

# **LIVELIHOOD TRAINING MODULE RESOURCE MATERIAL**

**MIZO VERSION**



**MIZORAM STATE RURAL LIVELIHOODS MISSION  
RURAL DEVELOPMENT DEPARTMENT  
GOVERNMENT OF MIZORAM**

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**OBJECTIVES :**

- 1) To understand the concept of livelihood and various approaches for livelihood promotion.
- 2) To identify the community livelihood and beneficial strategies for promotion of sustainable livelihoods.
- 3) To improve the skills and capabilities of community to support farm, off-farm and non-farm based activities.
- 4) To ensure food and nutrition security at the household and the community level.

**DURATION :**

These livelihood training are planned for duration of 5 days each with a provision for one day field visit to best practice site within district.

**EXPECTED OUTCOME :**

- 1) Community sensitization on the concept of livelihood and various approaches for livelihood promotion
- 2) Community appreciation on importance of convergence for sustainable livelihood promotion
- 3) Community sensitization on farming system for maximum utilisation of all resources available
- 4) Better awareness on skills enhancement available under NRLM

## **Opening session**

### **Topic 1 – Thlirlawkna (Pre test/expectation)**

#### **Objectives :**

Understanding the participants practice and knowledge about farm and off-farm-based activities

**Duration :** 15 minutes

**Expected outcome :** To have an overview about the participants understanding on farm and off farm based activities

#### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Pre test/ expectation	Test Question	Individual test	The trainees will be given paper to write down their experience, practice and knowledge on farm and off-farm based activities	Foolscap paper, Pen

## **Topic 2 – Eizawnna chungchang sawi hawnna**

### **Objectives :**

To aware the participants on the basic principle of livelihood

### **Duration : 30 minutes**

**Expected outcome :** Participants will develop understanding and awareness on the concept of livelihood

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Introduction to livelihood	* Meaning and concept of livelihoods * Assessment of livelihoods reality	Lecture	Trainer will give lecture on livelihood	LCD projector, Laptop

### **Eizawnna awmzia :**

Eizawnna chuan kan dam khawchhuahna atana kan theihna, kan hmanrua leh thiltih te hi a huam a. Eizawnna ngelng het chuan tunhun leh a hnulama chhiatna awmthei avanga harsatna leh buaina ata inkhaichhuak theiin a dawlzo thei tur a ni.

### **Eizawnna chu :**

- Sum lakluh nana kan thiltih chi hrang hrang mahni hnathawh emaw mi hnuiaia inhlawh.
- Mahni thiamna leh theihna hman tangkaina (mihring emaw khawlhmgan).
- Hausakna siamchhuah theihna (sum emaw thildang).
- Mahni leh inchhungkhur mamawh phuhrukna.
- Kan tih fo thinna avanga kan nuna bet thil.
- Duhthusam chuan awmze nei leh zahawm takin mihring hun a hmantir thin.

### **Eizawnna nihphung pali :**

#### **1) Lakluh :**

- Pawisa emaw, bungrua emaw, hnathawh leh thil chi hrang hrang hmanga kan thawhchhuah leh lakluh a kawk thei.
- Lakluh thenkhat chu tun huna lo lut emaw a hnuia lo lut a ni thin.
- Lakluh hi a hun a zir in a danglam ve thin.
- Lakluh chu hmun hrang hrang atangin a luangkhawm thei, hmun ngai atangin emaw hmun dang dang atangin emaw a ni thin.

- Mi thenkhat chuan hnathawh tak tak hma hauhin hlawh an hmu lawk thin. Thenkhat chuan an thawh zawh hnuah an hmu thin.

- Lakluh hi a luan luhna tipungin a tih tam theih a, chumi anih loh pawhin lakluhna pakhat chauh atang pawhin a tih pun theih.

## 2) Hmanral :

- Hmanral hi sum, hun leh tha anga teh tur a ni.

- Hmanral hi a tlangpuiin lakluh belh nan, damkhawchhuah nan leh chhiatna lo thleng thei tihtlem nan a ni thin.

- Kan thil thlir dan atanga teh theih a ni bawk.

## 3) Hna :

- Sum lakluh nan emaw bungraw chawk luh nana hun kan hman hi a ni.

- Kan eizawnna neihsa leh lakluh kan neih belhna atana hun kan siambelh a zirin hna hi a pungin a tam thei thin.

## 4) Hlauthawnna :

- Eng eizawnna ah pawh hlauthawnna hi a a awm thei vek. Mahse a in chenlo.

- Thlai chi thalo, vawnhimna/dahthatna tha neihloh leh thil man danglamna avangin hlauthawnna a awm thin.

- Heng hlauthawnna zawng zawng te hi mumal taka zir chianna atangin ruahhmannna mumal tak a lo awm thin.

- Hlauthawnna siam tha tur chuan a chhan hmuhchhuaha zirchhian te, a tihtlem dan kawng zawn leh nuaimih emaw insiamrem tulna lai thlir tel a tha.

## Eizawnna ruangam :

Eizawnna a harsatna awm thei chi hrang hrangte hailangin tanpuina chhungku leh khawtlang a awmthei a hmuhchhuah pui.

- Eizawnna ruangam hian heng zawhna hrang hrangah te hian chhanna a pe.

- Eizawnna puihna hian eng nge a tum?

- Chhungku ten hmalakna atana eizawnna hman an tum tihhawhlin nan eng sum lu nge a hman.

- Eng dinhmun ah nge chhungkuate an inhmua, chung dinhmun chuan eizawnna a nghawng dan a zir.

- Engtinne an thiltih, an tum, sum lu leh dinhmun te a in laichin.

## Tehna fei pali :

Nihphung	Duhthusam ah chuan
Lakluh (I)	Tam
Hmanral (E)	Tlem
Hna (E)	Tam
Chhiatna (R)	Tlem

Hmanral tihtlem hian ei leh in tellova khawsak a kawk lova, a awmzia chu hmanral tihtlema nunphung tihniam siloh a kawk zawk. Nihphung pali te hi a mal malin lak hran theih a ni lova. Pakhat hian a dangte nghawng thei khawpin theihna an nei vek. Chuvangin eizawnna nihphung pakhat kan thlak hian a dang pawh a thlak danglam thei a ni. Heng inlaichinna te hian eizawnna kalkawng hi mipuite a innghat a ni tih a entir.

## Sum lu paruk :

**1) Leilung hausakna :** Kan vela leilungin a pianken hi a huam vek thei ang. Tin, leilungin mihring hnena a pek theih zawng zawng hi a huam thei bawk. Thilnung nilo ram, tui, eng leh thilnung chi hrang hrang thingkung, ramsa, sava leh rannung te a huam.

**2) Mihring siamchawp :** Hei hian mihringin a siamchawp in te, kawng, kawlpetha, tui semna, tuihawk luankawr, thlai tui pekna, sikul leh library te a huam thei.

**3) Khawtlang inrelbawlna :** Chhungkuain khawtlang atanga thlawpna an dawn hi a ni. Hei hian fuihna leh venhimna khawtlang atanga chhungku in a dawn, khawtlang mite nena inpawhna and inkaihhruaina dan kenkawh te a huam. Entiran, leiba rulh leh hnatlang a tel. Chung inpuihna chu felfai tak, intluktlang leh mipui rorelna hnuia a awm chuan chhungku te dik takin hmasawnna thiltum te nei turin a pui.

**4) Mihring theihna :** Thiamna, finna, theihna, thil thlirdan leh rilru sukthlek te a huam. Hengte hian mihring theihna a siam.

**5) Sum leh pai :** Hei hian mihring bungraw hman tur leh siamchhuah nan a pui a. Sum leh pai hian nihphung pahnih a nei a, Thilkawl leh lolut chi te a ni. Khawl chu engtik lai pawha hman tura awm hi a ni. Lolut kan tih chuan sum chevel vangte, chanvo leh pawisa dawn atang tein a ni thei.

**6) Thlarau nun :** Mihring thinlunga nun tha zawk beiseina leh harsatna hmachhawn theih nana kan thil zawn hi a ni. Hetiang rilru nei lo tan chuan hmasawnna a awm thin lo.

## Four context :

### i) Chhehvel boruak leh inrintawnna :

Tun dinhmuna a awmna hmun a zirin leilung pianken hausakna leh nihphung hrang hrang te kawk. Ramngaw awm mahse hmun thenkhat chuan sik leh sa boruak nuam tak a neihtheih laiin hmun thenkhat dang chu malaria tamna a ni thei bawk. Chutiang bawkin tuipui kam bula awm nimahse hmun pakhat chuan tui thiaghlim in tur a nei a, chutih rualin khawdang chuan tui al avanga harsatna chuan hmun hla taka tui thiaghlim chawi tura an kal a neihtir ve thei a. Leilung pianken hian inrintawnna a awmtir kherlo.

## **ii) Techno economics :**

Hei hian tunlai thiamna bik leh inrelbawlna felfai tak khawtlanga a awm hi a huam thei a. Lo neih lama mithiam bik ten khua an tlawh thin chuan hmasawnna kawng danglam zawk an lo nei thin. Leilung hausakna nei tha deuh khua pawh kawngpui tha, rel leh kawlphetha an neithat loh chuan an nuamsa bik lo. Tunlai thiamna neih te, tih dan tha zawk zawm te, tunlai thiamna mila insiamrem thiam te hi thil pawimawh kan zirchian ngai te chu a ni.

## **iii) Thil sem darh dan :**

Thil sem darh dan a zirin thil huam chin leh tawp chin kan hrethei ang. Heng inthliar dan hrang hrang hausakna te, thil neihsa, tihdan thiamna, kawlphetha kan hman theihna, tunlai changkanna, hrall leh leina, inbiakpawhna, zirna, thiamna, kan khawtlang dinhmun, ram inrelbawlna a kan inhnamhnawihna, khawtlanga kum azira inthliarna.

**iv)** Sum hmandan leh ei leh in, silh leh fen, hriselna, in leh lo, zirna, ba, thil siamchhuah leh hna atana kan sum hman hi khawtlang a zir in a inanglo thin. Heng danglamna te hian tuna thil nithei tam tak chauh nilovin nakin hun atan pawha thil awmthei a tilang a. Heng danglamna te hian mamawh leh sum lalut tura insenna titamin, chu chuan hmasawnna kawng a sial emaw tawp chin neiah a siam thei.

## **Eizawnna tak tak zirchianna :**

Tuna kan dinhmun atanga eizawnna zirchian hi eizawnna ruangam din dawn chuan tih tur hmasak ber a ni. Heng zirchianna te hi hetiang hian kan ti thei ang:

- Khawtlanga chhungkaw tinte eizawnna leh thil inthlaka mipuiten an chhanlet dan leh an eizawnna ruangam hi thuk zawka thil kan tih hmain zirchian hmasak thin tur a ni.
- Zau zawka an dinhmun kan hriatchian hian sawrkar thiltum leh hnathawh tumah kan pui thei ang.

