi lakluh-lailawk (Subsidiary income) atan a \ha hle a ni.

EICHHETU RANNUNG LEH NATNA

Aloe vera hian eichhetu rannung leh natna hi a nei meuh lova, amaherawhchu, hmun\henkhatah erawh chuan mealy bug-te leh anthracnose natna a awm ve \hin bawk. TLumpi

avanga harsatna a awm veleh zauh \hin bawk a, tui pek in he harstna hi chu awlsamte in a sutkian mai theih a ni.

THLAI SENG:

A hnah no leh tharlam te kan in a hnah hnuailem upa deuh te hi kut in awm Tractor hnuh chi disc harrow emaw cultivator hmangin emaw an seng \hin a ni a. Thlai phun a\ang a thla 18 (kum 1 leh achanve ah) thlai hi a seng \an theih mai \hin a, amaherawhchu a hlawk tak tak hun chu kum 5 a nih ah a ni a, hemi hnu hian phun \hat leh tur a ni. India ramah chuan damdawi hmanglo a chin hian 12 tonnes/ha (a tharlam a buk in) hi thar chhuah dan tlanglawn tak a ni.



PASSION FRUIT

INTRODUCTION

Passion Fruit, Mizovin *Sapthei* kan tilh hi a scientific name chu *passiflora edulis* a ni a. Brazil ram thei a ni a, khawvel ram dangah pawh a darh zau ta zel a ni. India ramah chuan Western Ghat huam chhung Nilgiris, Wynad, Kodaikanal, Shevroy, Coorge leh Malabar bakah Himachal Pradesh leh Northeast State hrang hrang Manipur, Nagaland leh Mizoram ah te a tual to hmuh tur a tam hle. Sapthei hi a tui mai bakah a rintui em avangin a lar a, ngaihhlut a hlawn em em a ni. Theitui (*squash*) atan leh thil siam chhuah dang tihrimtuina'n an hmang nasa hle. Sapthei tui (*juice*) hi a tui em em a, a hrisel bawk a, chu vang chuan miin an ngaina hle a ni. A tuina belhchhah turin thei dang, heng lakhuihthei (*pineapple*), theihai (*mango*), sawhthing (*ginger*) tui (*juice*) ten en pawh an chawhpawh fo bawk. Sapthei hi chi thlum/hmawmsawm thlum (*confectionery*) siamna atan te, cake leh chhang chhang dang te leh ice cream siamna'n te an hmang uar hle.



CLIMATE AND SOIL

Sapthei hi ram lum (*tropical & subtropical*) hnawng bawk si-ah a tha duh em em a. Tuifinriat zawl atanga 2000m vela sang, kum khata ruahui 1000m – 2500m dawng ramah a tha duh a ni. Sapthei hian khaw lum lamah 20°C - 30°C vel a mamawh a, 15°C aia hniamah chuan a than a muang a, a par tha thei thin lo. Tui luan ral zung zung theihna hmun, *light sandy loam soil*

(sawntlung lei leh tiauvut inpawl), a pH value pawh 6.0 – 7.0 velah a tha duh ber a ni. Lei hnawng tha tak, *organic* lei (thlai leh rannung/ramsa tawih leitha), lei al (*salty*) lo-ah a tha duh em em a ni.

PROPAGATION

Sapthei hi chi (*seed*) neia inthlahpungtir theih a nih bakah a tang phun leh *grafting* (thinga thing dnag tang bel) hmangin a chin pun theih a ni. A chi tuh leh *grafting* hi a a tang phun aiin a hrisel zawk a, a thar hlawk zawk bawk.

SPACING AND PLANTING

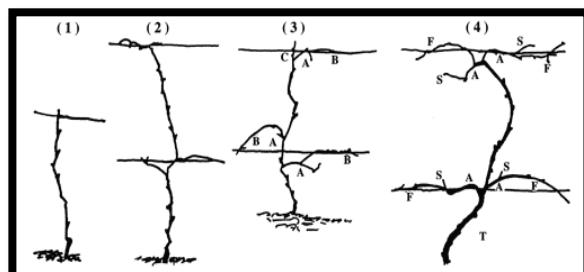
Sapthei kung inkar hlat zawng hi a *variety* a zir te leh training kan dawn a zirin a danglam thei ang a. *Kniffin system*-ah chuan 2m x 3m hi hman a ni a, chuti ang a nih chuan hectare khatah kung 1666 a chin theih a ni. *Bower system*-ah ve thung chuan a kung inkar hlat lam hi 3m x 3m a ni ve thung a, hectare khatah kung 1110 a chin theih ang.

PREPARATION OF LAND

Thli-in Sapthei hrui zam a tihchhiat theih bakah a zam dan tur dik tak (*trellis*)-a a zam tur a tiikhawloh theih avangin kan sapthei huan siamna hmun tur chu thli tamna/natna hmun a ni tur a ni lo. Ram awih tlan (*hill slope*) emaw phaizawlah emaw 3m x 2m a inkar hlatin khur 45cm x 45cm a thuk laih tur a ni. Kan khur laiah chuan lei chunglang chi thum leh leitha-a chang thei hnime hnime leh eng ilo (compose) chawhpawl tur a ni a. May – June inkar, monsoon ruahuu tlak hnuu, chhum tam ni-ah sapthei chu chin tur a ni. A lei titatu atan thali dang pawh chin tel theih a ni a. Aieng leh sawhthing bakah thlai kumhlun lo dang te pawh a chin theih a ni.

TRAINING AND PRUNING

Sapthei zam dan dik taka zamtir tura thununna/training hi a pawimawh em em a. A thar hlawk leh hlawk lohah nasa takin kawngro a su a ni. A zamna tur hmanraw derdep (*weak*) leh *trellis* dik tawk lo avangin lei lamah a zam thla hnup thei a, a hrui tam tak a chhiat phah thei. He thil (*lateral*) hian



sapthei rah theihna tur a hrui tam dan a hril a ni. *Trellising* kan tih hi thil pawimawh em em a ni a, a thar hlawkna atana thil pawimawh tawp a ni. Sum seng tlem si lova sapthei kung/zam enkawl dan tha ber chu a hmaa kan sawi tawh *kniffin system* kha a ni a. Ban (*pillar*) 2.5m a sang phun thliah thliahin a inkar hlat lam chu 3m vel ni se la, tlar 4-in a kawkalh zawngin gauge wire 9-10 vel zam bawk ila duhthusam a ni. *Trellis* chu

mual dung zuiin emaw chhim leh hmar zawngin emaw zam ni se la, tichuan sapthei chuan ni a dawng tam thei ang. Hun bi neia a zing thei ang bera hlawi (*pruning*) hi a pawimawh em em a, kuang/hrui thar hrisel a chhuahna'n leh hlawk zawk thar theihna tur a ni. A rah seng a nih hnu hian a *lateral* chu zik 4-5 vel tan thin tur a ni. Sapthei hlawi (*pruning*) hi a rah seng zawk hnu, Appril leh December thlaah te tih thin tur a ni.

HARVESTING AND YIELD

Sapthei hian phun a nih atanga thla 10 hnuah rah a chhuah thei a, a thla 16-18na thlengin a rah thei. Kum khatah vawi hniih a rah thin a, August – Decenber leh March – May inkarah te a rah tlangpui. A sen atanga ni 85 – 90 ah a hmin thin. A rah a rawn senduk deuh riai tawh chuan a lawh theih tihna a ni a. Sapthei lawh reng rengin phih tlak tawp tur a ni lova, uluk takin a rah bul lam kuang (*stem*) tlem nen lawh tur a ni. Sapthei rah hi a chhiat hma avangin hrall zung zung a ngai a. Chuti a nih loh chuan a buk a rit lova a hmel pawh a mawilo thin a, a hlawk thei lo a ni. A hawng/pil a lo sawng/chuar a, a chhung erawh chu rei tak chhung a la tha thei a ni. *Variety* hrang hrang thar hlawk dan a inang lo viau a. *Purple Variety* (a hmin duk chi) hi hectare khatah 8-10 ton vel a thar thei a, *hybrid kavery* hi hectare khatah 16-20 ton vel a thar thei a ni. Kung (*vine*) khatah hian 7-9 kg (rah/pum 200 – 250) vel zel a thar thei a ni.



