

# DRY TERRACING IN MIZORAM

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*Mizoram ::: Aizawl*

# BUNG - I

(Thu Kam Keuna)

Terrace siam uar lai kha thangkhat lian hmalam a nih tawh mai awm mange ka ti thin a, khatihlai kha chuan mipui hian an hlut der viauin a lang a. Ram/huan chhungah Terrace siam a lo nih chuan leilung luangral tur a veng ang a, hnim/hnah Terrace zawla tla khawm chu a lo tawih ang a, lei a lo titha dawn a ni tih chu naupang thleng pawhin an hre thin a ni. Heng a thatna lam ai mahin, ‘Terrace siamsa huan chu hralh lehchhawn atan pawh man a lo man dawn’ tih hian mite ngaihhlut a hlawh phah mah mahin ka hria.

Soil Conservation Department leh Community Development hi Terrace siam lama tanla nasa ber a nih a rinawm a, hun alo reiah chuan Agriculture Department pawh an bang bik lo. Kan vaiin Terrace kan ti ta sup sup mai a nih kha. Ka fa upa ber alo pian pawh khan, a hmingah pawh ka nuin Terrace chu a chawi tep a ni.

Mizote hi kan hmuh theih leh khawih theih bak hi chu hrilh hriat har deuh mai kan ni a. Cachar phai leh Burma ram leilet kan hmu a; kan awt a, neih ve kan duh a. Tui lak a leilet siam hi chu thiam pawh kan thiam viau a ni. Chuvangin Terrace awm ang ang pawh chu tuilak a, buh chin nan (WRC) hman kan tum thin a. Tuilak tur awm lohna ami chu, Terrace hi thil tangkai tak ni pawhin kan hre thin lo. Mithiamte erawh chuan Terrace tawh phawt chu tangkai tak niin an la sawi fo si a nih hi.

**Sawisel bur Terrace :** A sawisel thiamin an han sawi hi chuan hnial enah pawh ka en lo, thudik eng eng emaw an rawn phawrh ve si thin a. “Tlawng dung zulzuia Lunglei-Aizawl panna kawng, a hmingah ‘Tarmita kawng’ an vuah pawh kha kum 100 zet a ni tawh a. Kha kawng kha Lo-ah kan nei fo a, buh a tha chuang reng reng lo” an han tih hmiah mai chuan, chhanna tha ka vai thin.

Nilgiri tlang, South India-ah chuan kumtin Terrace zawlah Alu an ching a, a tha kum tin bawk si. Keini Zopain tha lem lo/tha chuang lo/tha lo kan ti bawk si. Tui lak loh (Dry Terrace) theuh theuh kan enkawl dan leh hman dan hi chik lehzuala zu bih chian a ngai a ni.

Kum 1998 khan Khuanglengah ka han kal zawk a, hetah hian Dry Terrace 4ft a zau lain, Large Cardamom phun vek a ni a. An hellai tleitiri te thingphurho chu Terrace zawlah ngat lo chuan an che duh bawk si lova, a belin L.Cardamom chu an chil pherh viau a ni. Mihringte ang bawkin kan ranvulh leh ramsate hian Terrace zawl chu an ngaina tho mai a. Kanchhi kawtzawl ang maiin Terrace zawl chu kan chen bel thin a ni.

Leitha (soil fertility) a pawimawh tluk zetin, leilung awmdan (soil condition) hi a pawimawh a, bawng ek pawh tel sek sek, lei hi a bel lutuk chuan thlai a tha thei chuang lo. Hei vang hian alawm kan ‘flower pot’ chhunga lei, Durtlang

bawngek nena tha thei ang ber tura chawhpawlh pawh a khat tawka vih phut a ngaih thin. Hetiang bawk hian kan Terrace pawh chen beltu kan tam lutuk a; mihring, kan ranvulh leh ramsa bakah ruahin a rawn nan bel bawk si a. A tiphur zawngin Changpat lo tang ve sateh mahse, eng a ang thei thin lo a ni. Gram 5 leka rit Perhpawng pachal pawhin a lamtual a chil bel thei a nih chuan; keini kephah hlai pui pui, vaihlo tuilo chil sawk sawk nana tha fahranin chettlat nana kan han hman meuh hi chuan, Terrace chu thlai ngeih chiin kan chhuah thin lo a ni.