## **Livelihood Enhancement Action Plan (LEAP) :**

**1) Social Map :** Khawtlang mipuiten in zawng zawng an kawhhmu a. Rawng chi hrang hrang leh hmanrua khawtlanga awmthei hmangin an siam thin. Social mapping hi khawtlang eizawnna dinhmun chhut nan a pawimawh hle. Hengte hi a hriat theih -

- Mihring cheng zat
- Mipui inthen dan
- Mirethei chhungkua leh retheina in a nghawng dan
- Bungraw neihdan
- In sak dan phung
- Ranvulh tlanglawn
- Khuaa pem lut zat
- Hmeihthai, parawl, kum lama upa, rualbanlo awmzat
- Sawrkar scheme hrang hrang awm zat

- Pawl hrang hrang a member nihna nei zat
- Khawtlanga hruaitu zat

### **Khuua Dinhmun chhe zawk te zirchhianna (Social map atanga a lan danin)**

<b>Khua :</b>	<b>Block :</b>	<b>District :</b>
<b>Ziahluh ni :</b>		
<b>An Dinhmun</b>	<b>Chhungkaw awm zat :</b>	
	<b>With vulnerable persons</b>	<b>Accessing entitlements</b>
Hmeithai		
Pasal neilo		
Pianphunga rualbanlo		
Rilru lam harsatna nei		
Natna chi hrang hrang vei		
Chhungkua ration card neilo		
Pem chhungkua		

### **Infrastructure/Services analysis in the village (Social map atanga a lan danin)**

<b>Khua :</b>	<b>Block :</b>	<b>District :</b>	
<b>Ziahluh ni :</b>			
<b>Hming</b>	<b>Awmna hmun</b>	<b>Pawh theihna</b>	<b>Remarks</b> <b>That dan, service hun etc.</b>
<b>General</b>			
Kawng			
Electricity			
Tui thianghlim			
PDS dawr/centre			
<b>Education</b> <b>Anganwadi centre</b>			
Zirna chhunzawmna centre			
Inbiakpawhna / TV Khawtlang			
Primary school			

High school				
College				
Library/lehkhabu chhiarna				
Technical and other				
<b>Health</b>				
ANM services				
PHC				
Sawrkar hospital				
Nursing homes				
Mimal inentirna				
Ran enkawltu				
<b>Inbiakpawhna</b>				
Phone				
Bus stand				
Rel station				
<b>Agriculture</b>				
Agriculture cooperative society				
Chawhmeh zawrhna				
Agricultural lama puinhna				
<b>A dangte</b>				
Bawnghnute sem				
Fire station				
Police station				
Post office (Dak in)				
Bank				

**2) Resource Map :** Leilung hausakna khawtlanga awm thei zawng zawng, ram leilung that dan te, hmandan leh hman theih leh theiloh te a hriattheih. He map leh a kaihnawih sawihona hian khawtlang leh a huaihawttu chu hengte hi a hriattir -

- Leilung hausakna awm chin, hmandan leh hemi chungchanga buaina kaihnawih
- Resource awmdan a zira sem darh dan
- Sik leh sa mila leilung hausakna an hman tangkai dan
- Resource inseum dan leh hman tura a awm dan
- Ram neitu leh a hmandan inlaichinna
- Resource tih thatnan leh changtlun nana sum hman leh an sum hmantur an hmuhna
- Chhiatna lo thleng leh chhiatna a lo thlena an tih dan? Chhiatna lo thleng thei an hmulawk em? An hmuhlawk chuan engtin nge lo hmachhawn an tum

**3) Livelihood Mapping :** Eizawnna awmsa zawng zawng hriatna hmanrua a ni a. Hei hian khawtlanga eizawnna tlangpui zirchian ngai bik thlanchhuah kawngah mipuite a tanpui. Hmun awl hnawhkhah ngai a hriattir bawk. Eizawnna awm thei zawng zawng hriat hnu ah khawtlang mipuite heng ho hi zawhchian an ni -

- Mipui engzat in nge he eizawna hi ti a, engzat in nge ei bel berah nei
- Heng eizawnna hi engtik huna chin thin nge
- Heng hnathawh nan hian ni engzat nge an mamawh
- Heng atang hian engzat nge an lakluh
- Khawtlang tana a tangkaina

A hnuia Livelihood mapping 1 hi a chunga chanchin hriatna atan hian kan hmang thei ang.

Livelihoods mapping 1						
Khaw hming :		Block :		District :		
Ziahluh ni :						
Tel te :						
Huaihawttu :						
Number	Thiltih	Chhungkua #		Tih hun chhung	Inhlawh fak hun chhung	Income range
		Primary	Adang			

A hnuia information pathum awm hi Livelihood Mapping 2 atan a tangkai :

- Eizawnna/hna atana chhungkaw tam zawk in an hman.
- Eizawnna/hnathawkku awmzat an pun zel na.
- Eizawnna/hna thar khawtlanga an rawn tih lar

<b>Livelihoods mapping 2</b>								
Khua:		Block :			District :			
Ziahluh ni :								
Tel te :								
Huaihawttu :								
An thil tih hming :								
<b>Tanpuina kalhmang</b>					<b>Lei leh hralthna lam nena an inpawhna</b>			
<b>Tanpuina mamawh</b>	<b>Awm leh awmloh (Y/N)</b>	<b>Awm theih dan</b>	<b>Tanpuina an dawn dan</b>	<b>Tanpuina atana sum hman</b>	<b>Leina lam</b>	<b>Lei theih hun chhung</b>	<b>Hralh theih hun chhung</b>	

**4) Traded-in and Traded-out :** Hei hian khua atanga bungrua chhuak leh lut chungchang a hriattir a, chungte chu hman atan emaw thil dang siamchhuahna emaw a ni thei. Khawchhung atanga bungrua thil hman atan emaw thil dang siamna atana kan lak hi a huam tel lo. Hei hian hailan a tum chu -

- Khua atanga bungrua lut leh chhuak dikhlehna awm thei te
- Eng bungrua hi nge khua a kan lakluh, a a hlutna kan tihpun theih tih te

<b>Traded-in and Traded-out</b>			
Khua :		Block :	District :
Ziahluh ni :			
Tel te :			
Huaihawttu :			

**Traded-in**

(Khuua thil lo lut reng reng, bungrua emaw thiamthil pawh a huam thei ang )

Bung rua	HH purchasi ng	Unit of reporting	Periodicity of purchase	Quantity purchased by HH per period	Quantity purchase d by HH per year	Rate per unit (Min. & Max.)	Total purchases by village	Season of purchase

**Traded-out**

(Khuua thil chhuak reng reng, bungrua emaw thiamthil pawh a huam thei ang)

Item	HH selling	Unit of reporting	Periodicity of sale	Quantity sold by HH per period	Quantity sold by HH per year	Rate per unit (Min. & Max.)	Total sale by village	Season of sale

**5) Income expenditure analysis :**

- Chhungkaw pawisa lakluh leh senral in mil leh mil loh a hriat theih
- He zirchianna titu hian eizawnna tlanglawn pathum vel thlang chhuakin chhungkaw khawsak phung in ang lo mi pathum a zirchiang
- Kum khat emaw a aia tam a an lakluh leh hmanchhuah dan hriat hi he thil tum ber hi a n

<b>Lakluh leh hmanchhuah zirchianna</b>							
Khua :	Block :			District :			
Chhungkaw hming :	Member awmzat	Mipa puitling	Hmeichhe puitling	Mipa naupang	Hmeichhe Naupang		
Chhungkaw eizawnna :							
Ziahluh ni :							
Tel te :							
Huaihawttu :							
<b>Lakluh</b>				<b>Hmanchhuah</b>			
Lakluhnah hnar	Lakluh zin dan	Lakluh hunlai	Amount (Rs)	Bungrua	Lakluh zin dan	Lakluh hunlai	Amount (Rs)

## 6) **Value-chain analysis** : Hei hian a sawifiah chu

- A indawt te te a thil/bungrua kan tuaihnum a, a hlutna a pun theih zel dan
- A tih dan, thiamna hmanrua ngai leh pawisa hman zawng zawng
- He sumdawnna thila inrawlh zawng zawngte sum insem kual dan

Livelihoods mapping zagh ah hian, a huaihawttu hian thil 3-4 pawimawh a thlangchhuak a, chung chu value chain analysis hmarua atan a ni ang. Heng thil pawimawh te hi step 4 in lak tur a ni.

**Step 1:** Eizawnna atan hmangte ngei atanga hriat tur a ni.

**Step 2 :** Khaw pawn atanga he eizawnna hmang tangkai a, thilsiam tute emaw, zavrhsak tute emaw hnen atanga lak bawk tur a ni. A tawpa a leitu kuta a awm hma inkara awm reng reng te pawh a huam thei ang.

**Step 3 :** Khawtlang emaw a hnai thei ang ber atanga hawk tha ber zawnchhuah

**Step 4 :** Hmun danga tihdan tha zawk an kalpui dan.

### Farm based activities a value chain analysis tihdan tur :

Value-chain Analysis																
Khua :	Block :				District :											
Ziahluh ni :																
Tel te :																
Huaihawttu :																
<b>Item of value chain :</b>																
	Bung raw lo lut	Siam danglam hma	Productio n	Harves t	Post-harvest	Local value addition	Marketing I	Marketing II								
Activities																
Materials, Tools																
Person power/labour																
Time																
Seasonality																
Technology																
Expenditure																
Credit (with source)																
Risks																

Infrastructure required								
Total production/sale								
Profit								
Recent changes								
Best practices								
Gaps								
Opportunities								

## 7) Local market opportunity analysis :

- Bungrua bazar a lo lut emaw, bungrua bazar atanga chhuak tlithlai nan an hhang thin. He bazar hi kan va zirchian tum mipui ten an tlawh thin a ni tur a ni
- Hemi atang hian khawtlang mipui ten hamthatna awm an hrethei ang
- Bungrua thenkhat te hi khua ah siamin a tuaihnum theih a. Tin khaw dang thawn tur pawh a hlutna pawh titaam theih a ni
- Mipui te tan hlawnheinhna hna a pe thei a ni

Local Market Opportunities									
Market zir :		Block :		District :					
Zir ni :									
Zirnaa tel te :									
Huaihawttu :									
Bazar a bungrua lolut									
Item	Hlutna	Bungrua lakna	Processing of item in the source market	Terms & conditions	Season				
Bazar atanga bungrua chhuak									
Item	Hlutna	Bungrua pekna	Processing after item enters into the target market	Terms & conditions	Season				

## **Topic 3 – Lei zirchianna leh lei hriselna enkawl dan**

### **Objectives :**

Understand the basic principles of soil testing and enhance understanding about living soil as a medium for plant growth

**Duration :** 45 minutes

**Expected outcome :** Participants will develop understanding and awareness on the importance of soil testing for medium growth of plant

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Training on soil testing and soil health management	* Essentiality of soil testing in crop production for sustainable livelihood * Technique of soil sample collection	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on soil testing through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

### **Lei zirchian tangkaina leh a tum te :**

Chhan leh tih dan hrang hrang vangin soil test (lei zirchianna) hi neih thin a ni a, chung zing a lei kan zir chianna langsar ber chu huan tlhai siam hlawhtlin nan a zir chian hi a ni. Thlai chinna tur ramah chuan kan tlhai chin tur a zir zelin a lei a tha em, tui leh hnawng duhthusam a awm em tih leh kha leiin a mamawh leitha engte nge pek belh ngai tihte lei zirchianna atang hian kan hre thei a ni. Lei sample chu la in department a mithiam bikte hnenah kan pe tur a ni a, sample hi pawng lak tawp lo in a hnuasia kan sawi tur ang hian lak tur a ni. Lei zirchian hian nasa takin tlhai thar a ti tam a, lo neitute hlawhchhamna lak ata a chhanhim thei a ni. Kan ram lei hi a tak tha em a, tlhai mamawh chakna a pai em, rannung leh natna tlhai tan hlauhawm a awm em tih te hi hma kan lak tak tak hma in kan hriat a pawimawh hle.