CHAPTER V

COMPONENT 9-10:

1. THINGPHUN A NGAW SIAM

NREGA leh National Afforestation Program (NAP) kaihkawp hi a hlawkthlak em em a.National Forest Policy¹,1988 in a lo hmathlir angin kan lei hmun thuma thena hmun khat hi ngawa siama thingphun khah vek hi Environment and Forest Ministry chuan a hna hlen tum a ni .He hna hi a hautak em avangin MoEF ngawt tan chuan hlen a harsa a. **NREGAS** nena tankawp chuan a awlsam sawt dawn a ni. NAP inkaihhruaina bu-ah pawh thingtlang lam hmasawnna tur programe nena kaihkawp tha a ti a, chu chuan ramngaw kilkhawr deuh leh khawtlang / mimal ram te chu a zavaiin hma a sawntir thei ang. Mihring leh ramngaw te inkungkaih dan ngaihtuah ran chunga thawhdunna chuan NREGA hnathawhnaah ruahmanna siam chungchangah leh ramngaw humhalh chunga hnathawhnaah nasa takin a pui dawn a ni.

NATIONAL AFFORESTATION PROGRAMME (NAP)

NAP hi sawrkar laipui ruahman ang thlapa kalpui a ni a. A tum ber chu mipui tam zawk huap tela ramngaw hlutna hman tangkai a, a bikin hmun kilkhawr leh mi harsa zawk tana hmasawnna hi a tum ber a ni. NAP scheme hian Joint Forest Management Committee (JFMC) village level ah leh Forest Development Agency (FDA) forest division level a kalpui mekah te puihbawma tihchak a tum ber a ni.**NAP** Scheme hnuia sum hmuhte hi ramngaw siamna tur atana tih a ni. A hlawhtlin nan chuan a puibawmtu awm ve a tul bawk a ni. Heng atan hian sum hmuh theih a ni :

(a) **Ramngaw siamna atan:**

- Leilung pianken siam thar leh nan
- Mihring siam chawp tih hmasawn nan
- Mau phun nan
- Hrui chi phun nan
- Damdawi atana hman theih chi hrang hrang phun belh nan
- Hlobet leh hnimbuk kumtuana nung tih thar leh nan
- Ran peh tur phul hnim tih hmasawn nan

(b) Khawtlanga JFMC leh pawl te dang te tih hmasawn nan

(c) Leilung leh khaw ro leh hnawng tur ven nan

(d) Entry Point Activity (khawtlang hmasawn nan ; Hactare khat thingphunah Rs.4000 vel zela puih nan)

(e) Ram hung nan, endika a hlutna chut nan,training, awareness atan

NAP hi thuang hniha kalpui niin, Forest Development Agency hi forest division level-ah leh Joint Forest Management Committee (JFMC) hi village level-ah te a ni.

Thuneihna sem zai te, mipui tam zawk tel avang leh NAP hna kalpui dan avang hian NREGA hna thawh a phuhruk thui thei hle a ni. NREGA hna hi PRI in a kalpui a ni a, zaa sawmnga hi Gram Panchayat in a thawh a ni bawk. A department thawhpui thenkhat forest department te pawh a ti hlawhtlingtu te zinga mi an ni a,a kalphung erawh chu forest department te duh angin a ni thung. NAP hnuiaia project huam chin chu ramhnuai leh khaw inrina leh ram intawm te, vantlang ram te, revenue ram duh tawh loh te,thlawhhma ram leh mimal ram te, NREGA hnuiah pawh an thawk tho bawk a ni.

CONVERGENCE TEHNA TUR TE

NREGA hnuiaia convergence(Department hran tangkawpa hna khat thawh dun) a hna thawh turte chu NREGA tehna hmanga ruahmana thawh tur a ni, chungte chu:

- a) Hna thawhna atana sum hmuh za a sawmli ai tam hi hna thawktute hlawh atana hman loh tur a ni.
- b) A theih chin chinah hna te hi kut ngeia thawh a khawl hman loh tur a ni.
- c) Contractor rawih phal ani lo.

NREGA LEH NAP TE CONVERGE TURA NGAI TE

Heng programme pahnih NREGA leh NAP te thawhdun nan chuan heng kawngah te hian an inkaihkawp a ngai dawn a ni

- (I) Enkawl danah
- (II) Ruahmannna siamah
- (III) Hna thawhnaah

ENKAWL DANAH

DPC NREGA (Collector/ CEO)-ah chuan district level-ah District Resource Group awmin Forest Department leh Rural Department , Panchayati Raj leh Block level a group atangin aiawh te an tel tur a ni .

Group te tangkaina tur

- (a) **Hriatna** insem : NAP leh NREGA inkaihhruaina danin a phut anga group member zawng zawng inhriatchian. Hei hian hna converge tur lrh tur loh chungchanga programme tehna tur a ti chiang ang.

- (b) **Ruahmanna siam** : He programme pahnih hnuiah hian hna kal mek a awm lain, ruahmanna thar siam ngaite a awm bawk a, group ten hna kal mek te enfiah ruahmanna thar tul ang te an siam bawk a ngai ang.
- (c) **Inbialpawhna** : Heng programme pahnih te hian mipui tam zawk tel theihna an duh avang hian khawchhung mite, group hmang tangkai tu te, hnathawk te, ramhnuia cheng te nena tha taka inbiakpawhna tur ruahmana tihpuitlin a ngai bawk.
- (d) **Training** : NREGS leh NAP atana thawktu mimal/pawl a mawhpurtute training pekna tur ruahmana tihpuitlin.
- (e) **Technical support** : Thing phuna rawngaw siam anih nan chuan khawl lama mi thiam bik ten hmanraw hman awm tawk leh phal chin te, hna tur thlan nan leh ruahmanna siam nan te a tul anga kawng an kawhhmu a ngai bawk. NREGA hna thawhte endika chhuizui a nih nan thiamna mamawh ang chu NAP in a pe tur a ni a, tichuan duan lawk angina hna a kalpui theih dawn a ni.
- (f) **Hmanraw pawimawh tan ho tir** :
- (i) **Mihring** : NREGA hnuiah hian mimal tana kawng hawn tur a ni a. District a afforestation kalpuinaah forest department atangin aiawh a intirh theih a, tin, mimal thiamna in a tlin chuan contract a thawhtir theih a ni bawk.
 - (ii) **Sum** : Sum lam dinhmun inhrilh hriata kum lo kal leh tura sum hmuh beisei zat te sawi ho tur a ni a. Hei hian hna kalpui theih chin te, khawilaiah nge converge a sum tihpunna tur leh eng programme hnuiah nge kalpui tur tih te a hril bawk.
 - (iii) **Hriattirna lam** : Inenkawlna thil vel inkawhhmu chu NREGA MIS kal tlangin a hna thawh/thawktu bika then darhin a in converge theih a. NAP in belh duh dang a neih chu NREGA MIS leh RD Ministry te sawi dun hnuah belh leh theih a ni.
- (g) **Vil zui leh a hlutna chhut** : A huhoa hna te en a vil zui fo tur a ni a. A bulthut enfiah a, hna thlithaia NAP leh NREGA hnathawhin khawtlang mamawh te ramngaw tichhe lova a phuhruk dan atangin a teh theih a. A chhawr tangkaitu an tam chuan hna kalpui zel theih a ni.

HNATHAWH DAN LEH RUAHMANNA SIAM KAWNKA CONVERGENCE KALPUI DAN TUR

NAP nena in converge chuan a lem ziaka ruahmanna siamah leh annual plan ah te telh ve ngei tur a ni a. NREGS inkaihhruaina dan chuan district hmasawnna tur bik awmze thlir chunga plan siam tur a ruat a. A tum ber chu NREGA hna thawhte district a tih zui tlak leh hna thawh tur daih rei leh chhawrzui tlak lo thliar hran a ni. NREGA ziaka ruahmanna siamah chuan sector hrang hrang te mamawh leh inhlauhna te NREGA hnuia hna thawh chauh nilo ah pawh a thai

lang bawk. He plan hnuiah hian thingphuna ramngaw siam hi kalpui a tha a. Kum tam tak chhung kalpui atana tha tak a ni.