**Rah tha chhuah Leilung :** Mizovin kan Lo neih tur kan enin emaw, ram lei tur kan enin, ram tha chu kan hre mai a, ram tha kan tih hi i'n bel Chiang Teh ang. Ram ngaw lei, lei bel ni lovin lei phur, kut lawng pawha zu tham tawn tawn theih an ni thin. Hetiang lei hi ngaw hnuaiyah kan hmu ber a, hei vang hian alawm harsa chung chung pawhin ramngaw thiah kan chin phah a ni. Tlawhbaw ram chu a belin, lei a khal a, thlai a tha mawh a ni.

Tichuan, i ram chu rah tha chhuah tura i duh chuan, tih phut/phur a ngai a ni. Vai/Sap mithiam ho duhdan an ziak hi i lo enchiang leh teh ang: **50% Solid, 50% Void** an han ti pek a nih hi. A awmzia ni awm chu kan leilung enkawl lai chuan a chanve lei tak tak (mineral leh hnah tawih inpawlh) nei sela, a chanve chu thawrawng (boruak leh tuihnawng tawmna tur) rawh se tihna ni awm tak a ni. Hei vang hi a ni ang chu kan antam huan tur kan leh phut thin a, Nilgiri tlangpang Alu ching thin pawhin an Terrace chu thlai chin dawn apianga ngun taka an leh phut thin a, kan Vai hlumbel 'flower pot' chhunga lei pawh kan vih phut thin ni. Hei vang bawk hi a ni ang chu Tlawng dunga Tarmita kawng belah chuan kum 100 dawn mau hnah tla tawih thin mahse, lo-ah neih chang pawha rah tha a chhuah thin loh; a bel vang a ni.

**I Terrace kha :** UT hun laia siam, pholengin a khuh reng ni mahse thlai a that theih chuang loh avangin i sawisel thin a, mahse tunah chuan a chhan i hre ta. Vawikhat mah i let phut ngai lova, mihring, bawng, lawi leh sihal ten an chen bel si a, hnah tawih pawhin awmzia an nei thei thin lo a ni. Vawikhat mah Sawhthing emaw, Alu emaw, Buh emaw chin tumin, a saptawng taka 'tillage' (lehphut) tiin, i sawngbawl ngai lo a ang. Han ti chhin teh, a tha duh viau a nia. Kan ruahtui tla pangngai hi a chawm nan a tawk lek asin. A lei tih that nan, bawngek, vawkek leh hnimhnah tawih tur pawh dah la, Terrace zawl atang chuan ruahtuiin a tleng fai mai thei lo tih chu kei aiin i hre zawk daih.

**Terrace laih thar :** Dry Terrace laih dan tur han sawi dawn hian, Zoram 'tha ber hria' tamna ramah ziak ka nih avangin min ti tim deuh a. Ngaih dan phuhchhuak ngam lo khawpa zumzuk nih ka duh bawk si lova, ka'n ziak ta reng reng a nih hi.

**i) Type :** Kan ram ruahtui tamna ang atana mithiamten an recommend chu; 'Inward slope Terrace' a ni tlat. Hemi awmzia chu PWD kawng thar angin, Terrace chhuat chu a ko lamah rawn awih lut sela, ko bulah 'side drain' (toe drain an ti zawk) siamin, ruahtui rawn luang khawm sela. Terrace te chu Contour-ah zawl taka kal lovin, kawrte lamah tui luang thei tawkin awih (Gradient) bawk sela.

Chhim lam lei min nasa leh tunlai ruah bawhawk (cloud burst) sur fo thin ngaihtuahin, hei hi tul tak a ni. Min laka inven lawk a ngai a ni. Tuihawk nasa kawr te lama paih zung zung theih a nih chuan, lei min a veng a ni.

**ii) Slope :** Ram awih lutukah chuan Terrace laih loh a tha kan ti thin a, 5-35% a awihah chauh Soil Department chuan Terrace a siam sak thin. Mahse Sikkim leh Nepal ramte kan en chuan, 3ft zau zawl lek nei turin mihring pil pil lungchhia an rem chho thin a ni si a. Neitupa duhdan azira laih ni teh se.