### **Lei zirchian hian tlhai chaw tha hlawm lian pathum hetiang hian a zir chiang :**

- 1) Thlai in a mamawh nasat zual chaw tha : Nitrogen, Phosphorous leh Potassium (NPK)
- 2) Thlai in a mamawh chaw tha : Sulfur, Calcium leh Manganese
- 3) Thlai in a telo pawha a damkhawchhuah theihna chaw tha: Iron, Manganese, Copper, Zinc, Boron, Molybdenum leh Chlorine

Lei zirchian tur kan lak reng rengin hmun khat ami kan la tur a ni lo a, kan sample lak khan khami ram kha a khai khawm tha hle tur a ni. Kan hriat atana pawimawh tak chu ran ek awmna bula mite, tui tlin khawmna hmun ami leh thing daihlim hnuai ami te hian a ram lei a hril thui lo a, chuvangin heng hmun ami te hi zir chian atan a lak loh hram tur a ni.

## **Soil sample tur lakkhawm dan :**

### **Hmanraw mamawh te:**

1. Bawngtuthlawh
2. Chemkawm
3. Soil sampler
4. Lei dahkhawmna tur
5. Plastic tray leh bucket

### **Hriat atana pawimawhte :**

1. Thlai chin tan hma in sample lakkhawm tur a ni.
2. Thlai a awm tawh chuan sample chu thlai tichhe lo in a inkar ami lak tur.
3. Zig-zag angin hmun hran hran ami lak tur.
4. Ram enkawl dan leh kuthlak dan in ang chu hlawm khat ah a ngaih theih.
5. Hmun hnawng, ran ek leh thingbul hnaih ami lak loh tur.
6. Thlai zung pawnlang chu 15 cm a thuk ah sample lak tur, thlai zung thuk deuh chu 30 cm a lak tur.
7. Sample lak hian a ram neitu hriatpui na leh enpui thlap a lak theih ni se.

### **A tih dan :**

1. Sample kan lak na tur ram chu hlawm in ang lian tak tak ah then hran tur.
2. Lei pawnlang hnawmhawnawh tihfai hmasak tur.
3. Bawngtuthlawh in hmun 15 atanga 20 ah 15 cm a thukin lei laih tur.
4. Ram hmun hrang hrang ami lak loh tur. A darh zau thei ang ber a sample kha lak zel tur a ni.
5. Chung lei kan lakkhawm te chu tha tak a chawhpawl in lung leh thlai zung te thenfai tur a ni.
6. Lei chu kg chanve emaw a khat a dah hran leh tur a ni. Hemi kan tih dan tur chu kan lei lakkhawm zawng zawng kha tha tak a kan chawhpawl hnuah hmun li ah then in hmun hnih in kawkalh te kha pah in kan duh zat kg kan hmuh hma hetianga tih tur a ni.
7. Chu lei kan duhthusam chu puan emaw polythene bag fai tak ah dahthat tur.
8. Bag ah chuan hengte hi felfai tak a ziah lan tur, loneitu hming, ram awmna hmun, survey number, thlai lo chin tawh, thlai chin mek, thlai chin leh tur, sample lakkawm ni leh a lakhawm tu hming.

Sl. No.	Thlai hming	Lei laihkhuar thuk zawng	
		Inches	cm
1	Hnim leh phul hmun	2	5
2	Thlai zung pawnlang	6	15
3	Thlai thuk taka zung nei chi	9	22
4	Thlai kumhlun, oil palm, serthlum leh a dangte	Hmun thumah 12, 24 leh 36 inches	Hmun thumah 30, 60 and 90 cm

## Topic 4 – Buh chin dan

### Objectives :

Sensitizing the participants towards the importance of paddy and System of Rice Intensification (SRI)

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness towards the importance of paddy and System of Rice Intensification (SRI)

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Paddy cultivation	* Paddy cultivation in Mizoram * SRI vs shifting cultivation * Settle / permanent cultivation * Seed selection * Land selection & preparation * Seed treatment * Harvesting * Post harvest management	Powerpoint presentation, Interactive learning method	The trainer will discuss the topic on paddy and SRI. Trainer encourage trainees participation by asking them relevant, practical and electives question	LCD projector, Laptop

### Buh (Paddy – *Oryza sativum*)

Buh hi mizo ten chaw a kan rin ber a ni a, Mizo te tan thlai pawimawh tak a ni. Kumtin mimal ram neih dan azirin lei hmun hrang hrang ah kan ching thin a, leilet a ching an awm laiin tlangram a ching pawh an awm a ni. Mimal tin kumkhat chhung thar dan pawh a in ang tlang lo hlawm hle a, buh chin dan/thar dan tlang pui han tarlang ila.

### Sik leh sa mamawh dan :

Buh hi boruak chi hrang hrangah a chin thei a, amaherawh chu tui duh tak anih avangin tui thatna hmun a chin in a thar hnem thei a ni. Tui a mamawh zat hi kum khatah ruahui 1000 – 1500 mm a ni a, boruak lum zawng 27°C-35°C hi a chi kui nan an mamawh a, a par chhuah hun laiin nikhat ah ni (sun) hi darkar 8-10 a mamawh.

### Lei mamawh leh sawngbawl dan :

Buh hi lei chi hrang hrangah a chin thei rual in sawntlung lei/hlum lei hi a ngeih ber a, lei tha hnawng leh lei thur zawng pH 5.5-7.5 a mamawh bawk a ni.

Leilet hmuna buh phun tur chuan a lei chu sawngbawl phawt tur ni a, lei chu May-June thlaah thuk tha taka leh hmasak a, karkhat vel dah ruah/nisa hem tir tur a ni. Hei hian lei ti hnawn nan ruahui a dawntir mai baka rannung leh natna lei a awm te a that dawn a ni.

Tlangram lo ah chuan a tlangpuiin leileh a ngai lova, hnim awm thei ang chite tih fai that tur a ni, lo hal zawh hnuah kangvar te ti faiin, chumi hnuah kar khat vel nisa hem tir tur a ni.

### **Buh chi tha te :**

- a) Tlang rama chin chi :  
PNR-381, Saket-4, Pusa-169, VL dhan-206, Manhar, VLK-35
- b) Phaizawl ah chin chi :  
Saket -4, Pusa-169, Pusa- 33, Ratna

### **Chi mamawh zat :**

- Direct sowing : 80-100 kg/ha
- Transplanting : 35-40 kg/ha

### **Buh chi theh dan chi hrang hrang te :**

- 1) Direct sowing
  - a) Broadcasting
  - b) Line sowing
- 2) Transplanting
  - a) Dry-wet method
  - b) Wet-wet method
  - c) Dapog method

### **Buh chi kui dan :**

Buh chi chu a kuina hmun atanga phun sawn tur hi ni 20-30 (kharif) a upa a ni tur a ni, a inkar hlat zawng a tlar leh tlar 20 cm leh a kung leh kung 15 cm a ni tur a ni. Thlasik a phun tur chu ni 30-35 upa a ni tur a ni a, a kung leh kung inkar 15 cm leh a tlar leh tlar 15 cm a hla a ni tur a ni.

### **Lei tha pek dan :**

Buh phunna tur hmun leilet chu hectare khata bawng ek leitha 20-25 tonnes vel phun hma kar khat velah leileh rualin telh tur a ni a, cm 15 a thuk thleng leh tel tur a ni. Chemical leitha pek duh chuan hectare khata 120 kg nitrogen, 50 kg potash, 60 kg phosphorus, pico-5 leh zinc sulphate-te pek tur a ni, phun rualin phosphorus, potash, zinc sulphate leh 50% nitrogen te hi basal dose atan pek tur a ni bawk, a bak nitrogen chuangte hi phun atanga ni 30-35 inkarah a chanve (25%) pek leh tur ni, a chuang zawng chu phun atanga ni 60-70 hnu ah pek leh tur a ni.

### **Tui pek dan :**

Buh hi thlai zawng zawng ah tui heh ber a ni a, Buh kg 1 thar tur hian tui litre 500 zel mamawh ang a ni. A tiak phunsawn te chu tui 2-15 cm a thuk a chiah tir reng tur a ni a, seng theih hma karkhat vel thleng tui hi chim tir reng tur a ni. Lei a zirin tui te hi seng hma kar khat ah emawh kar hniih hmain paikh chhuah vek tur a ni.

### **Hnim suat dan :**

Buh hmun chu hnim in an bawh nasat lutuk hian tlang ram ah a thar tur 50-70 % thleng a tihniam thei a, leilet ah 20-23 % velin a ti hniam thei bawk. Hnim te chu buh chin atang emaw phun atanga ni 20-25 velah a vawi khat nan thlawh fai tur a ni a, ni 40-50 hnu ah vawih hniih nan thlawh fai leh bawk tur a ni.

Mihring indaih loh changin weedicides (hlo tur) hmangin a kah theih bawk a, Butaclore 1.5 kg a.i/ha emaw Propanil 35 kg a.i/ha in phun atanga ni 2-3 emaw ni 15-20 hnu ah kah tur a ni.

## **Natna leh enkawl dan :**

**Blast:** Natna thlentu-*Pyricularia oryza*

### **A lan dan :**

Mitmu ziah ang deuh in sen duk emawh a paw deuh in a hnah leh a kuang vel a bawm thin a, buh vui a ei chhe thin, a uk rawng emaw a dum rawngin a thlak thin a, buh si ah a chhuah thin a ni.

### **Enkawl dan :**

Buh chi kg 1 hi Agrosan GN 2.5 gm a chiah hmasak tur a ni.

## **Sheat blight-Corticium sasaki**

### **A lan dan :**

He natna hi a hnah ah centimeter 2-3 vel a sei, paw dal deuh a pawl duk rawngin a kual hnan a, a nasat chuan buh si ah a chhuah thin a ni.

### **Enkawl dan :**

- 1) Natna in a tlakbuak kung te chu phawi a pah tur a ni.
- 2) Thlai thar thlai chi nen kar thlak/Crop rotation hman thin tur a ni.

## **Stem rot-Leptophearia salvini**

### **A lan dan :**

A kung leh kuang vel a eichhe thin a, a dum tle deuhin a lo tuam thin a ni. Hetiang natna neih te chu an vuai a, an tlu thin a ni.

### **Enkawl dan :**

- 1) Natna in a tihbua te chu phawi chhuah a, pah tur a ni, lei buatsaih laiin thuk taka leh tur a ni bawk.
- 2) Tui chim tir rei lutuk loh tur a ni bawk.
- 3) Cupperoxy chloride 1.5 a.i kg/ha hi tui liter 600-800 nen a chawpawlh hnu ah kah thin tur a ni.

## **Bacterial leaf blight-Xanthomonas oryza**

### **A lan dan :**

A hnah ah tui hnang rawng eng deuh a lo chhuak a, buh vui a ti hmuar in buh si a siam thin a ni.