NREGA hnuia Annual Work Plan (NAP) chuan Gram Sabha pawm tawh hna thawh tur a thliar a, chung chu Gram Panchayat/IP/ZP ah te thutlukna siam a ni a. Lem ziak nen thlapa plan siam anih chuan AWP chuan chung zulzui chuan hna a thawk anga a,mahse Gram Sabha in a pawmpui a tul thung ang. NREGA plan chu NREGA hnuia hna thawh theih chin huam chauha siam tur a ni.

Ruahmanna tenau deuh chu JEMC/EDCS in NAP guideline angina a buatsaih ang a, chu chu FDA kaltlangin NAP hmsawn nana hman tur a ni. NAP hnuia thawh tur ruahman te chuan heng hi a huam –

- (I) Lei awmsa leh boruak hnawnna teha humhalh
- (II) Engineer te ruahman siam hmanga lei leh boruak hnawnna te humhalh.
- (III) Tangkaina nei tam thing te,hnim te,hnim buk te leh bekawm nei chu te leh thing tum chi ni lem lo te pawh phun a chin tam.
- (IV) Thintlang lam mite tana tangkai tur tuah chi thing leh ran chaw leh phul hnim phun uar.
- (V) Damdawi atana hman chi thlai tualto te humhalha tihpun.
- (VI) Mau ,hrui chi leh damdawi chi thing leh mau enkawl zui.
- (VII) Tuipui kama ram chin venna atana hman theih invet kual chi hrui te harsatna hmuna dah tam.
- (VIII) A hnam anga hmalak.
- (IX) Agriculture leh silk pangang leh a dangte a remchan anga tihhmasawn.
- (X) Thing pangai leh tuah chi thing bim humhalh nan thing heh lo thuk sem.
- (XI) Thil thar thehdarh nana hmalak.

A chung no (i) – (iX) te hi NREGA hnuiah pawh a thawh theih a. Chuvang chuan heng hna ramgaw lam kaihhnawih, khua intawm ram, khawtlang ram, revenue duh tawh loh ram, lo atana neih ram leh mimal ram te hmasawnna tur bik deuha hmalak. NREGA hnuia thawh tur te chu NREGS in a thlang ang a. NREGA hnuia thawh theih loh si, NAP hnuia thawh theih chu NAP in a thlang thung ang.

HNA A TAKA THAWKTUTE

Forest department leh Gram Panchayat te bakah Joint Forest Management te pawh hi a taka thawktu an ni ve bawk.

HNA THAWHNAA TIH DANGLAM THEIH LOH

- (a) NREGA hnuiah Job Card nei chauh chhawr phal a ni.
- (b) Hming lama bu neih a chu chu Gram Panchayata a copy dah a nrega.nic.in ah te dah luh bawk tur a ni.
- (c) Gram Sabha kaltanga social audit neih thin tur.
- (d) Bank account / post office mumal lo atanga hlawh sem loh tur.
- (e) NAP atanga sum te hi NAP hnuia ramngaw siam anih chauhin dawn theih a ni.

PROGRAMME CONVERGE NANA HRUAITU TUR

District thlan bikah an ram leilung azirin programme tam tak converge theih a ni a. Chung te chu a chunga tarlan anga kalpui tur a ni. Hruaitute chuan zirchiangin an chhui ho ang a hna thawh belh tur te pawh an enzui ang.

NREGA LEH NAP KALTLANGA SUM HI HMUH TUR A NI

HENG INKAIHHRUAINA TE HI FOREST DAN HNUAIA KALPUI TUR A NI.

2. KAWNG SIR THINGPHUN :

Thuhmahruai :

NREGA thil tum ber pakhat chu , ‘Thingtlanga chungkaw tin tan kum khata ni za tal inhlawnha tur siamsak leh chu chuan chhungkaw tan ro hlu a chhuah in a daih rei tur a ni a, mi harsa te innghahna a chawikang bawk tur a ni’.

Schedule - I – para- 4 (I), (I). (v) hnuiah hian khawkheng tur venna atana ramngaw siam leh thing phun hna te thawh theih a ni a. ‘Kawngkama te, tui kawng bulah te, tui khuah bulah te leh tuipui kam velah te leh midang ramah pawh ramngaw siam a, thei chi leh thing pangai phun tur tih paragraph 5 na ah kan hmu’. Thingkung chauh hi kum tina chhungkaw tin tana rah tha chhuah thei ro hlu daih rei tak a ni. Chuvang chuan MGNREGA hnuiah hian thungphun hi ngaih pawimawh a ni.

Kawngkama Thing Phun :

Kawng hi chi hrang hrang a awm a chung te chu – national, state highways, PMGSY leh thingtlang panna kawng ten an ni a. Hmun tam takah thing phun ni mah se sum a tam tawk loh avangin kawng kamah te hian phun vek theih a la ni lo a ni.

Kawng kama thing phun hian ro hlu tak min pe mai ni lovin, kawng chhe tur te a veng a, mihring leh ramngaw te inrintawnna tinghetin khawlum zel tur te a veng bawk a ni.

A bul tan nan chuan PMGSY hnuiaia kawngkam thing phun bul tana, MGNREGA hnuiah ruahmanna fel tak nen National highway ah te phun bawk tur a ni.

A Thil Tum Te :

- i. Mi retheite tana innghahna tlak,tangkai leh ro tling pek an nih theih nan.
- ii. Thil nung leh kan chenna khawvel inkungkaihna tinghet paha tui leh lei humhalh chunga thing phun.

PMGSY Kawng Thliar Hranna :

Thing phunna tura PMGSY kawngte chu PMGSY field officer ten Gram Panchayat/Zilla Parishad leh MGNREGA officer te rawn chungin an thliar ang.

Pradhan / Sarpanch / Gram Panchayat leh Gram Rozgar Sevak member ten nen khua fangin a pawimawh tur ang chu fan chhungin lo chhinchhiah vek tur a ni.

Kawngah te pawh a sir tuakah thing a phun theih a, sawrkar ram remchang laiah pawh kawng hnah him chinah chuan tih theih bawk a ni.

National Highway Thliar Hranna :

National Highway te hi NHAI in a thilar hran tur a ni a. National Highway a thing phun hi NHAI nena thawkduna tihpuitlin tur a ni a,he hna thawhna tur sum hi NHAI leh MGNREGA hnuiaia State Employment Guarantee Fund atanga pek tur a ni.

Beneficiaries te Thliar Hranna :

He programme hnuiaia thing phunna tur chin kawng/tui kawng chu Gram Panchayat in revenue thuneitute nen an ngaihtuah.

Thingphun hna thawh tan anih hmain beneficiary tur te chu MGNREGA Schedule – I Para 5 na in a huam chin kawng sira chengte atanga thliar phawt tur a ni . Beneficiary te zingah hian kawng hnaiha chengte chu thlan hmasak tur an ni ang.

Beneficiary leh hna thawhna tur ram thlan chu MGNREGA inkaihhruaina dan angin Gram Sabha a pawm tur pharh tur a ni.

Gram Sabha in a pawm hnuah Gram Panchayat chuan beneficiary thlan bik te aiawhin thuneitute hnenah chuan thing phunna tur ram thlan bik te, beneficiary hming te leh thing phun tur hming te a thehlut ang.

Phalna :

- i. Thuneitute chuan Format I a dilna an dawn te chu phalna pek an nih leh nih loh tur an lo rel ang.

- ii. Thing phunna tur ram te chu mipui vantlang himna tur anih emaw, ram chu a remchan lohi emaw, inchuhbuai a nihin leh nakin lawka department in ala mamawh tur a nih chuan dilna hnawl theih a ni.
- iii. Thing phunna tur dilna hnawl anih chuan thuneitu sang zawk phalna pe theitu hnena dilna kalpui zel theih a ni.
- iv. Phalna pek anih chuan Format II angina midang ram hawh theih a ni a, chung ramah chuan phun sown mai mai chi ni lo, inrochun theih chi phun tur a ni.
- v. Beneficiary te chu thingkung 200 ai tam lo phunna turin ram pek an ni tur a ni.
- vi. Phalna pek tawhte chu heng a hnuia tarlan anga an lo awm anih chuan MGNREGA Programme officer in a report dan angin thuneitu sang zawk te atanga sut leh theih a ni.
 - (a) Scheme anga hna a kalpui lohin.
 - (b) Ram a tihchhiat emaw tihchhiat a tumin.
 - (c) A bul hnaia lo neitute ram a va dipdal in.
 - (d) Dan phalloh thil chu ram chhunga a tihin emaw tih a tumin.