**iii) A zau lam :** Terrace chhuat zau lam tur hi chu ram awih dan azir chu a ni teh meuh mai a. Tunhma deuh khan Soil Department-in 10ft tal ni sela, bawng leh a 'hal' a inher thei tura tih a ni. Ram awih deuh laih tel loh theih loh a lo ni a, leihnuai leisen laihsan tel a lo ni thin. Heng leiah hian thlai chu sawi loh Buar leh Vaihlenhlo pawh par chhuak zo mang lo khawpin an chhia a.

A zau lam pawh hi neitupa duhdan ni leh teh se. A zau apiang enkawl a nuam tih hi i Chhura umpui mu hriat tlat ang u. Terrace zau tak erawh laih a harsa thung a, sum sen a sang duh hle.

**iv) Dawlzawl :** Pu Barthakur, Zoram Sorkarin Consultant atana an rawih khan, leivung dawlzawl hi a sawimawi khawp mai a, Arunachal-ah pawh hlawhtling taka Terrace Scheme an tih theihna chhan niin a sawi a. Zoram mau tamna angahte hi chuan a dawlna siam a harsa si lova, leivung chu luangral lova dawlzawl chuan Terrace a zau hma viau mai a. Fur khat a tuar hnuah leivungte hi a insawh nghet titih mai si a, tih chi tak a ni.

**(v) Grass sodding :** Terrace ko panga phul phun hi, Terrace tingelnghet atan a tha tih hi, kan peih loh zawng mah nise ka sawi tho tho dawn. Lei vung dawl loh Terrace thlang lama tawlh thla, nakina ruahtuiin a rawn hnawh leh turah pawh hian Japanhlo phun ila, fur chhung zawng a hnahin lo khuh se a tha em em a ni.

**A hmanna :** Terrace te chu duh duh atan kan hmang ang chu i ti mai thei a, kei pawhin chu chu dik ka ti tho. Mahse hmun hnih-khata an hman dan kan sawi ve reng reng ang chu mawle :-

**1. Nilgiri :** Khulai tlangah khuan Alu a tha duh viau mai a, ami chengte pawhin an ching thin reng a. Indopui pahnihna a lo thleng a, Army Supply atan Alu mamawhna a lo sang ta phut mai a. A tlang ngawte chu thiatin Alu chu nasa takin an ching ta a. Leilung luangral (soil erosion) a lo awm a, a thlang Hydro-Electric Dam, Kateri ami chu a zu hnawhkhat ta a. He Dam atanga Electric hi Sana siamna hmunpui chawmtu a nih bakah a vel mihringte chhit en ber a lo ni si a. Army Engineer ruaiin JCB ang deuh khawl nen fur tirah chirh tling khawm chu tui nena chawh nut a, chhuah thlak an tum ta a, eng an ang thei lem lo. Pu VLT Muana kha a hmuna zu hmuchiangu tu leh hretu a ni.

Tunah chuan Nilgiri-ah Terrace lo chuan Alu an ching tawh lova. Kum khatah vawihnih an thar a, irrigation nen vawithum thar an tum ber thin. Hemi ti thei

tur chuan a chi chawr rang tura sawngbawl (treat) a ngai hle a; vawi thum chu an thar reng bik lem lo. Tuilakna (Irrigation) nei chuan an phuh tir ber zawk a ni. Terrace te chu Inward Slope kan sawi ang kha an ni a, a lehna ah Bawnggek an chehpawlh ziah thin. Alu chu Terrace vang zawng rihvum thlur (furrows) in an ching a. An District sum hnar ber pakhat zawng a nih khu mawle.

**2. Thenzawl :** Mizo District Council hun tawp dawn vel lai khan Thenzawlah sawn Soil Department in mimal Teres a laih sak nasa viau mai a. Dan pangngaiin heng Terrace hi hman a ni lova, Di hmun tha tak an ni ringawt. Kumtin thal laiin a kang ziah a, tu-khawin an ngaihsak lem lo.