### **Enkawl dan :**

- 1) Buh chi thiaghlim/ natna do thei a chi tha Goving, Ratna, Prasad, Pusa 2 -21, IR – 20 te hman thin tur ani.
- 2) Tui chim chu a khat tawk a pah chhuah/ luanral tir ze; thin tur ani.
- 3) Cupperoxy chloride hi tui liter 500 – 600 nen a chawpawlh hnu ah kah thin tur a ni.

## **Khaira disease :**

### **A lan dan :**

He natna hi zinc tlakchham vanga awm a ni a, nursery natna a ni. Bial te tak te in a hnah chawr no a lang thin. Hetiang natna nei chu a thang thei lova, phun sawn tlak lohah a chhuah thin.

### **Enkawl dan :**

1. Buh chi tha, hetiang natna do thei IR- 20 emaw Ratna te hman tur a ni.
2. Natna kai kuang te chu pah thin tur a ni.
3. Thlai dang nen a chin tlak pawh natna do nan a tha hle.

### **Seng hun leh seng dan :**

Buh chi hrang hrang te hi chin atanga ni 100-150 velah a seng theih tlangpui a, a seng hunlai hian buh vui tui zawng hi 20% a ni tur a ni.

### **Thar thei zat:**

Hectare khata buh tonne 15- 20 vel a thar thei a ni.

## **System of Rice Intensification (SRI) :**

SRI hi buhchin dan thar a ni a, buhchi a ni lo. SRI chu organic hman tam zawk a buh chin dan a ni. Kum 1983-1985 vel khan kristian puithiam social worker ropui tak Fr Henri de Laulanie, SJ-an, Madagaskar thliarkar atanga a hmuhchhuah a ni a. A hmuhchhuah dan pawh tihpalh (accident) thil mah zawk a ni. Antsirabe a farm school ah chuan an tum aia hmain buh tiak phun sawn a ngai ta a, tichuan ni 15 a upa chauhte kha an phun sawn ta a, mahse a tha duhin a pengte a lo tam phian a, a thar a hlawk ta phian mai bawk si a. Chuta tanga lo lar chho ta a ni.

### **A sawngbawล dante :**

**1) Buh chi kui dan :** Buh chi hi chiah uingho sa nise, chu chu a kuina tur chikuang, nursery kan tih mai uluk taka siamah rual taka theh tur a ni. Chikuang chu rih pawn, thingphel emaw dap emaw mau phel emaw a khuah tur. Buh chi theh hnuah lei dip leh di emaw buhpawl emaw a khuh tur a ni a, ni khat danah emaw fimkhur taka tui pek tur. Buh a lo tiahin a khuhna hi dahsawn leh tur.

**2) Buhchi mamawh zat :** Hectare khat a phun turin buh chi kg 5 kui ila a tawk. Chutiang anih chuan acre khata phun tur kg 2 kui ila a tawk chiah. Nursery te chu metre 1 a zau, a sei zawng erawh a remchan dan anga siam tur a ni. Lo a zau deuh chuan hmun hrang hranga siam a tha, a chi tiak thiар vel a awlsam zawk vangin.

**3) Phun sawn hun :** Buh tiakte chu ni 8 a upa anih atangin a phun sawn theih a, ni 12 a upa thleng hi duhthusam a ni. A ai chuan upa lo se a tha. Hetih hun hian buh tiakin hnah pahnih a nei ber. Thlai tiak dang phun pawhin a naupang pang phun a tha fo.

**4) Phun sawn dan :** Phun sawn dawn hian buh tiakte hi pawh chi a ni lova, fimkhur takin thirphek emaw cement mistiri hmanrua grandhi te hian lawk tur a ni. An la naupangin an la no em em a, kan hliam hauh tur a ni lo. Minute 15-30 chhungin kan phun fel vek tur a ni. Heng buhtiak lawk sa pawh hi khote, tray te in emaw keng ila a tha. Hetianga buh phun hian a nung nghal mai a, phun tirha a than chawl lailawk leh eng tiar tuar pawh a awm ve lem lo. Hetianga buh

tiak naupangte kan phun hian buhin than hun a neih rei phaha, chu chu a pengin a lo pun phah bawk a, buh a lo thar tamin a thar hlawk phah a ni.

**5) A bi hlat zawng :** Buh phun hian a tlar a ngil tur a ni a, a tlar a a bi inkar te pawh a inang thlap tur a ni. Square in an phun thin. Chumi awmzia chu a tlar kar pawh inches 10 emaw 15 emaw a ni ang a, tlar 1 a a bi inhlat dan pawh inches 10 emaw 12 emaw 15 emaw a ni tur tihna a ni. Bi khatah pakhat chauh zel phun tur a ni a, pahnih a lo awm palh anih pawhin chu aiin a tam tur a ni lo. A bi leh thar khat dan hi a lei a that dan leh a buh penduh danah a innghat bawk.

**6) Lei sawngbawl dan :** Lei hi uluk taka leh tur a ni a. Lei pawh uluk tak leh chiar tha taka kawi tur a ni. A in level tha em em tur a ni bawk. Tin, phun laiin tui a tling tur a ni lo.

**7) Phunsawn dawna hmanraw mamawh te :** A tlar ngil tak leh a bi inkar inang leh ngil, rual taka kan tihtheih nan hrui emaw hmawlh emaw, a hran a an siam marker an tihte hmang thei ila a tha hle.

**8) Tui pek dan :** Phun hnu pawh hian tui pek mai chi pawh a ni lova, a lei leh a ram leh khaw awm dan a zirin ni 2-6 danah te tui tling lova, a lei tihnwng khawp chauva pek tur a ni a, chutiang chuan kalpui zui tur. A leite pawh sin te te chuan khi sela a pawi lo, a khi nasa tur a ni lo thung. A phun tan atanga a seng hma ni 15 vel thleng tui pante a chim tir tur a ni a, chutah sah kang zui tur. Duhthusam ah chuan chhun pachang lai emaw nisat vang laia tui pek loh hram tur a ni. Tui a mamawh tlem em avang hian Mizoram atan hian thil tih itawm tak a ni.

**9) Hmun mamawh dan :** SRI tihna hmun hi tui control theihna nise duhthusam a ni. Tui tam lutuk paihna drainage channel leilet sirah awm sela; tin, bial chhungah pawh metre 2-3 danah tuitlinna tur channel emaw furrow emaw siam a tha bawk.

**10) Hnim ven dan :** Hetianga SRI dana buh chin hian hnim pawh a thang duang duh hle, mahse phun atanga ni 10 vel atangin hnim hman lova hlo hi thlawh zel tur. Hlo tur hi recommend chu a ni chiah lova, a hnim awm a zirin hman pawh a tha zawk thei. Tin, rotary weeder (hlothlawhna) a awm a, a tangkai hle. Hei hian lei a let chiara, hnim pawt phawiin leiah a hnim phum nghal bawk a, lei titha tura tihdan kawngkhat a ni nghal. Weeder a hlo thlawh dawnin a hma nikhatah tui lo pek hmasak phawt tur a ni.

**11) SRI hlawkna :** SRI dana buh chin hian a peng tam duh hle mai a, a zung a hriselin a sei bawk a, hei hi a hlawkna chhan chu a ni. Bi 1 a buh tiak 1 lek phun si khan 60 te, 70 te leh 100 chuangte pawh a peng thei. Chuvangin phun khat hi a ngai a, rin ngam mai tur. A than chak avang leh a pen tam avang hian hlo thlawh pawh a hautak rei lo thung. A vui rau rauah pawh a zakzeh emaw vui puitling lo a awm ngai meuh lo.

**12) Leitha pek dan :** Buh kung a tha a, a peng tama, a rah a that bawk avangin chaw a ei nasa in lei a da duh hle tura ngaih tur. Chuvangin leitha in kan chawm uluk hle tur a ni. Leitha pek tur zatve hi organic leitha nise a zatve dang erawhchu chemical fertilizer hmanga pek tur a ni thung. Sawi tawh angin SRI danglamna chu buh chin dan pangngai aia buh a thar hlawk em em mai hi a ni a. Kum 2004-05 leh 2005-06-a Mizoram leilet a kan buh thar hlawk dan chu hectare khatah a hum in 26.80 qtl leh 27.30 qtl a ni a, a buhfai erawh chuan 18.70 qtl leh 19.1 qtl a ni thung. Hetih hun chhung veka all India a buh thar dan chu 19.80 leh 21.00 qtl a ni thung. Hetih lai hian SRI tih dana buh chin erawh chuan a hum a ni emaw a fai a ni emaw a hmun ngaiah a thar hlawk bik em em a, a let li (4) let nga (5) in a thar hlawk zawk a, hei hi zoram chhunga Agriculture department in a enchhinnaah pawh chiang taka hmuh a ni.

## Topic 5 – Leitha chungchang

### Objectives :

Sensitizing the participants toward the application of organic fertilizer

**Duration :** 45 minutes

**Expected outcome :** Participants will develop understanding and awareness towards organic farming and application of organic fertilizer

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on organic farming	* Importance of organic farming * Impact on the environment sustainability * Vermicompost	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on organic fertilizer. Trainer will ask the participants experience of using organic fertilizer	LCD projector, Laptop

### Engnge organic farming chu?

Organic farming chu damdawi (chemical) hlotur, zuva/rannung thahna hlo hmang lova thlai leh ran enkawl dan hi a ni.

Organic farming in a tum ber chu thlai kar thlak a chin, ran zun leh ek hman tangkai leh thlai/hnim tawih te tangkai zawka hman uar hi a ni. Thlai leh hnime te pah mai lova lei tih that nan a hman leh hi a tum ber a ni. Thlai leh ran zun leh ek hmanga lei hausakna (thlai tana chawtha) humhim a ni a, hetianga lei enkawl hian ruahui luangral tur leh leimin tur a veng a, hun rei zawk daih tur chawtha a pai tir thin a ni.

### Organic farming tum tlangpui te :

- 1) Boruak chhe tur ven, lei tawlh leh leimin tur venhim, mihring tana hrisel zawk thlai thar leh hriselna ngaih pawimawh
- 2) Nunna nei hmanga hun rei zawk lei tha vawnhim
- 3) Thlai in a mamawh em em nitrogen pai hnem thlai chin uar

### Organic farming hlawkna/ that zawkna :

- 1) **Chaw tha :** Chaw tha hriltu ber chu thlaiin an pai vitamin leh mineral te a ni a, damdawi hmanga chawm thlai te aiin damdawi hmang lo thlai thar te hian a let tam takin vitamin leh mineral te an pai tam zawk a, an hrisel zawk bawk a ni.
- 2) **Natna laka fihlim :** Organic thlai thar ei te nihlawh em em na chu thlai thar natna pai lo, taksa in a mamawh leh hriselna pai tam thlai an ei vang a ni.
- 3) **Lei tha a vawng rei :** Hlotur, rannung thahna hlo leh damdawite hman anih loh avangin lein thlai tana chawtha a pai rei a ni. Lei tihhnawm nan thlai emaw hnime hring leh ro tawih ral mai tur hmanga khuh anih vangin ruahui luang ral tur leh leimin tur te a veng em em bawk a ni.