Mi Ram Hawha Thing Phuntute Chu :

Mi ram hawha thing phuntute chuan an thing phunte chu an rochun thei ang a, mahse an phun sown thiang lova, thing phunna ramah pawh thu an nei lo a ni. Heng chanvo te hi tha taka hetianga thawk ten an chang thei a ni –

- (a) Chhungkuua an thing phunte an chawm len a, an humhim a, tui an pek that chuan.
- (b) Thing te chu an puitlin hnuah a kung tichhe lo leh mipui tana chhawr tangkai theih thildang tichhe lovin a rah an seng thei ang a, thing chu kih a tul chuan tha taka inrawn chungin a aiawh dang an phun le hang.
- (c) Ram pek chin nilo ram dang a dip dal tur a ni lo.
- (d) An ram chanpual tur pek chin tichhe zawnga thil tih emaw tih tum thiang a ni lo.
- (e) Dan phalloh thil tih nan ram chu hman theih a ni lo.

Thlai Chi Thliar Hran :

Thingkung chi thlan tur chungchang chu IRC SP 21:2009 in a duh angin Gram Panchayat leh Forest leh Hoticulture Department te nena inrawn chungin a phunna tur ram nen a inmil em tih te leh hmun ro, hnawng, chirh dum leh hmun al deuhah te a that theih dan thlir chunga thlan tur a ni.

A kum khatnaah chuan thing phun turte chu Gram Panchayat in Sawrkar Nursery emaw Forest Department te atangin a dap thei ang a. A kum lehzelah chuan Self Help Group ten nursery te enkawlin thlai an lo pe thei ang.

Nursery Siam Dawna Thlir Tel Ngai Te :

- (a) Nursery awmna hmun tur chu Sawrkar ramah emaw Self Help Group te in leh a vel ram hnaihah a awm ang a, tui a hniang hnarin plantation site lian bulah awm thei se a tha a ni.
- (b) Nursery siamna tur hmanrua te chu kan chhehvel boruak leh ram tichhe lo tur chi di leh mau te hman tur a ni.
- (c) Hmanraw awm anga a tha thei ang bera hung tur a ni.
- (d) Hnah atanga siam ip a awm theih chuan plastic ip aia hman uar a tha.
- (e) Ram huan leh thlawhhmaa leitha te a remchan zawk avangin leitha atana hman a tha a ni.
- (f) Nursery ah chuan a tul dan ang zelin rual ban chiah lo te, mi chak lo zawk te, kum upa zawk te, Job Card nei chhungkua te chu an theih ang tawk an thawh theih nan ngaih pawimawh hmasak tur an ni.
- (g) Thlai te an lo hrisel nan renchem takin enkawltu mamawh tur chu duan lawk angai a ni.
- (h) Nursery thlai tiak te chu mamawh ang khawpa tam 150% tleng pawh a phuhruk thei tur a ni.
- (i) Nursery a thlai chi zai ngai te chu Forest Department rawn chunga tih tur a ni.
- (j) Nursery a thawhtur ang thlai chi lo sawngbawl te, hun bik neia thlai chi zai ngai leh a dang te chu Forest Department hruaina hnuaria thawh tur a ni.
- (k) Nursery enkawl a buaipui tur SHG/Committee te chu Forest/Horticulture Department hnuiah zirtirna pek fo tur an ni.
- (l) Inkungkaih dan tur chin 60:40 hi Gram Panchayat ah tha taka vawn tur a ni.

1. KAWNGKAM A THINGPHUN (ROAD SIDE PLANTATION):

Introduction:

MGNREGS thiltum puiber pawimawhtak pakhat chu “ Sawrkar kum chhung athinglang a chhungkaw tin ten an mamawh ang zel a ni zâ aia tlemlo kuthnamawl thawk tur a inhlawhna siam sak a chung hmang a thil tharchhuak thei leh daihrei zawk bungraw din leh sak leh siam” leh miretheite eizawnna tihchak te hi a ni.

Schedule-I-para-4(I), I.(v) chuan “Vantlang ram te, ramngaw te, kawng kamte, tuilakna kam te, tuikhuah kamah te leh tuipui kam vel te a ramngaw siamthar te, thing phun te hi paragraph 5-na a a huam chin chhungkuate te dikna hriatsak chungin a phal a ni”. Kum tin a intodelhtheihna tur a rahchhuah nei thei awmchhun assets chu thing chiah hi a ni. Heivanghian MGNREGS ah chuan thingphun hi ngaihpawimawh em em a ni.

Kawngkam athing phun:

Kawng chi hrang hrang heng – national, state highways, PMGSY leh thingtlang khaw kawng hrang hrang kamah te hian thing phun \hin a ni a, amaherawhchu, phun thar na tur leh enkawluina tur fund tlakchham avang te in kawng tam tak kamah thing phun theih a nilo a ni.

Kanwg kam a thingphun hian rah a chhuah mai nilovin kawng venhim naah tha thawh ve in khuarel inbuktawkna awm thei tur in a pawimawh in khawvel lum zel tur ven kawngah a pawimawh hle dawn a ni.

A aitechhin nan, mumal leh awmzenei takin MGNREGS hnuiah PMGSY leh national highway kamah te thingphun tur a ruahman chhin a ni.

A thil tum :

- i. Thingtlang mirethei te tan a ngelng het, rahchhuah leh duah\ha eizawnna tling buatsaih sak.
- ii. Khuarel inbuktawkna a awm theihna tur atan a thingphun hna hmang a tui leh leilung venhim hnathawh

PMGSY kawng thlanchhuah:

Gram Panchayat/Zilla Panchayat leh MGNREGA officers te rawn chung in PMGSY officer in PMGSY kawng kama thingphunna tur te chu a thlang ang a (Kawng kam hmunawl \ha awmna te thlan tur a ni)

Pradhan /Sarpanch/ Members of Gram Panchayat leh Gram RozgarSevak te tel vekin Transect walk neih tur a ni (a phunna hmun tur thlang tur te, a zauh lam bituk tur te leh thing phunna chin leh phunlohma chin tilang tel sketch buatsaihna turin). Transect walk tih hian engkim fel tak a chhinchhiah tur a ni.

Kawng dung zui zawng in avenue plantation a tih theih ang a (kawng ko piah lamah), kawng ep a sawrkar ram awmna ah kawng himna ngaihthawh bawksilo in thing a phun theih bawk a ni.

National Highway thlanchhuah

National Highways chu NHAI in a thlang tur a ni. National Highway kam a thingphun hna reng reng chu NHAI te nen a thawhho ngei ngei tur a ni a, estimate a material component te chu MGNREGA hnuai a State Employment Guarantee Fund chhunluh zat bawk kha NHAI hian a chhung ve ang.

Beneficiaries thlan chhuah:

Revenue thuneitu te ne a inrawn chungin Gram Panchayat chuan he programme hnuai kawng kam a thingphun na tyur thui lam an bituk ang.

Hna \an hma in kawng kam a khua a\angin Para 5 of Schedule-I of the MGNREG in a tarlan chhungkua te a\angin beneficiary tur kan thlang in kan rem fel thlap tur a ni a. Heng thlanchhuah ho zingah hian kawng thlanchhuah kam a ram nei te chu ngaihpawimawh hmasak tur a ni.

Beneficiary thlanchhuahte leha kawng thlan te chu Gram Sabha pawmpui turin an hmaah pharh tur a ni.

Gram Sabha in an pawmpui hnuah chuan Gram Panchayat te chuan beneficiary thlanchhuah te aiawh in hmun thlanchhuah chungchang a thuneitu hnenah dilna (Proformain **Format I**-thil tel a ni) an siam in sheme hnuai a thingphun ang dil ang a, thingphun na hmun tur zauhzawng te, beneficiary hming te leh thing phun tur hming te chiang takin an ziak tur a ni.