Tunhnai Sawhthing hralhna a lo that deuh hian, mifing deuh tlem tein an va sawngbawl thar leh ta a. Terrace te chu an let a, Di zung leh thing zung an paih fai vek a. An leileh phut zawlah chuan Sawhthing zing angreng takin an ling a. An lin zawh chuan Di emaw, Buhpawl emaw in, chhah mawi tawk takin an khuh chhuak vek a. Ruah a lo sur a, Di/Buhpawl-te chu a rawn nan bek a, tawih an tum nghal a. Chutih laiin Sawhthing chawr, hmawlhzum ang tak chuan a rawn thil tlang chho bawk a. Hnim leh hlo a tiak thei bawk si lova, thlawh ngai lovin Sawhthing chawh tur a neih theih mai awm asin. Chuvangin, Millenium thar a ni bawk a, kan Terrace te hi thlir dan tharin i thlir leh teh ang u.

## BUNG 2

(Engvangin nge Terrace)

Bung hmasa ah khan, tunhma a terrace laih chanchin kan chhiar thuak thuak a. Tunah chuan ‘Eng vangin nge sum leh tha senga Terrace chu kan laih ang?’ tih hi ilo chhui teh ang u.

**Runoff Retarding Scheme:-** Tunlai mihring zet hi chu thil hi an ti danglam zung zung a. Hmanah chuan Terrace hian hmun laili a awh thin kha a ni ngai a, tunah chuan Runoff Retarding Scheme zing a scheme pakhatan an dah ve ta lek a. Chung Scheme-te chu:-

1. Contour Bunding(Narrow Based Terrace).
2. Contour Trench.
3. Logwood bunding(changkham)
4. Contour Terrace/Bench Terrace-te an ni.

Pakhatna hi luikam zawlah leilet siamna tura ‘Bial ko’ siam hi a ni a. Pahnihna hi, kum 15 kalta a Agriculture Department-in nasa taka hna an thawh thin kha a ni. Pathumna hi Lo/Huan awih tan zawnga thingtum leh mau kang-bang kan changkham thin ang hi a ni mai a. Palina hi tuna kan sawi tum: Terrace - a bik taka Dry Terrace a ni. An vai hian huan/lo a leilung luang ral tur venna tur a siam an ni. Tichuan kan Terrace pawh chu huan-thlai chinna atan a siam a ni a, kum tamtak hnuah pawh

leilung hek lova kan ram kan enkawl reng theih nan leh kan thlai tharchhuah theih zat alo tlakhniam loh nan a duan a ni.

Kan ramah ruah tui a tam a, kan lei pawh tuihawk hian a la hek hle zawng a ni. Leilung luanral nasat zia chu sawi ngai lovin kan hre theuh a, ka'n tuihnih lo mai teh ang. Ruah chu van atangin alo tla a, kan lei khuhtu awmlo lai chu an nan per sawk sawk (splash erosion) a. Chutah ruah tui tla lei chhunga put bak lei chung a awm chu an luang khawm a, 'tuihawk' kan lo ti ta a ni. Tuihawk kan lei a rut hek dan hi ilo chhui chiang leh teh ang.

**Acceleration:**-Ruah lo tla lei chunglang a awm chu Motor ding lai nen ilo tehkhin teh ang. An pahnih hnihin an kalsawn miah loh rih avangin; an kal chak zawng chu '0 speed' a ni. Motor chu a khawl an tinung a, zawi te atangin a tlan chak tial ta thin a. Heihi saptawngin 'acceleration' an ti. Motor tlan tir ang bawkin, tuihawk insiam hlim chu zawi te atangin, a luang chak telh telh a, a accelerate ta a. Tui tam zawkin an rawn fin hnu pheichuan, kawrte siamin chak takin an luang ri hum hum ta thin a ni. Vawilekhatah Motor ang bawkin, a kal chak phut thei lo.

Tuihawk hian kan huan leh ram chu a rut hek ta chiam mai a. Tuihawk chakna (power) chu a luan chak zawng (speed)ah a inngat a. Hemi awmzia chu a luan chak viau chuan thil nasa tak a ti thei a, zawi te-a a luan chuan, ram a la hek lo thin.

- 1 speed - - - - - 1 gm.
- 1 speed X 2 - - - 72 gms
- 1 speed X 3 - - - 320 gms.