- 4) ***Sum sen a tlem*** : Organic farming ah chuan khawvel pianken hman vek anih avang hian thlai huan enkawl nan sum sen a ngai tam velo a, lei tihtthat nan changpat, ran zun leh ek, thlai tawih te hman a ni a, hengte hi a hran pah a lei ngai lo anih avangin sum sen a tlem phah em em a ni.

#### **Organic farming siam dan :**

- 1) ***Crop rotation*** : Hemi awmzia chu huan pakhat ah thlai ngai reng ching lovin sik leh sa intlhak dan azirin thlai dang chin thlak hi a ni. Lei hmun khata thlai ngai chin reng hian leitha a ei chhe thin a, amah ei chhe tu rannung leh natna ten bu an khuar thin a, chumi ti reh tur chuan thlai dang chin thlak thin tur a ni. Hei hian leitha a siam leh ang a, rannung leh natna te pawh an bo thei dawn a ni.

*Entirnan* : - Kum khata thlai chi hnih karthlak

Buh-bean-buh

Kum khata thlai chi thum nen a karthlak

Buh-bean-Antam chi-buh

- 2) ***Green manuring*** : Hei hi lei tihtthat nan a thlai chin a ni a, lei ah leh tel emaw thehdar leh thin a ni. A tlangpuiin thlai ngaih pawimawh bikte inkar ah chin tel ve thin tur a ni a, duh chuan lei awl lai (thlai engmah chin lohlai) ah pawh a hlangin a chin theih a ni. Hetiang tur hian “leguminous family” thlai, boruak atanga nitrogen dawngnem thei, a zung atanga lei chhung lama thlai dang mamawh pe chhuak thei chi hman a ni tlangpui a, chung langsar zual te chu :

- a) Azolla
- b) Behliang (Red gram/Pigeon pea)
- c) Behlawi (Cowpea)
- d) Chana hrung (Green pea)
- e) Antam
- f) Neem

- 3) ***Biological pest control*** : Hei hi rannung ven dan a ni a, damdawi emaw hlo hman loh a ni. Rannung thlai eichhe thin te chu kut lawnga thah emaw amah ei thin rannung dang nena ven thei a ni a, thlai karthlak (inchhawk) a chin hian rannung lakah a veng thei bawk. Hei mai bakah kan thlai chin tam ber emaw pawimawh ber ei thin rannung in a ei ve thin thlai dang chin khalh te pawh a tha hle.

- 4) ***Organic waste*** : Ran ten an ei in an paikh chhuah leh te tangkai zawk a hman dan a ni a, zun leh ek ah hian lei tihtthatna mineral tam tak a awm a, chungte chu paikh ral mai lovin, lei ah thehdar in emaw sawngbawl hnu ah lei tihtthat nan hman tur a ni. Hei mai bakah kan eiin bang te pawh sawngbawl a, thlai kan chin na hmun ah theh dar tur a ni bawk. Ran talhna hmun a sa ning nawi leh sa ruh te pawh hian thlai tana chawtha tam tak an pai a ni.

- 5) ***Vermicompost*** : Hei hi changpat atanga lei tha siam dan a ni a, khur chhung ah changel chansawm hmasak a, bawng ek a vur tur a ni, chumi hnu ah changpat thlak leh tur a ni, a khat tawka tui lei huh thin tur a ni bawk. Thlathum vel chutiang chuan sawngbawl tur a ni a, changpat ek leitha chu thlai chinna hmun ah mamawh dan azirin hman mai tur a ni.

- 6) ***Hnim ven dan*** : Organic farming ah chuan hnim te hi nuaibo vek lam aiin hman tangkai lam a kawk a, chutiang tih tur chuan kawng hnih a awm, chung te chu :

- a) **Mulching** :- awmzia chu leikhuh tih na a ni. Hnim chi hrang hrang, thlai ti buai thei tur ven nan hian polythene/silpaulin hman thin a ni.
- b) **Mowing/Cutting** :- Hnim lo to hmasa te chu kutin thlawhfai thin tur a ni.

## **CHANGPAT HMANGA LEITHA SIAM (VERMICOMPOST) :**

Vermicomposting hi changpat hmanga thil tawih chi hrang hrang leitha a siamdan tihna a ni. Kan huan leh lo a hnawmhawlk te paikh mai lovin, leitha siam nan kan hmang thei a ni. Changpat te hian hnawmhawlk leh hnimhnah te eiin an paitawih a, an e chhuak leh thin a, heng changpat ek hi leitha tak niin thlai tan than chakna a ni a, mit a hmuh tham loh rannung te tak te te lei ti tha tu a pai bawk, thlai ei chhe theitu rannung laka ven theihna a nei bawk a ni. Hei vang hian changpat hi rangkachak dum (Black Gold) tih a vuah a ni hial reng a ni.

### **Hmanraw mamawh te :**

Ran ek, a bik takin bawng ek leh thlaikung/hnimhnah sahsawmte leh changel te hi hmanraw hman tlanglawn berte an ni. Tin, thlai kung seng zawh tawh hnu pawlh hian vermicompost thatna a tih pung bik a ni.

### **Changpat chi :**

Changpat hi chi hrang tam tak a awm a, chungte chu *Eisenia foetida* (Changpat sen), *Eudrilus eugehiae* (zana vak chhuak chi), *Periony excavates* leh a dangte an ni. Heng zingah hian changpat sen chi hi an in thlahpung chak a, chuvangin leitha an siam chak bikin an tha bik a ni. Tin, a chunglang a piang ei thin anih avangin a chung lam atangin leitha siamin a hnuaih an siam thla zel a, chuvangin an tha bik bawk ni.

### **A piangphung :**

*Eisenia foetida* hi han zir chiang deuh bik ila -

1. Sei zawng : 3-10 cm
2. Taksa rih zawng : 0.4-0.6 g
3. A puitlin hun chhung : Ni 50-55
4. A leitha siam thei zat : Changpat 1000 in thla 2 chhungin 2 quintals
5. A tui tam dan : Ni 3 chhungin pakhat
6. A tui atanga pian hun rei zawng : Ni 20-30

### **A sawngbawl dan :**

A tlangpuiin vermicompost hi chhuata chhunvum chi leh khur siama buatsaih a ni a, chhuata chhunvum chi ah chuan lei chhuata emaw cement chhuata 6x2x2 ft a kan compost hman tur chu chap tur a ni. Hei hi enkawlk leh buatsaih a awlsam hle a; tin, khur hmanga siam dawn chuan 5x5x3 ft cement concrete a siam tur a ni. Khur hi compost kan duh dan anga dah khat tur a ni. Khur hmanga siam hi leitha tam tham tak tak siam dawn chuan a tha zawk a ni.

### **Siam dawn thil tulte :**

1. Kan siam na tur hmun chu hmun vawt, hnawng tha leh daihlim a ni tur a ni.
2. Hnimhnah ro/changel kan hman turte chu uluk taka chan sawm tur a ni.
3. A hmasa berah bawng ek leh hnimhnah ro te chu 3:1 in chawhpawlha, ni 15-20 chhung dah tawih deuh hlek tur a ni.
4. Hemi zagh hian bawng ek leh hnimhnah kan chawhpawlha kha 6x2x2 ft a phah tur a ni.

5. Bawng ek leh hnimhnah ro kan hman tur te chu bawng ek hmun 10 a thena hmun thum anga hman tur a ni.
6. Kan leitha siamtur hnimhnah leh bawng ek te chu leitha kan siam duh zat a zirin kan mamawh ang.
7. Kan leitha siam tur chapah khan bawng ek chap a, a chungberah changpat sen chi 1000 vel dah tur a ni.
8. Changpat dah zawh veleh tuileih tur a ni a, a chungkhuh pawh siam thei a ni.
9. Kan leitha siam na hmun chu a hnawnthat reng theih nan nitin tui vawi khat tal pek tur a ni a, polythene emaw buara in a chungkhuh siam tur a ni. Di hmangin a chungkhuh siam theih a ni bawk.
10. Vermicompost hi a tlangpui in ni 50-60 hnuah seng/hman tan theih a ni.
11. Bawng ek tharlam chunga kan leitha thar chhuahte chu hrikfai hmain darkar 24 kan dah phawt tur a ni a, hei hi leitha atanga changpat thliar theihna tur a ni.
12. Kan leitha thar chhuahte chu kan hmanraw hman hmunli a thena hmun thum a ni tlangpui.

#### **Vermicompost hausakna :**

Changpat ek leitha ah hian heng NPK kan tihte bakah thatna dang tam tak a awm a, thlaiin an ei mai thei chi a ni a, kan hman kum la la hian a thatna pai zawng zawngte chu thlai ei theih turin a chhuak vek thin.

1. pH	:	6.8
2. Total Nitrogen (%)	:	1.02
3. Available N (%)	:	0.15
4. Available P (%)	:	0.30
5. Available K (%)	:	0.24
6. Ca (mg/100g)	:	8.8
7. Mg(mg/100g)	:	5.50

## **Topic 6 – Integrated Pest Management leh Integrated Nutrient Management chungchang**

### **Objectives :**

Creating an awareness on the importance of INM and IPM

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness towards the importance of INM and IPM

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Training on Integrated Pest Management and Integrated Nutrient Management	* Types of pest * Organic pest management * Trap crop * Introduction of nitrogen fixing plant * Green manure and organic manure * Crop rotation Creating an awareness on the importance of INM and IPM	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on INM & IPM through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

### **Engnge Integrated Pest Management (IPM) :**

Hei hi chu rannung thlai ti chhe thei te ven dan a ni a. Boruak, ram leh leilung te ti chhe lo zawng a rannung ven dan a ni.

### **Rannung ven dan :**

Rannung dan nan chemical hrang hrang an hmang hluar hle a, mahse zirchian hnuah heng chemical te hian boruak an tih chhiat mai baka mihring hriselna atan pawi thei tak a ni tih hmuhchhuah a ni a, a chhan chu kan thlai ei ah pawh chemical a kai thin vang a ni. Mihring tana hrisel zawk leh boruak vawn thatna ngaituahin, mithiam ten chemical hmang lova rannung tih kiām dan an duang chhuak a, Barlett (1956) chuan ‘Integrated Pest control’ tih an duang chhuak a ni. Hei hian a tum ber chu chemical hman tlem a, nunna nei hmanga rannung thlai ei chhe tur ven a ni.

National Acadeny of Science chuan IPM hi ti hian a hrifiah leh a, “Boruak hrisel leh leilung hun rei zawk hman theih nan chuan rannung kan enkawlna kawngah hian damdawi ringawt hmang lovin, khawvel pian ken hmanga ven tur a ni, hei hian mihring tan hriselna a thlen tam dawn a ni”.

## Rannung vendan chi hrang hrang te :

### 1) CULTURAL METHOD :

Cultural method chu hman atang tawh a kan lo tih thin, thlai ching thin ten an tih ngei ngei thin hmanga rannung tha emaw vendan a ni a, lei kan leh thin te, hnime kan thlawhfai te ang hi a ni.

#### a) Tillage :

Hei hi leileh tihna a ni a, lei hi rannung te tan tawmna tha tak a ni a, an thanlen theih nan an mamawh chawtha te a pai hnem em em thin a, hei vang hian thlai kan chin hma in lei hi uluk taka kan leh in a chhunga rannung awm te a phawrh chhuak a, nisa ah pho anlo nihin a thi ta thin a ni.