Phalna:

- i. Format I hmang a dilna a dawng a nih chuan thuneitu mawhphurtu chuan phalna pek tur nge pek loh tur tih ah thutlukna a siam ang.
- ii. Heng te avang hian dilna chu hnawl theih a ni ang: (a) Vantlang himna ti derthawng thei a nih in, (b) ram chu inchuh emaw a remchanglo a nih in, (c) Nakin lawk a sawrkar department in an mamawh tur ram anih chuan.
- iii. Thingphun pallohma reng reng chu thuneitu sang zawk, thingphun phallo tu thupek sut leh thei leh phun phal tur a thupe thei hnenah a thlen leh theih a ni.
- iv. Phalsakna atan chuan Format II hman tur a ni ang a, chuchuan thingphun leh humhalhna kawng a thuneihna pe in thingte chu a in rochun theih rual in midang hlanchhawn erawh chu a remlo thung a ni.
- v. Beneficiary tin te chu thing 200 aia tamlo phun theihna tur ram an bituk \heuh ang.
- vi. Thuneitu sang zawk in MGNREGS Programme Officer report tlawhchhanin leh Ram venhimna a tana thuneihna pek a nih angin, ham\hatna dawngtu in heng a hnuai tarlan ang hi a tih chuan Phalna pek tawh chu sut leh theih a ni:
(a)Scheme ang a a tihtur ang a tih loh in.
(b)Ram a tih chhiat emaw tihchhiat a tum in.
(c)A ram ri a mi te ram a a luh in.
(d)Ram chhungah Dan palloh thil a tih emaw tih a tum in.

Usufructsor the Tree Pattas:

He scheme hnuiaia a Thing nei tur a Hamthatna dawngtu chu an thlahte lehzel tan pawha in rochun theih leh lak hran theih loh dikna chanvo an nei a ni, Mahse Thing awmna hmun ram te erawh chu a huam lo ang. An dikna chanvo an neih theih na tur chuan hmathatna dawngtu in hetiang a hna a thawh in:

- (a) An than chhoh zel na tur a hnathawh te, venhim te, chhungkaw mi tu emaw berin tui pek dan tur ruahman sa angin tui pek te a ni.
- (b) Vantlang thil leh Thing te chu tichhe lo in, a lo puitlin tawh chuan a rah seng theih a ni a, Tin, thingphun te chu kih a ngai anih chuan mumal taka in berawn in a dang phun leh tur a ni.
- (c) A ram atana pek a nih loh chuan mi ram ah a lut tur a nilo.
- (d) Ram pek chu a chhiat na tur in eng thil mah a ti tur a nilo.
- (e) Dan phalloh thil reng reng engmah ram pek chhungah a ti tur a nilo.

Thlaichi hrang hriatchhuahna:

Thing chi thlan chu Mipui ten VC te, Forest department te, Horticulture Department te berawn in leh Thing awm theihna tur leh ram ngaih zawng tur te: ram ro, ram hnawng,dum (Chirhdum), Ram al leh a dangte IRC SP 21:2009 a rawtna angin.

Thing phun dawn chuan VC ten Sawrkar nursery emaw Forest department atangin a kum khatnaah an la ang. Tichuan a kum leh a\ang chuan Self Help Group ten Nursery siamin thlai chi an pe chhuak tawh ang.

Nursery siam dawn chuan heng te hi hriat reng tur a ni:

- Nursery chu Sawrkar ram ah emaw SHG te in bul hnai, tui pektur awmna hmun leh Thing china hmun hnaiha a ni tur a ni.
- Nursery siamnana kan hmanraw hman te chu ram leilung in a huat loh zawng, Mau, Di leh thilthek te a siam tur a ni. The
- A hungna atan chuan thlai hring vek emaw a hmun a hmanraw awm ang ang hman mai tur a ni.
- A awm remchang a nih chuan hnah atanga ip siam leh a tlukpui te, Polybag nilo ho hmang tura hmalak.
- FYM remchang awm thei thei te chu lei\ha atan hman tur a ni
- Nurseryah hian a hnachhawp a zirin, a hlawk theih dan ber tur thlir chungin rualbanlote, taksa chaklohma nei te, upate leh Jobcard neite hnathawk tur a ngaihpawimawh hmasak tur a ni.
- Thlaite hrisel tak a an awm reng theihna turin nitin a enkawlhna thawh dantur mumal tak a relfel thlap tur a ni.
- Mamawh zat ang mil zel in nursery ah chuan thlai \iak siam tur a ni.
- Nursery atan a thlaichi mamawh te chu Forest department lam berawn chung a ngaihtuah tur a ni.
- Nursery hna \henkhat heng: phun hma a thlaichi sawngbawl te, a hun tak a thlai chi tuh te leh adt. reng reng hi Forest Department kaihruaina hnuai a tih zel tur a ni.
- Nursery siamna a tel SHGs emaw Committees te chu a khat tawkin Forest/ Horticulture Department in trainig an pe tur a ni.
- Gram panchayat 60:40 ratio hi vawn tlat tur a ni.

KUHVA



INTRODUCTION:

Kuhva (*Areca catechu*) hi a hel ei mai leh siamdanglam hnu a ei tur atan a buatsaih \hin a ni a. Ei mai bakah hian natna \henkhat heng; Leukoderma (vun natna chikhat) te, khuh te, kaih te, rulhut pai te, thisen tlachham te leh thau lutuk enkawlna atan te an hmang fo \hin a ni. A hnah kau hi vawikhat-hman thleng leh no siamna hmanraw \ha tak a ni bakah plyboard te incheimawina leh milem tarna siamna hmanraw \ha tak a ni bawk a ni.

SIK LEH SA LEH LEILUNG:

Kuhva hi MSL 1000 lai a sangah te pawh chin theih \hin mahsela hmun sang lutuk hian a quality a nghawng \halo viau thei a ni. Sik leh sa 14°– 36 °C a nih hian an \hang duang hle. Khawlum leh vawt lutuk leh chhun rei lam danglam nasat lutuk na hmun hi kuhva hian an ngeih meuhlo a ni. Laterite soil leh red clay soil hi kuhva chinna atan a lei \ha ber a ngaih a ni.

A PHUN:

Kuhva \iak thla 12 – 18 hi phun a tan chuan an hmang tlangpui a, a phun kar dan (plant to plant) hi 8.8 ft (8.8ft x 8.8ft or 2.7m x 2.7m) a tih tur a ni a, Square emaw rectangular emaw triangular emaw quincunx system emaw phun \hin tur a ni. Mumal tak a thlai ohun hian nisa lutuk lakah thlai te a vneg thei \hin a ni. May – June emaw fur \an tir lai hi kuhva phun hun \ha ber a ni a, tui tlinduhna hmun tlaklei hmun ah erawh chuan August- September-ah a phun chi ber a ni. A phunna tur khur 90cm x 90cm x 90cm a laih ah leichunglang leh FYM leh



balu te chawhpawl h a khur mawng a\ang a 50-60 cm thleng hnawhkhah a, a khur laitakah chuan kuhva \iak chu phun tur a ni. Thlai \iak phun chu a bul vel nghet tak a nem muk tur a ni a, a colar thleng lei a vur tur a ni.

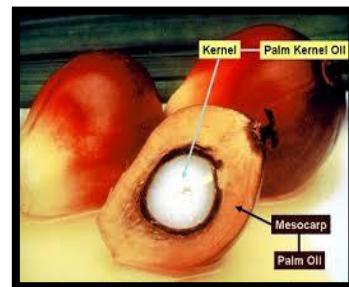
INTERCROPPING:

Kuhva nen a thlai kan chin pawlh tur reng reng te chu daihlim mngam tak an ni tur a ni a, tin, kuhva kung te nen a lei\ha leh tui inchuh NASA tur chi thlai an ni lo tur bawk a ni. Thlai kan chin pawlh te reng reng hi hrall leh tihral awlsam tak an nih a pawimawh hle a ni. Heng thlai; Balhla, lakhuihthei, pangbal, kalwbahra leh adt. te hi thlai chinpawl atan a \ha te an ni a, heng hi kuhva chinna hmun a zirin a danglam thei bawk ang.