A chung ami khi ilo sawifiah dawn teh ang. A tlar chung berah khian, i tuihawk chuan leinawi gram khat luanpui zo tawk ta sela. A tlar hnihnaah chuan, tuihawk luan chak zawng 'speed' chu a hma mi letin lo chak ta sela. Ngaihtuah dan pangngaih chuan 'gram 2 a luanpui thei tawk ang' tih awl tak a ni. Mahse tui hian hna a thawh dan hi a dang khawp a; a let a luang chak tuihawk chuan 72 grams leitlang a phurbo zo daih a ni. A let thum a luang chak tuihawk chuan 320 grams a la zo var var tawh a ni. Tuihawk control loh kan huan/ram a luang chuan leilung nasa takin a rut ta thin a ni.

Tuihawk leilung a lak hek theihna chakna dalna chu, 'speed braker' siam a ni mai a. Motor tlan chak lutuk ven nan hman deuh kha chuan kawngpuihaw pawh speed braker pawng lian pui pui an siam thin ang deuh kha a ni mai. Tuihawk speed tihmuanna (speed braker) 4 chu kan rawn tarlang tawh a, an zavai a hming lakkhawm chu Runoff Retarding Scheme an ti a. Kan Terrace pawh chu chung zing a pakhat alo ni ve ta a ni. Tuihawk luangte hian Contour Trench emaw, Contour Bund emaw, Logwood Bund emaw, Terrace zawl emaw an zu thlenin, an luan chak zawng speed chu chelhdin alo ni a. Terrace zawl an luan liam leh hunah 0 speed a tanin, lo mawng lamah an luang thla (accelerate) leh thin a. A thlangah chelhdingu

Terrace alo awm leh thin avangin, chak taka luang hman lovin, huan/ram an luanpelh hma chu control-na hnuaiah an luang ta thin a ni.

Chutichuan, Terrace kan siamna chhan chu leilung humhim kan duh avangin kan huan-ramah tuihawk chak tak tak a luan loh tir laia thlai chin nan a ni. Tuihawk in Terrace zawl alo thlenin, a lei rawn phurh thlak a dah a, chu chu thil tangkai tak a ni bawk. Rang taka luang puat puat lova kan ramah ruahtui a cham chhungin, leihnuaiah puh thlakna hun an nei a. Heihi tuihna insiam nan a tul em em bawk a ni.

### **BUNG 3**

#### **Zoram Tan Terrace**

Ram hmasawna (Land Development) hna hi kan ramah a kal chak takmeuh meuh tawh a. Department hrang hrang Agriculture, Horticulture, Sericulture, Rural Development leh Soil & Water Conservation Department ten Scheme hrang hrang: State leh Central sum sengin hna an thawk mek a ni. Mahse an hnuhma han enin, kum 100 ralta a Mizo pi-pute tihdan pangngai; vah fai a hal (slash & burn) bak hi kan kal pel meuhin a lang lova. Hetiang ringawt hi chuan eng pawh ching ila, kan ram hi kan tichhe thuai mai dawn in a lang; kan ram a awih nasa si a. Slash & Burn (Jhuming) hi chu ram tichhetu a ni tih khawvel pum hriat a ni si a. Pi-pute tihdan bak thiltha tih hi chu a ngai tawh takzet a ni.

Ruahtui tel lo chuan huanthlai a neih theih loh tih kan pawmtlang thei vek a, nghakhlel takin fur ruah lo thleng tur kan nghak a. Fur alo thlen meuh chuan ruah a sur nasa thei si a. Kan huan lu-a ruah tla lo luang thla chu a thlang ami nen infin khawm zelin, huan mawng lamah chuan 'kawrte' siam thei deuhthaw in a tam in a luang chak tawh a. Kan huan chhung tuihawk luang kan 'control' loh chuan, kan ram a hekin a da tawlh tawlh dawn a. Kan huan enkawlna (management) pakhat atan Terrace siam hi kan rawn vawrhchhuak ta a ni.

Kan ram ruahtui tamna ang atan a mithiamten an chawh chu 'Graded Inward Slope Terrace' a ni. Hei hi ilo hrilhfiyah dawn teh ang. Bung khatna ah khan kan sawi thuk thuk tawh a; 'Inward Slope' a nihna chhan chu, Terrace-te chu a chhuat zawl lovin, ko lamah an awih lut a. Ruahtui lo tla pawh kopang bulah a luanna tetakte 'toe drain' siamah an luang khawm thin tur a ni.