#### b) Thlai chi thienghlim :

Thlai kan chin tur a chi te hi uluk tak leh fimkhur takin thlan thin tur ani a, natna kai loh leh pan emaw hliam nei lo te thlan thin tur a ni.

#### c) Tui hmangin :

Thlai te hi seng zawk hnuah tui tam tawkin luan tir thin tur a ni a, hei hian rannung lei a awm chi te a len bo thei dawn a ni.

#### d) Thlai kar hlat zawng :

Rannung te hian thlai bichilh lutuk hmunah an pung chakin an tam duh thin a, chu vang chuan, kan thlai chin te hi a awm tawkin kar hlat deuh a chin thin tur a ni.

#### e) Thlai chin thlak :

Thlai chin thlak hi rannung tih rem nan a tha a, thlai pakhat i seng hnu ah thlai dang i chin leh khan, thlai hmasa zawk ei chhe tu rannung te kha an ei tur a awm tawh loh avangin an kiam ta thin a ni.

*Entirnan* : Vaimim-fu, bu-vaimim

#### f) Thang :

Thlai tam zawk a kan chin duh te eichhe thin rannung in a ei thei ve tho tur thlai dang a sir vel a chin khal tur a ni.

Entirnan		
Cabbage	Mustard	Diamond back moth
Cowpea	Pigeon pea	Cowpea borer, flower thrips, Bihar hairy caterpillar
Tomato	Cucumber	Whitefly, mites
Maize	Cucurbits, Sorghum	Shoot fly

#### g) Zarthlak/ tan bulh :

Theirah chi anga hian a tang upa lam leh rannungin an bawm te chu a zar thlak thin tur a ni. Hetiang tih hian serthlum hnabawm thin a ti kiam thin a ni.

#### h) A hun taka chin leh seng hi rannung vennan pawimawh tak a ni a, a chin hun a chian loh hian rannung a ko em em a, a thar tur a ti tlem thin a ni.

## **2) MECHANICAL AND PHYSICAL METHOD :**

Hei hi hmanrua leh kut hmanga rannung vendan leh tihbo dan a ni.

### **a) Kut hmangin :**

Rannung bawmtu a tam in kut hmangin pah bo thei a ni a, a tlangpuuin rannung puitling tawh leh a tui te tihbo nan hman thin a ni.

### **b) Nets :**

Rannung bawm tur ven nan net hman thin a ni a, net chu mahni remchan dan a zira lian in thlai kung te khuh thin tur a ni. Khau leh khau khuap te mai bakah sava laka ven nan hman a ni thin.

### **c) Hlap/Vuak :**

Tho hlapna ang chi te, hnim hling nei chi leh hmunphiah hmangin rannung te thah thin a ni a, kan thlai ven tur a zirin a hlap na tur hmanrua pawh thlan thiam a ngai bawk a ni.

### **d) Sawi/thing :**

Rannung tih rem dan chi khat leh chu thlai kung te sawi/thin hi a ni. Rannung te sawi thlak a, lei a an tlak hnuah remchan dan a zirin thah tur a ni. Hei hi thlasik lai leh zingkar lam rannung te an la harhvang hma a tih thin tur a ni.

- e) Rannung te vendan pakhat leh chu kawngkhar, tukverh emaw net hmanga ven a ni. Hei hi thlai seng tawh hnu vendan a ni tlangpui. Hei mai bakah huan sira leikhur feet 2 a thuk leh feet khat vel a zau laih tur a ni bawk. Light hmang leh ri siam pawhin a ven/hnar thei a ni bawk.

## **3) BIOLOGICAL :**

Rannung te hi in ei tawn deuh vek an ni a, kan thlai kung leh thar ei chhe thin te chu an mahni ei thin rannung dang chaw lut in a tih kiam thei a ni.

### **a) Vertebrate :**

Hei hi rannung thendan chi khat a ni a, kawng ruh nei chi ho a ni. Heng kawng ruh nei chi te hian rannung dang ei in chaw ah an ring thin a, sava, utawk, lai tel etc. te hian thlai huan a rannung an tlan thin a, rannung tih rem nan an tangkai hle.

### **b) Arthropod :**

Hei hi rannung thendan chi khat tho a ni a, a langsar zual te lo ziak lang ta ila :

#### **i) Spider :**

Hei hi maimawm a ni a, maimawm te hi rannung dang chaw ah an ring thin a, thlai thar leh kung ei chhe thin rannung ven nan leh tih kiam nan an tangkai hle thin.

#### **ii) Mite :**

Fanghmir ho hian, rannung danga beiin an nung ve thin a, muangchangin an beina rannung te an that thin a ni.

#### **iii) Rannung za a sawmthum vel hi thlai ching tu te tan tangkai tak a ni a, an tih chhiat lam ringawt en lovin, an tangkai nate hriat a pawimawh hle.**

## **Engnge Integrated Nutrient Management chu?**

Integrated Nutrient Management chu thlai kan duhtawk a thar hlawk nana a tawk chin chiah a leitha pek leh sawngbawl a ni. A tawk chin aia tam leitha chi hrang hrang hmang lo a thlai thar hlawk si hi a tum ber a ni a, kan leitha hman te, leilung kan sawngbawl dan ten kan ram leilung daih rei zawk tur leh mihring tan a pawilo tur a enkawhl hi a tum a ni.

### **A tum :**

1. A tawk chin chiah a thlai chaw tha pek.
2. Leitha enkawhl leh siamthat.
3. Ram leilung tan a pawilo tur a enkawhl.

## **Integrated Nutrient Management pawimawhna :**

Kan thlai thar hlawk nan a chemical fertilizer kan hman hian hetiang hian pawi a thlen thei a ni :

1. Chemical fertilizer hman nasatna lei chu khuareiah lei hanna a tlem tual tual a, leitha pek chhunzawm reng chung pawhin thlai thar a hlawk tawh lo.
2. Thlai thar hlawk lohna hi leitha kan pek ve ngailoh atangin a lo in tan thin. Hei hi a chhan chu kan leitha pek kha kan hmuu theih awlsam chauh kan pek vang a ni.
3. Nitrogen leitha rei tak pek hian ram leilung nasa takin a tichhe thei a ni.
4. Nitrogen hman nasat luat avang hian lei chhung tui awm te a ti bawlhhlawh thei.

## **Integrated Nutrient Management pawimawhna te :**

Fertilizer man te a sang zel a, loneitu te tan awlsam takin hmuu zung zung tur a awmloh thin avangin loneitu te tan kawng awlsam zawk zawn a ngai a ni.

Chemical fertilizer ai hian ran ek leh tawihral awlsam hnimitawih te leh vermicompost kan hman hian thlai thar a ti hlawk mai bakah kan ram kha a daih rei zawk in ram hran hran a insuan ngailo in rei tak kan ring thei a ni.

Ran ek te leh leitha tawih ral chi te hian loneitu te mamawh zawng zawng hi a daih sen dawn loh avangin a tawk chiah in chemical fertilizer te nen hian kan pawlh tur a ni.

## **Integrated Nutrient Management atanga awlsam zawk a leitha kan hmuu theih te chu heng te hi an ni:**

1. Vermicompost (Changpat leitha)
2. Farm Yard Manure (Ran ek leitha)
3. Ar ek leitha
4. Vawk ek leitha
5. Kan ei leh in duh tawh loh tawih ral thei
6. Thlai mamawh tawh loh tawih ral tur

## Topic 7 – Spices chungchang

### Objectives :

Train the participant to impart the knowledge of spices management for better production

### Duration : 45 minutes

**Expected outcome :** Participants will develop understanding and awareness towards the knowledge of spices management for better production

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Spices (Ginger, Chilli, Turmeric, Garlic, Onion, Dhania)	* Introduction of spices * Different varieties * Seed treatment * Propagation of land * Spacing requirement * Diseases and pest management * Harvesting * Post harvest management * Marketing	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on spices through powerpoint followed by an interactive session with the participants	LCD projector, Laptop, leaflet

### SAWHTHING :

Sawhthing hi thlai pawimawh tak niin India ram hmun hrang hrang a chin nasat pawl a ni. Mizoramah pawh kan ching uar hle a, tangkaina/hmanna hrang hrang nei a ni a, chawhmeh siam nan mai baka damdawi atan hman uar tak a ni. India hi khawvel a sawhthing thar hnem ber ni a, kan thenawm state Meghalaya leh Orissa te hi India rama chuan thar hnem ber an ni.

### Sik leh sa mamawh :

Sawhthing hi boruak hnawng leh lum deuh a chin a tha a, sea level 1500 m vela chin a tha ber a ni. Ruahtui 50-100 cm vel kumkhatah a mamawh a, boruak lum zawng temperature 28°C-35°C vel a mamawh bawk.

Sawhthing hi tui luan ral zung zung theihna lei, lei thawl emaw tlak lei deuh a tha duh bik a, thlai no deuh anih avangin lei tha a pawimawh em em a ni.

### Varieties :

- 1) Maran (Assam)
- 2) IISR Varada, IISR Rajetha (Thar hnem chi, bulh lian, turil pai tlem-3.29% to 4.50%)
- 3) Himagiri

### Chin hun :

Hmarchhak biala chuan April thla hi sawhthing chin hun tha ber a ni. Tui pek chawp ngai chi atan February-March ah pawh chin thei bawk.

**Chi mamawh zat :**

Hectare khatah kg 1500-1800 vel a mamawh a ni.

**Lei sawngbawl dan :**

Sawhthing chinna tur hmun chu ruahui tlak hmasa hun velah a ram azirin cheh phut emaw leh phut tur a ni a, hnime leh zung hrang hrang te thenfai nghal tur a ni. A chi te chu 40 - 50 cm inkar hlat a chin tur a ni.

Sawhthing chi atan a bul hman thin a ni a, chin hmain mancozeb 0.3% ah minute 30 vel chiah hmasa thin tur a ni.

**Lei tha pek dan :**

Ran ek lei tha pek ngei a tha a, rem chan chuan hectare khat ah tonne 25-30 vel phul/telh thin tur a ni.

**Lei khuh (Mulching) :**

Hnah hring a lei khuh hnawn hi sawhthing tan pawimawh tak a ni a, hei hian leitha luangral tur a ven mai bakah hnime to tur a veng bawk a, lei tih hnawn nan tha tak a ni. Chin zawh rualin khuh nghal tur a ni a, ni 46-90 vela khuh nawn leh tur a ni.

**Lei hlawk zawk a hman dan :**

Sawhthing hi thlai no tak a ni a, lei hmun khat a kumtin chin zawm reng tha loh a ni. Vawi khat seng hnu in thlai dang chin a, kum leh ah duh chuan chin zawm leh thin tur a ni. Sawhthing hi bal, hmarcha leh buh te nen chin thlak thei a ni. Kuva leh Serthlum inkarakh pawh chin thei a ni bawk.

**Seng hun :**

A hring a thar duh tan chin atanga thla 6 vel atangin a seng thei a, a ro/rep tur atan chin atanga ni 245-260 velah seng tur a ni.

**Thar thei zat :**

A tlangpui in hectare khat a tonne 15-25 vel thar thei a ni.