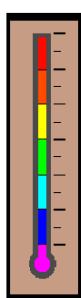
OIL PALM

INTRODUCTION

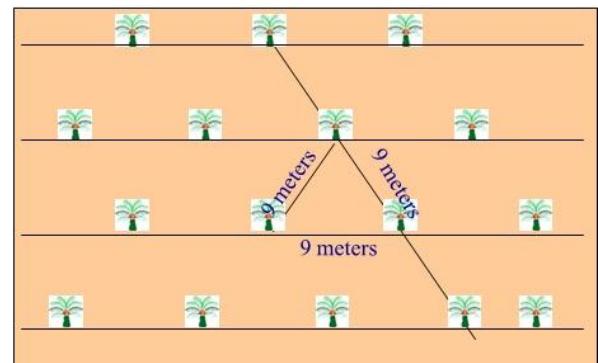
Oil Palm (*Elaeis guineensis*) hi thlai kumhlun zinga oil nei ngah ber a ni a. *Palm oil* leh *palm-kernel oil* a pe chhuak a ni. Choka leh ei siam lam thil atan leh *industry* lamah te an hmang NASA hle.



CLIMATE AND SOIL



Oil palm hi hmun lum leh hnawng, khaw lum lam a sang berah 29°C - 33°C leh a hniat lamah 22°C - 24°C ah te a tha duh em em a. Ruahtui tlak thatna ram, kum khata 2,500 – 4,00 mm, humidity 80% leh ni khata darker 5 tal ni eng dawng a ni tur a ni. MSL 900m aia sang thleng a thang thei a. A lei ngeih zawng hi a danglam thei hle bawk. Lei hnawng tha tak, dur tha tak (tlaklei) kan tih ang chi-ah te leh *alluvial soil* (tui lianin leivung a len khawm), tui tamna hmun-ah te a tha duh em em a ni. A lei pH value chu 5.5 – 8 ni thei se a tha ber bawk.



PLANTING

Oil palm hi eng hunah pawh a chin/phu theih a, duhthusamah chuan ruahtui tlak tam hun lai (*monsoon season*) ni se. Phun atan chuan, a chi thla 10 – 14 a upa \iak, 1-1.3m a sang, hnah 13 vel chhuah tawh leh bul vawng \ha nelh nawlh ni thei se. Oil palm tiak tir chu kil thum nei (*triangular system*)-in a inkar hlat zawng 9m (30 ft) vela phun tur a ni a, hectare khatah kung 143 vel phun ni se, a khur zau lam chu 60cm x 60cm a ni tur a ni.

INTERCROPPING

Oil palm kung hian hmun a duh zau em em a, a puitlin hun chhung pawh kum 3 lai a ni thei. Chumi a nih avang chuan oil palm chinna hmunah hian thlai dang tam tak, heng thlaihnah lam te, be lam chi (*pulses*) te, balhla te, pangpar te, vaihlo te, hmarcha te, lakhuihthei leh thlai dang tam tak a chin theih a ni.

IRRIGATION

Oil palm hi thlai thang duang tak leh thar hlawk tak a ni a, tui pawh a mamawh tam hle a ni. Tui a tlakchham chuan kau (*leave*) a chhuah tha thei lova, a rah (*par*) a tha thei lova, a thar hlawk thei lo a ni. Oil palm puitling tawh kum 3 chin hian a tlem berah ni khatah tui *littre* 150 tal a mamawh. *Drip irrigation* hmanga chawm a nih chuan *pipe hnawh* (*clogging*) tur ven te, tha takin tui a luang em tih te endik reng a ngai a ni. Darkar 5 – 6 chhungin tui *littre* 150 – 200 vel a dawn theih chuan duhthusam a ni.

ABLATION

Ablation chu kan palm chin, a par kak, a nu leh a pa lo insiam lakchhuaha tihran a ni ber mai a. Hei hian palm chu a venghimin chakna a pek mai bakah a zung a tinghet bik em em a ni. *Ablation* hi a par kak rawn chawr tantirh te-ah a tih nghal theih a, kut hmangin emaw ablation tihna khawl IIOPR hmang emawin a tih zung zung theih a ni. Tichuan, ablation hi kum 2.5 – 5 thlengin a tih theih a, kan palm len lam leh than chak dan leh a hrisel danah a innghat hle a ni.



HARVESTING

Oil palm hi chin a nih atanga a kum 4-naah a seng theih tlangpui a. A chinna hmun sik leh sa a zirin a par (rah) atanga thla 5-6 velah a seng theih thin. A rah bawr seng dan kalphung (*nature of harvesting*)-ah a quality leh a thar tam lam a innghat thui hle. A hmin tantirh ni 7-10 inkar chhungin a tlem berah oil 20% a insiam hman. A rah (*fruit*) thenkhat a tlak pheuh pheuh tawh chuan a seng a hun tihna a ni a. A seng hun aia tlaia seng a nih chuan a rah a til nasa ang a, kan thar tur aia tlem kan thar ang a, a *quality* pawh a hniam phah dawn a ni. Chu bakah chuan *labour cost* (hlawhfa mana sen ral) a snag bawk ang. A hun hmaa seng (a hmin hmaa seng) pawh a tha chuang lova. A chhan chu oil tam tawk a inseam hman lova, chu chu loneitu tan a hlawk lo a ni. Chu vang chuan a hun taka seng a nih theihna'n ngaihven reng tur a ni.

YIELD

A chi (*variety*) avang te, a chinna huan upat danah te, a ngei zawng boruak a zir te leh a enkawl danah te a thar hlawk dan a inang lo thei hle. A tlangpuiah chuan oil palm hian hectare khatah 15-20 t FFB thar chhuak thei tura ngaih a ni.

BALHLA

INTRODUCTION:

Balhla hi khawvel hmun hrang hrang a thei ei nasat ber te zing a mi a ni a. Balhla ei hi thisen hniam tan a \ha in thawhah leh ngâwt natna thlen theihna pawh tihniam thei a rin a ni. Tun dinhmunah hian khawvel ram hrang hrag 107 zetah balhla hi chin \hin niin khawvel a sumchang thei hluber zing a pali-na dinhmun hauh thei hial khawp a ni. America mipui te hian apples leh serthlum an ei zawng zawng belkhawm aiin balhla an ei hi a tam zawk a chhut a ni.



SIK LEH SA LEH LEILUNG:

Tui luanral zung zung theihna leh lei in thlithlawr \ha deuh hmunah chuan Balhla hi a chin theih deuh vek mai a. Tlaklei dur (Clay loam/ Vertisol) ah ai chuan balu leidur (Sandy loam) ah hian balhla hi a \ha duh zawk a. Lei thur lam (pH) 6.5 a\ang a 7.5 inkar hi duhthusam nimahse enkawl deuh chuan 8.5 thleng a lei thurah pawh a chin theih a ni. Balhla \han \hatna atan a boruak lumdan duhawm ber chu 20° – 30° C vel a lum leh kum khat chhung a 500 – 2,000 mm ruahsur hi a ni. Lei in thllithlawr \halo a tui tling hian a \han a ti \hu \hin a ni.

A PHUN DAN:

Balhla chi hrang hrang hi a phun dan karhlat lam a inanglo thluah a. Balhla phun hlawk dan, High Density Planting sysytem-ah chuan thlai phun in karhlat lam hi 1.2m x 1.2m x 2m a ni a, hemi awmzia xhu thlai kung leh thlai kung (plant to plant distance) hi 1.2m tihna a ni a, thlai tlar leh thlai tlar (row to row) erawh chu 2m aa ni tur a ni tihna mai a ni. Thlai tlar kar 2m zuah awl hi hmunawih deuhah phei chuan a pawimawh em em a, thlawhfai leh thlai enkawl bakah seng hunah chetvel a ti nuam em em bawk a ni. A phunna atan hian khur 60 cm³ (2ftx2ftx2ft) laih tur a ni.