'Graded' a nihna chhan chu, Terrace-te chu contour (phei) zawh chiah lovin, vau kawrte lamah awih hret hret (gradient) a laih tur a ni. Toe drain a tui awm chu vau kawrte ah luanbo tir tur a ni. Hei hi pawimawh deuh mai a ni a, huan min tur venna a ni. Hemi awih hret hret zawng hi 1:50 ni sela, tuiin lei a hawrh lo deuh ngei ang. Meter 50 zawlah 1 meter a tih awih tur tihna a ni mai. Graded Inward Slope Terrace hi leilet WRC atan a duan a ni lova, Dry Terrace atan a siam a ni tih hriat reng tur a ni. W.R.C atan chuan Level & Table Top Terrace (a lema mi ang) hi siam mai

tur a ni a. Mizoten kan thiam lutuk; tui lak tur a awm zen zen lo mai pawh a.

Hetah hian Terrace bak thil tangkai tak, huan chhung a tuihawk tam lutuk paihna tur leh leimin venna tur rawn zeh tel ka duh. ‘Graded Contour Trench’ hi 120ft danah siam nita sela; huan chhung tuihawk tam lutuk paihna (excess run off disposal drain) angin hmang ta ila; leimin tur a veng ngei ang. A siam dan chu ‘Contour Trench’ ang tiat laih tur a ni mai a, a phei/zawl chiah a kal lovin, tui luan theihna atana awih hret hret zawhin (non-erosive gradient), tuihawk chu huan bul kawrteah va in chhung baw thei ta sela. Leilung venna leh min tur laka venna tha tak a ni ang. Ram awih lutuk Terrace laih harsatna 50% chung lamah pawh 120ft danah Graded Contour Trench hi siam a tha ngawt mai.

**Terrace siam nan-a sum sen :** Terrace laih nan hian lei laih a ngai tlat mai a, senso a sang hma hle. Tlawng kamah hman ni khan Leilet tur JCB kan laihtir a. Hectare khat laih nan Rs. 50,000 zet sen a ngai a. Mihring tha chuan bei nita ila, a let thum Rs. 1,50,000 zet sen a ngaih ka ring. Hetiang tho hi Terrace tha tak laih man chu anih hmel a. Sum sen a ngaih tam vang hi anih a rinawm; CSS hnuai a Guideline ho hian Terrace hi an telh duh tlat lo.

Mahse a that miao si chuan, keini pawhin zawi zawiin kan bei mai ani ang chu. Kan huan kan ram hmangaih ve te tuihawkin a rut chhiat loh nan, Graded Inward Slope Terrace chu kan sual ngat ngat mai tur lah ni. Sorkarah 50% subsidy a Terrace siamsak thinna kha sum awm loh vangin, a zuihral a ni tawh ber a. Mahni sum leh tha leh zung senga tan lak a ngai ta a ni e. A thatnain mi rilruah a bukthluk chuan, Dry Terrace chu ti tawk kan awm em ang chu !

**A tulnain min nang :** Leilung humhalh hi ngai tilo leh tuina neilo tan pawh a tulna hian tunah min nangching tawh a. Global Warming hian ruah bawhawk (cloud burst) leh ruahtui tam lutuk (excessive rain) a rawn chhawm tel ngei dawn a. Inven nan engnge maw chu kan tih a ngai a ni. Terrace laih chu i tlin lo anih pawhin, Graded Contour Trench a i huan tuihawk i paih bo a la ngai ngei dawn a. Chutilo chu leimin leh tuihawkin a ram hrut chhiat i hmabak a ni. Beng sikin i inngaihtuah ang u.

Thlai chawm tur leh lei tihdawng tur leh kan hman atan ruah chu kan mamawh. Mahse duh ang tawk thlapin ruah a sur si lova, tuihawk leh tuilianin ram a tichhe nasa thei si a. Lei chhunga a put seng lo tuihawk lo ni ta hian buaina a siam a, chu chu control a ngai ta a ni. I ram i huan venna atan Graded Inward Slope Terrace leh Graded Contour Trench hi lo ngai pawimawh ang che.