## **HMARCHA :**

Hmarcha hi India rama thlai pawimawh tak a ni a, Chawhmeh tihtak nan leh bawlhlo atan hman a ni thin. Mizoramah pawh hmarcha hi kan ching uar hle a, thardan pawh a in ang lo thluah ang. Hmarcha hlawk zawk a thar theih nan mithiam ten chindan an duan dan han zir chiang ila.

## **Sik leh sa mamawh :**

Hmarcha hi boruak hrang hrangah chin theih anih rualin hmun lum leh hnawng lam a mamawh a, boruak lum zawng temperature 20°C-25°C velah a tha duh bik a, ruahui kum khata 1000-1500 mm vel a mamawh a ni.

## **Lei buatsaih dan :**

Hmarcha hi lei chi hrang hrangah a chin theih a, lei thawl leh tlak leiah a tha duh bik. Lei thur lutuk ah tha thei lova, pH 5.5-7.5 velah chin thin tur a ni.

Tlangramah chuan leileh te a harsa thin a, mahse a theih hram chuan cheh phut deuh thei nise duhthusam a ni. Chin hma ni 20 velah lei kan cheh phut chu bawng ek hectare khata tonne 15-20 vel nen pawlh tur a ni.

## **A chi tha te :**

1. Agnirekha
2. Musahvadi
3. Phule Jyoti
4. Jayanti

## **Chin dan tur :**

Hmarcha chin dawn hian a bi inhlat zawng hi tha taka siam tur a ni a, ruahui ring thlaiah chuan 60x45 cm a chin thin tur a ni.

## **Leitha mamawh zat :**

Leilung buatsaih laiin bawng ek lei tha tonne 10-15 vel telh tur a ni.

## **Biofertilizer :**

Pseudomonas/Trichoderma/Phosphate solubilizing bacteria (PSB)/Azospirillum te hi hman thin a ni a, hetiang hian hman tur a ni :

1. **Seed treatment :** Bur khat hi gram 500 vel chiah nan hman tur a ni.
2. **Soil application :** Litre khat bur hi lei kg 5 leh bawngek kg 100 nen chawhpawl a, thlai kan chinna tur hmunah theh tur a ni.
3. **Foliar spray :** Bur khat hi tui litre 50 ah pawlh a, thlai kah thin tur a ni.

## **Hnim ven dan :**

Hmarcha hian hnim bawm a haw em em a, uluk tako thlawhfai thin tur a ni. Phun/chin atanga ni 10 hnuah thlawhfai tur a ni a, a hnuah pawh ni 10-15 dan zela thlawhfai thin tur a ni.

### **Hmarcha natna langsar zual te chu :**

1. Damping off : Hei hi nursery natna a ni a, a zung a ei chhia a, a hnah a roin a kung a tlu thin a ni.
2. Bacterial Leaf Spot : A hnalah dum bial leh duk a siam thin a, a rah bawk a ti duk thin, natna a zualin hnah a ti tla a, a thar a tih tlem phah thin a ni.
3. Anthracnose : A rah (hmarcha) ah a dum bial lo siam chhuakin a lai takah a eng bial te a lo lang thin. A rah a tih tawih a, a tla thin a ni.

### **Vendan :**

Lei buatsaih laiin uluk taka leh phut a, phun hma ni 20 vel chu nisa hem tir thin tur a ni. Hei hian leichhung a awm bacteria leh fungus natna thlentu te kha hem ro dawn a ni.

Hmarcha chinna hmun chu tui tling thei lo tura siam a ngai a, tui luan ral zung zung theih na tur luankawr siam tur a ni.

### **Rannung vendan :**

Hmarcha hian rannung chi hrang hrang bawm tu leh tlan tu a nei a, Fruit borer leh Thrips te hi langsar zual an ni. Heng rannung ten hmarcha an ei chhiat theih loh nan hmarcha hi thlai dang nen a kar in tlak in chin tur a ni.

**Entirnan :** Tlar pakhat ah hmarcha chin chuan tlar dawttu ah bawkbawn emaw samtawk te chin tur a ni.

Hnim to te hian rannung te an ko em em thin a, chuvang chuan hnim te a hun tak leh uluk takin thlawhfai thin tur a ni bawk.

### **Thar thei zat:**

Hectare khatah kg 500-700

## **AIENG :**

Aieng hi bawlhlo thlai pawimawh tak leh chin uar tak a ni a, hmanna tam tak nei a ni. A zung/bal hian “Curcumin” an tih hi 1.8-5.4% vel a pai a, 2.5-7.2 vel hriak a pai bawk. Aieng hi chi hrang hrang a hman a ni thin a, chawhmeh tih rimbui nan leh rawng ti mawi tu atan hman a ni tlangpui a, damdawi siam nan leh cosmetic siam nan hman a ni bawk.

## **Sik leh sa mamawh :**

Aieng hi boruak chi hrang hrangah a chin theih a, tuipui (sea level) 1500 m a sang leh boruak lum zawng temperature 20°C-35°C velah a chin theih a ni. Aieng thar tha tur chuan ruahui kumkhat ah 1500- 2250 mm vel a mamawh bawk.

## **Lei mamawh :**

Lei chi hrang hrangah a chin thei a, sawntlung lei, lei sakhat deuhah a tha duh bik a ni. Lei al leh thur zawng pH 4.5-7.5 hi a ngeih ber bawk a ni.

**Varieties :** A chi tha langsar zualte

Sl. No.	Variety	Duration (Days)	Yield (t/ha)	Curcumin content (%)
1	CO 1	285	5.85	3.2
2	Suguna (Assam)	190	7.20	4.9
3	Suvarna (Manipur)	210	4.60	4.0
4	Ranga	250	7.0	6.3
5	Rasmi	240	7.8	6.4

## **Lei buatsaih dan :**

Aieng ching tur chuan fur ruahui tlak hma deuhin lei chehphut deuh tur a ni a, hnime leh zung hrang hrangte thenfai bawk tur a ni. A chinna tur khur hi meter 1-1.5 zau leh cm 15 vel a thuka laih tur a ni a, karhlat zawng hi 40-50 cm a siam tur a ni bawk.

## **Chin dan :**

A tlangpuiin aieng hi hmarchhak bialah chuan April-May vel a chin thin a ni. Aieng hi daihlim duh/mamawh anih avangin huan sirah a zar buk chi thing i.e Neem te phun thin tur a ni.

## **A chi lak dan tur :**

Aieng chi atan hian thlar/bal hman thin a ni a, a chi tur chu natna laka fihlim hman hram hram tur a ni. A chi tur ‘thlar’ hi chin hmain Mancozeb 0.3% emaw Malathion 0.5% ah minute 30 vel chiah hmasak thin tur a ni.

## **Leitha :**

A theih hram chuan chin hmain bawng ek leitha hectare khat ah tonne 10 vel phul hmasak tur a ni. Changpat leitha (Vermicompost) pawh remchan chuan hman theih a ni.

### **Lei khuh (Mulching) :**

Thlai chu chin zawh rualin hnim hringin emaw balhla kawr emaw in khuh nghal tur a ni a, hei hi lei ro tur leh hnim laka venna tha tak a ni. Chin atanga ni 50 hnuah khuh nawn leh tur a ni.

### **Hnim vendan :**

Hnim thlawhfai uluk tur a ni a, hnim atam dan a zirin chin atanga ni 60, 120 leh 150 ah te thlawhfai thin tur a ni.

### **Leilung hman tangkai dan :**

Aieng hi thlai dang nen a chin pawlh thei a ni a, a kar thlak in emaw chawhpawlh pawhin chin thei a ni. Kuhva, serthlum, theihai etc. te nen kar thlak in a chin thei a. Purun, hmarcha, bal etc. te nen chawhpawlhin a chin thei bawk.

### **Tui pek dan :**

Leilung a zirin ruahuti mai bakah a hrana tuipek a ngai mai thei a, chutiangah chuan tum 20-25 vel pek thin tur a ni.

### **Seng hun :**

Aieng hi a tlangpuiin chin atanga thla 7- 9 velah seng a hun thin a, hectare khata 20-25 tonnes (a hring) vel a thar thei a ni.

A chi tur atana thlan te chu uluk takin dah that tur a ni a, daihlimah ama hnah veka khuh thin tur a ni. Lei khura pawh phawi nen chawhpawlh in dah that thei bawk.

### **Sawngbawl dan :**

#### *Curing:-*

Curing awm ziah chu tui a chhumso hnuah nisa a phoro leh thin hi a ni. Hetiang hian minute 45- 60 vel tleng chum tur a ni.

Hetiang chum tawh hnuah cm 5-7 vela chhaha a rem a, nisa a phoro leh thin tur a ni, zan lama chuan khuh that thin tur a ni. Ro tawk tur hian ni 10-15 vel a mamawh thin a ni.

#### *Polishing:-*

Aieng phoro tawh te hi a zung sin avangin a hmelhmang a mawi lo thin em a, hetiang zung sin hi a hmel tih mawi nan nawh/nawi vak thin tur a ni.

## **PURUN VAR :**

Purun var hi bawlhllo thlai pawimawh tak pakhat a ni a, chawhmehah thlak thin a ni. Damdawi atan hman a ni thin bawk, pumna, beng na leh awm natna damdawi atan tha tak a ni.

## **Sik leh sa :**

Boruak chi hrang hrangah chin thei a ni a, mahse lum lutuk leh vawt lutukah chuan a tha thei lo a ni.

Purun hian tui luan ral zung zung theihna leh tlak lei lam deuh mamawh a, lei nghet deuh ah tha duh bik a ni.

## **A chi tur :**

Purun hi a bul var atanga chin thin a ni a, hetiang bul thianghlim natna kai lo leh him pial hi hman thin tur a ni.

## **Chi mamawh zat :**

Hectare khat atan bul kg 150-200 vel a tawk a ni.

## **Chin dan :**

### **1) Dibbling:-**

A chinna tur hmun hi tui pek nuam tawk turin then hran vek tur a ni a, a bul chu cm 5-7.5 thuk ah thlak thin tur a ni. A than that thei nan in dip lutuk loh turin chin tur a ni a, tlar leh tlar inkar 7.5 cm leh 15 cm kung leh kung velin chin tur a ni.

### **2) Furrow:-**

Hetiang ah chuan purun var bul kha lei tih pawn deuh a phum a, 7.5 cm leh 10 cm a hla in chin tur a ni, lei pan te in khuh leh thin tur a ni.

## **Lei tha :**

Remchan chuan ran ek leitha pek tur a ni a, hectare khat atan tonne 25 vel a mamawh thin a. Vermicompost pawh hman thei a ni bawk.

## **Tui pek dan :**

Chin zagh rualin tui pek nghal tur a ni a, ni 10-15 danah leilung a zirin tui pek reng tur a ni. Seng awlsam zawk nan seng hma ni 2-3 velah tui pek bawk tur a ni.

## **Hnim suat dan :**

Chin atanga thla khat hnuah thlawhfai nghal tur a ni a, chumi hnu thla khat dan zelah hnim bawm dan a zirin thlawhfai leh thin tur a ni.

## **Seng hun :**

Purun hi thla 4-5 velah seng a hun thin a, a hnah a lo eng tan a, ro tur anga awm in seng thin tur a ni.