A PHUN HUN:

15 June a\ang a 15 July thleng hi balhla phun hun \haber a ngaih a ni a, amaherawhchu, tissue culture balhla te erawhchu kumtluanin a phun theih thung a ni. Phun hma lutuk hian thlasik nat lai tak hian a bu rawn insiamin a puitling 7\ha theilo \hin a, heihian thlai thar a ti hniam thei a ni. September – October thla a boruak lum lutuk leh thlasik na lutuk hian balhla bu \hang tur a ti \huanawp thei a ni.



INTERCROPPING:

Hnim \o tur dip atan te, lei ti \ha tur te leh tharchhuah ti pung tur balhla leh thlai dang chinpawlh hi chindan tlanglawn tak a ni a. Kumkhatnaah chuan heng thlais; bekang, behlawi, beans leh bal lam te hi an chin pawlh tlangpui a ni. Thlai \henkhat nematodes leh lei a\ang natna paw awlsam bik deuh te chu chin pumpelh hram hram tur a ni. Bawkbawn leh cucarbits lam chi hi chinpawlh loh a \ha bawk. Balhla la naupan lai chauh hian thlai chinpawlh \hin tur a ni a, a lo len hunah chuan thlai dang chin pawlh loh a \ha.

BALHLA ENKAWL DAN PAWIMAWH BIK TE:

A hnuai a balhla enkawl dan kan tarlan hrang hrang te hian balhla tharchhuahthehna leh quality a nghawng avangin a pawimawh em em a ni:

i) *Desuckering / Pruning (/hawlh/ Tan)*: A kung chawr (Sucker) zuah tam lutuk hina a tharchhuah a ti tlem thei a, a kung puitling tur thlan fel a nih hnu hi chuan a chawr ve dang paih mai hi chindan \ha tak a ni. A kung pui ber nen a thla 2 kar hlat a rawn par zuah hi duhthusam a ni a, a kung pangai rawn vui zagh a rawn thlak chiah tur a ni a a pawimawh hle a ni. A kung chawr dang suat hlen dan \ha ber chu a leisehchin a tan hmawk hnuah a bulbâl lai takah khan phel leh phawk tur a ni.

ii) *Propagation (Phunsawn)*: Balhla chawr suat dan kawng dang leh chu phunsawn mai hi a ni. Balhla chawr te chu suat lovin a bulbâl a\ang a kar in huan atan a vah tharah kan phun leh thei bawk a ni. A kung chawr (Sucker) lian bik tak (Sword sucker) hi phunsawn a tan a dhthusam ber a ni. Balhla bul kan kar hian a zung kan kar tel ngei tur a ni a, a bul kar te chu ni hnih chhungin kan phun hman ngei tur a ni. A zung te a ro mai loh na atan nisa ah dah reng reng loh tur a ni.

iii) *Deflowering (Tumbu paih)*: Bahla kung in a \ullo a chaw\ha a senral lohna atan leh a bu te a lo len \hat theihna a tan Tumbu hi kan paih \hin tur a ni.

iv) *Earthing up (Rih vûr)*: Thlai kung vel lei tih dûr na atan leh a kung tih ngeh na atan balhla kung vel a lei te chu chek phut in a kung rihvur na atan kan hmang \hin tur a ni.

v) *Removal of female hands*: Remove the last one (1) to two (2) hands of the bunch. Banana growers often remove the bottom female hands so that the remaining hands grow bigger as it facilitates fruit development and increases bunch weigh.

vi) *Bunch Covering (Balhla vui khuh)*: Balhla vui khuh \hin hian balhla bu a ti mawiin a ti rit sat thei a, chindan \ha tak a ni. Tihdan \hnah chuan balhla bu te chu nisa lutuk lak a venna atan hnah ro te in an khuuh \hin a, amaherawhchu, hei fur lai chuan a harsat mai bakah hun a heh em em a ni. Sumchang



thlai atan a chin \hin ho chuan balhla bu khuhna atan hian sahar pawl (blue plastic sleeves) an hmang \hin a ni. heihi an tih \hin na chhan chu balhla bu te chu; rannungte, savate, nisa te, damdawi kah chambang te leh vut leng vel lak a vawng him tur in a ni. Balhla bu kan khuh hian a bu kha a uap lum in a thlar te an puitlin theihna atan a \anpui thei a ni

vii) *Propping (Balhla dô/dô kalh)*: Balhla kung te chu mau in emaw, thing hmang in emaw a rinchhan tur \ha leh rinawm tawk tak kan siam tur a ni. A bu rit tak avang hian balhla te hi an tlou fo \hin a, hei vang hian a kung do tur leh a rinchhan turin mau emaw thing emaw 2 tal kan hmang \hin tur a ni. A do na pakhat chuan a kung ler lam do tur a ni a, a do na pakhat zawk chuan a kung bul lamah do thung tur a ni. Mau pakhat chauh hmang a do hian thli tleh nat deuh \um in a do lohna lamah a tluk duh \hin avang in tih loh a tan a \ha hle a ni.

TEA

INTRODUCTION

Thingpui huan siam hian India ram chhunga a chin theihna hmun hrang hrangah te chuan a chingtute tan ei leh bar an zawnna kawngah hlawkna nasa tak a pe mek a. Thingpui huan siam hmanga eizawnna hian hna tam tak a siam mai bakah ram chhung ei leh bar dinhmun a tithang nasa hle a, ram dang nena insundawn tawnna atana buhzem pawimawh tak a nih bakah ram sum leh pai vawng him tlattu pakhat a ni. India ramah chuan Assam, West Bengal, Tipura, Tamil Nadu, Kerala leh Karnataka te hi thingpui thar chhuak tam berte an ni a. Himachal Pradesh leh Uttaranchal te pawhin thar chhuak tlem deuh mah se hmasang atanga thingpui huan siama eizawng thin an ni. Heng bakah hian Arunachal Pradesh, Manipur, Sikkim, Nagaland, Meghalaya, Bihar, Orissa leh state dangah te pawh thingpui huan siam hi nasa taka kalpui a ni a. Mizoram pawh thingpui huan siama sumdawnna kalpui theihna hmun tha tak a ni bawk.

CLIMATE AND SOIL

Ruahtui tlak thatna hmun, 2000 mm atanga 5000 mm inkar velah thingpui hi a tha duh ber a. Hmun lum lutuk lo, April leh September chhungan *temperature* sang berah 28°C leh 32°C inkarakah a tha duh a, a changa 36°C - 37°C a thlen zeuh pawhin a pawi lo. A tlangpuiin lei thatna hmun *sandy loam (tiauvut leitha)* leh *silty loam (lei hnawl tlingkhawm)*, pH value 4.5-5.5 inkarakah a tha duh ber a. Hlawhtling taka thingpui ching tur chuan lei (*soil*)-in *organic carbon* 1% vel, leitha 1-2%, P₂O₅ 25ppm leh K₂O₅ 80ppm a pai tur a ni. Thingpui huan siam hian a hlawkna tak tak tel tur chuan hun duh rei tak a duh avangin hmalak tak tak hmain kan chinna tur leilung chu thingpui that duhna lei a ni em tih uluk taka zir hmasak phawt a tha a. State Agriculture Department emaw KVK-a lei (*soil*) endikna bik (*soil testing laboratory*)-ah te endiktir tur a ni.

PLANTING

Thingpui huan siam hi a chinna tur hmanrua/chak (*planting material*)-ah a innghat thui hle a. A kung hrisel leh hrisel loh thu-ah leh a tawi that leh that loh thuah te a chinna hmanraw that dan a zirin a danglam thei hle a ni. Nipui lai (June-July), ruahui hmasa tlak hnuah emaw favang (October-November) chhung, lei hnawn that lai leh kan chinna hmuna tui lak (irrigation) tha tak a awmna hmunah chuan hlawhtling takin a chin theih a ni.



North-east india-ah chuan hectare khatah kung 14,00 atanga 17,00 thleng an ching ber a. A kung inkar hlat lam hi a lo berah 60cm ni thei se la, tlar (*row*) inkar hlat lam hi 105cm a ni tur a ni. A phuna tur lei laih khuar (*planting pit*) zau lam chu 45cm x 45em x or 60cm a ni tur a ni. Thingpui kung tiak tir sawngbawl dan hi a pawimawh ber lai chu a ni a. A phun sawn (*decentering*) te, hlawi/suat (*thumb pruning*) te, a kuhmum sih chhum (*debudding*) te leh *frame forming pruning* te hi a pawimawh em em a ni.

PRUNING

A hnah chawr no zelna tur leh hnah hrisel tha tak a neih theihna turin thingpui kung chu hunbi nei taka hlawi thin tur a ni a, chu chuan a kung sang lutuk tur a thunun ang a, hlawk zawkin a thar theih dawn a ni. A kung hlawi hun leh khaw ro leh ro loh hun hian kawngro a su em em a. A tlangpuii hmun awih (*mid-elevation*) vak lohah chuan kum 4 chhung vel hlawi tur a ni a, hmun awih (*high elevation*) takah chuan kum 5 vel tal hlawi a ngai thin.

Thingpui hlawi (*pruning*) hun lai hian a tawk chauha lei hnawng (*adequate moisture*) a mamawh avangin ruahui tlak hma (*Pre-monsoon season*) emaw ruahui tlak zawh hnu (*Post-monsoon season*)-ah hlawi thin tur a ni. Thingpui 30cm-40cm a sang a niha hlawi hi **hard prune** an ti a, 45cm-55cm a sang a niha hlawi hi **medium prune** an ti. Thingpui, 60cm-70cm a sang a niha hlawi hi **light pruning** an ti. Thingpui 75cm a sang a niha hlawi hi **skiffing** an ti a, hei hi a hlawi awlsam lai ber a ni. A kung san lam tur chu a kung len danah a innghat a ni.

Hlawi a niha hnua a than chak dan hi hlawi a niha laia a san danah te, a chi-ah te, a hlawi hun a zir te, a kung hrisel danah te, carbohydrates a pai tam danah te leh a chinna leilung san danah te a innghat thui hle. Kan hlawi san dan a zirin a **tipping** pawh a tawi ve zel ang. **Tipping-** in a tum ber chu a zik awm dan tur siam te, hnah tam tawk tak a chawrna'n te leh tang (*branch*) tam tak a chhuah theina'n te a ni.

SHADING

Dan naranin thingpui hi thing buk hnuiah chin thin a ni a. Thing hlim hnuia chin thatzia pawh hriat chian a ni tawh a. Thingkung te hian khaw lum leh vawh lam te leh boruak hnawn dan te an thunun a, tui tuihua chang (*evaporation*) zel tur te a veng a ni. Ni zung hlauhawm (*UV radiation*)-in thingpui hnah a tihhiah theihna tur lakah te a venghim bawk. Lei chunglang luangral zel tur leh leitha luangral zel tur lakah thingkung te hian a veng nasa em em a, kum khatah hectare khat zelah OM 8-10 tones a belhchhah zawk zel a ni. Chutih rual chuan thingpuiin chaw tha (*nutrient*) a mamawh te a eiralsak ve bawk.



HARVESTING

A seng hun lai hi hlawhfa mamawh tam hun lai ber a ni a. A *quality* leh a thar tam lamah pawh kawngro a su hle a ni. Thingpui sih (*plucking*) hi a pawimawh lai ber leh hlawhfa induhthawh hun lai tak a ni a. Hun bi neiin a zik hnah 2/3 leh a kuhmun chu an sik ta thin a, chu chu *plucking operation* an ti. A zik sih tawh sa chu thingpui fe siamna hmun (*tea factory*)-ah thawn zel a ni a. Hlawi a nih hnua rawn chawr thar leh chu a awm tawkah sih tur a ni a, tichuan a lo tawi buk ta hluah ang a, chu chu **Tipping** an ti. Kan sih (*tipping*) bang hnah la awm te chu *photosynthesis* neiin a rawn chawr no leh ang a, zik tam tak a rawn chawr leh dawn a ni. Thingpui *quality* ngaihthah chuang lovin a buk rih hun lai berin sih thin tur a ni. Hlawk tako thar tur chuan a zik sih tlak 85% leh a kuhmum, leh a hnah sih tlak loh 5% vel chauh a ni tur a ni.



SERTHLUM

INTRODUCTION:

India ram a ser kan chin \hin zingah chuan Serthlum/M. Orange (*Citrus reticulata*) hi a lar ber a ni a. India ram a Ser lampang chi chinna zawng zawng a\ang a zaa sawmnga (50%) zet a hauh pha hial a ni.

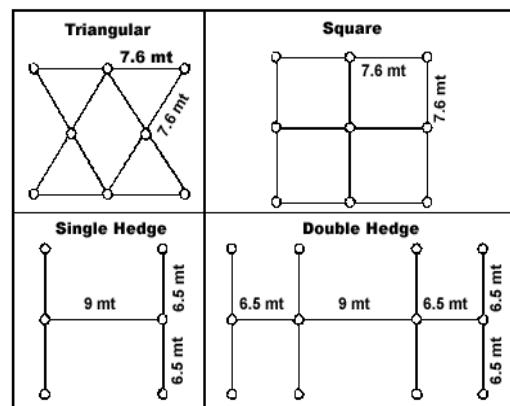


SIK LEH SA LEH LEILUNG:

Thlasik a vur khang \hin lohna hmun tropical leh sub-tropical hmun reng rengah chuan serthlum hi hlawhtling takin a chin theih vek a. Tlang ram lam deuh, MSL chung lam 370-1,500m a sangah leh sik leh sa 10°-35 °C a nihna hmun te hi an ngeih ber a ni. A par lai leh a rahsêñ lai a thli lum tleh leh khaw lum lutuk te hian a rah tur an ti \han \hu thei in a rah sêñ tla leh ni em (sunburn) te a awm tir thei a ni. Boruak hnawnna a hniam (Low humidity) hian serthlum rah rawng a nahl duh a, ni eng khamkhawp hmulo serthlum chu a rah a chhia in a tlem \hin a ni. Serthlum hi lei chirang hrangah a chin theih nachungin lei dur \ha leh in tlithlawr \ha, lei thur lam 6-8 inkarah a \ha duh deuh ber a ni.

A PHUN:

Serthlum chinna hmun reng rengah a tlangpuuin fur laiin an phun \hin a. Khur 50cm x 50cm x 50cm a lian a cho in 4.5m – 6m inkardanah square system in an phun \hin a ni. Hetiang a phun a nih hian hectare 1 hmunah serthlum 350 a\ang a 450 vel a phun theih \hin a ni. India hmarchhak ramah te chuan hei a inhnaik tak, 4.5m x 4.5m a phun in hectare 1 hmunah kung 500 lai pawh an phun leng thei \hin a ni.



TRAINING AND PRUNING (\hawlh leh):

An ideal M. Orange tree should be low headed with a dome like crown. Trees are trained to single stem with 4-6 well-spaced branched for making the basic framework. Further, the lowermost branches should be allowed not to grow below the height of 50cm from the soil surface. Removal of water sprouts and suckers of rootstock is also highly essential. Pruning of non-bearing trees can be done any time of the year, but for bearing trees the best time is after harvesting, during late winter or early spring when these are in somewhat dormant stage.

HARVESTING:

Picking of fruits at proper stage of maturity is of paramount importance. Harvesting at right time not only maximizes profits but also helps build up the demand for quality fruits. Unlike climacteric fruits, M. Orange does not improve in taste after harvesting. Therefore, fruits should be harvested when they attain full size, develop attractive colour with optimum sugar: acid blend. Method of harvesting is very important as it affects the shelf-life of fruits considerably. Further, faulty harvesting and rough handling adversely affect the marketability of fruits.



The common commercial practice of harvesting is to pull the fruits from the branch, which may rupture the skin near the stem-end leading to fungal infection and subsequent rotting. This practice should be avoided. Therefore, fruits should neither be plucked nor torn off, but should be cut off preferably with clipper, shears or secateurs. Generally, M. Orange start bearing from the fourth year having 15-20 fruits/plant. However, its plan attains the level of full bearing at the age of 10-12 years.

Storage life of M. Orange is influenced by many pre- and post-harvest factors. Green or fully ripe M. Oranges can be stored successfully at 8-10°C with 85-90% relative humidity without impairing fruit quality.