## **Thar theih zat :**

A tlangpui in hectare khat ah tonne 6-8 vel thar thei a ni.

## **PURUNSEN :**

Purun hi thlai pawimawh tak pakhat ni a, India mai baka khawvel pumah pawh purun sen mamawh na hi a sang hle a ni. Purunsen hi a hnah leh a tak ei theih a ni a, chawhmeh tih rimtui nan leh bawlholo atan hman uar tak a ni.

### **Sik leh sa mamawh :**

Purunsen hi thlasik thlai a ni a, boruak vawt deuh laiin chin thin a ni, khawlum (nipui) lo in her tak tak hmain seng thin a ni. Fur ruahui ring turin April leh August inkar ah pawh chin thei a ni. Purunsen hian boruak lum zawg temperature 21°C-26°C vel a mamawh.

### **Lei tha mamawh :**

Lei chi hrang hrang ah a chin theih a, lei buatsah laiin uluk taka leh thin tur a ni. Lei al/thur zawng pH 5.8-6.5 vel a mamawh in a tha duh a ni.

### **A chi mamawh zat :**

Hectare khata chin atan kg 10-12 a tawk.

### **Chin hun :**

Kharif atan June thla leh Rabi atan October-November.

### **Lei buatsah dan :**

Purunsen hi a chinna tur hmun zawl leh rualrem deuh ah siam tur a ni. Hetianga tih hian tui leh leitha pek a rualkhai duh a, chu chuan purun bul tha a siam thin a ni.

### **Leitha mamawh zat :**

Leitha (Bawng ek, changpat leitha) tonne 10-20 vel hectare khat atan pek tur a ni.

### **Hnim suat dan :**

Hnim fai taka thlawh thin tur a ni a, hnim in a bawm hian purun thar tur a tlem phah mai baka rannung a tih pun thin a ni. Purun seng hmain vawi 2-3 vel tal hnim thlawhfai tur a ni.

### **Tui pek dan :**

Purun zung hi a pawn lang angreng a, chin tirhah emaw tet lai chuan tui pek lutuk a ngai lova, a len hnuah erawh chuan kan chin hun a zirin tui pek thin tur a ni. Kharif a chin chuan vawi 6-10 vel pek tur a ni a, Rabi a chin erawh tum 10-15 vel tui pek tur a ni.

### **Natna tlanglawn :**

#### **1. Purple blotch (*Alternari porri*) :**

##### **A natdan :**

A hnah natna a ni a, mitmu pian ang deuh eng deuhin a tuam tan a, chu chuan a hnah vel tidukin, a nasa ah chuan a hnah a tla thin a ni.

**2. Anthracnose (*Colletotrichum gloesporioides*) :**

A natdan :

A hnah a kir a, a hrual/khawr vek thin a ni.

**3. Fusarium (*Fusarium oxysporum*) :**

A natdan :

A zung a ei chhe ber a, rawng eng lam deuh a siam chhuak a, a ti tawih thin a ni. A nasa ah chuan a zung a thi vek thin a ni.

Enkawl dan :

1. Tui luan kawr tha tak siam tur a ni.
2. Nipui laiin lei thuk deuh hleka leh tur.
3. Purun than hnua hnim leh leitha pek laiin thlai hliam loh dan ber turin tih thin tur.
4. Kumkhat chin zawh hnuah thlai dang kum 4 vel chin thlak hian natna a veng thei a ni.
5. Trichoderma nen a chi chiah phawt tur a ni.

**Rannung :**

Purunsen ei thin rannung langsar zual te chu thrips, mites leh maimawm chi te an ni. Heng rannung te vendan tha ber chu vaimim emaw buh emawh in purun chin hma ni 20 velah (purun kan chinna tur hmun kha hual turin) chin khalh tur a ni.

**Thar thei zat :**

Hectare khata quintals 150-250 vel thar thei a ni.

## **DHANIA :**

Dhania hi bawlhlo thlai pawimawh tak niin, chawhmeh tih rimtui nan hman uar tak a ni. Dhania pumpui (hnah leh kung) hi ei theih vek a ni a, chutney siam nan te leh soup vela thlak atan an hmang uar hle.

### **Sik leh sa :**

Dhania hi kumtluan a chin thei a ni a, khawlum zual lai March-May ah erawh a tha duh vak lo. Boruak ro leh vawt lam deuh ah a tha duh bik a, a bik takin a par hun laiin khaw vawt lam a mamawh bawk.

### **Varieties :**

<b>Sl. No.</b>	<b>Variety</b>	<b>DURATION (days)</b>	<b>YIELD/Ha (Kg)</b>
1	Col	110	500
2	CO 2	90 – 110	600 – 700
3	CO 3	85 – 95	640
4	C0 (CR) 4	65 – 70	600

### **Lei mamawh leh enkawl dan :**

Lei chi hrang hrang ah a chin theih a, leitha leh hnawngah a tha duh bik a ni. Tlangram ruahui ringah chuan lei chu cheh phut deuh tur a ni a, lei buatsaih zawh rualin a chi tuh nghal tur a ni, hei hian lei hnawnna a veng dawn a ni.

### **A chin hun :**

Dhania hi thlasik thlai a ni a, October thla laihawl atanga November thla laihawl vel tleng hi a chin hun tha ber a ni. January leh February ah a seng theih nghal bawk.

### **A chi mamawh zat :**

A tlangpui in hectare khata kg 10-15 vel a ngai a, a chi chu chin hmain darkar 12-24 vel tleng tui ah chiah hmasak thin tur a ni, hei hian a ti to tha dawn a ni.

### **Lei tha pek dan :**

Bawng ek lei tha 10 tonnes vel hi lei buatsaih laiin hman theih chuan a tluk a awm lo. Remchan dan a zirin vermicompost te pawh hman tur a ni.

### **Tui pek dan :**

Chin atanga ni 3 hnuah tui pek nghal tur a ni a, chumi hnu ah ni 10-15 danah a leilung a zirin pek ziah tur a ni.

### **Hnim suat dan :**

Hnim hi uluk tako tlawh fai thin tur a ni a, chin atanga ni 30 hnu ah sam fai ngei ngei tur a ni.

**Seng hun :**

A tlangpui in Dhania hi chin atanga ni 90-110 velah a seng theih thin a ni. Variety thenkhatah chuan ni 60-75 vel atangin an seng tan thin bawk.

**Thar theih zat :**

Hectare khat ah kg 400-500 vel a thar thei tlangpui.

## Topic 8 – Thlai hring chungchang

### Objectives :

To improve the agriculture product from pre production stage to the post production through simple and effective form of agriculture practice

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding toward pre production stage to the post production of vegetables through simple and effective form of agriculture practice

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Vegetables (Brinjal, Cabbage, Cauliflower, Tomato, Bitter gourd, Pumpkin, French beans, Mustard, Beet root, Cow pea, Maize)	* Introduction of vegetables * Different varieties * Propagation of land * Spacing requirement * Weed management * Diseases and pest management * Harvesting * Post harvest management * Marketing	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on vegetables through powerpoint followed by an interactive session with the participants	LCD projector, Laptop, leaflet

### BAWKAWN :

Bawkbawn (*Solanum melongena* L.) hi thlai lar tak niin a rah avang hian Mizoramah kan ching uar hle. Tomato leh alu nen hian a in kungkaih hnai hle, a kung hi 45-65 cm a sang a ni thei a a hnah hi 10-20 cm a sei leh 5-10 cm a hlai a ni. A par hi a duk rawng ni in a rah hian chi tam tak a nei a ni.

### Sik leh sa leh lei :

Bawkbawn hi thlai khawlum duh chi a ni a, mahse ruahui tam lai pawh in a chin theih a ni. Tuipui atanga meter 1200 ah nipui lain an ching ber. Khawvawt lutuk a ngam lo a, temperature 17°C aia hniamah a thar hlawk thei lo. Lei chi hrang hrangah tha takin a chin theih a, mahse lei thaw tha tui luan ral zung zung theihna ah a tha bik. Lei thur zawng pH 6.0-6.8 hi duhthusam a ni.

### A chi hrang hrang :

Bawkbawn chi hrang hrang te chu-

- i. Pusa purple long
- ii. Pusa purple cluster
- iii. Pusa kranti
- iv. Pusa barsati
- v. Pusa ankur
- vi. Vaishali

## **A chi mamawh zat :**

Hectare khat atan 370-500 gm

## **A chi kui dan :**

Bawkbawn hi thlai kui tiah chi a ni a, nursery ah kui tiah in thla khat hnuah an phunsawn thin a ni. 90-100 cm a zau ah kui tiah ni in lei chunglang hang tha hman tur a ni. Chu leiah chuan leitha tawih ral awlsam chi pawlh tur. Chin hma hian a chi te chu *Trichoderma viride* @ 4 g/kg emaw Thiram @ 2g/kg a chiah hmasak hian a hnah tla lakah a veng a ni. Chin hunah hian 5-7 cm a in hlat leh 2-3 cm a thuk ah chin tur. Tui tha tak a pek tur a ni a, a thih loh nan Bavistin 1.5-2.0 g/L a chiah hnawn tur a ni. Kan kui tiah te hi kar 4-6 a upa annih leh 15 cm a sang, hnah 2-3 an neih hunah kan phun sawn tur a ni.

## **Chin hun :**

Ruahtui chawm tur chu May-June ah ruahtui tlak tam hma in chin tur a ni a, tui pek tur hnianghnar a awm chuan September-October ah a chin theih a ni.

## **Thlai inkar hlat zawng :**

A inkar hlat zawng hi a chi a zirin a danglam thei. A kung in zar pharh lo chi chu 60x60 cm a in hlat a phun tur a ni a, a kung in zar pharh chi erawh chu 75-90x60 cm a in hlat a phun tur.

## **Leitha pek dan :**

FYM tawih tha tak emaw thlai tawih 25 t/ha pek tur a ni a, hei hi phun hma in lei nen chawhpawlh tur a ni. Leitha 75:40:25 kg N:P<sub>2</sub>O<sub>5</sub> : K<sub>2</sub>O hectare khat ah pek bawk tur. Nitrogen leh potash bik hi a chanve a pek phawt in phosphorous hi a vaiin pek tur.

## **Hlo thlawh :**

Hlo awmlo tur a tha taka thlawh fai tur a bik takin thlai ala naupan lai in. Hlo a tam chuan bawkbawn nen leitha in chuh in a thar a hlawk lo bik.

## **Tui pek dan :**

A zung in a khuh chinah tui leh hnawng tha tak a enkawl tur. Phunsawn anih atanga ni khat na leh ni li na ah tui tlem pek tur a ni. Nipui laiin ni 3-4 danah tui tha tak a pek tur.

## **Thlai enkawl dan :**

### **Rannung :**

#### **1) Shoot and fruit borer (*Leucinodes orbonalis*)**

Heng pangang te hian a kung chawr no an hreuh kaw phawt a hei hian a kung alo ti thi thin. A lo rei deuh hnuah a rah an bei leh a, hralth tlak loh in a rah te an siam ta thin a ni. A nasat chuan a rah te hi a tawih chhe vek thei bawk.

### **Enkawl dan :**

Lo ah bawkbawn chin reng loh tur, thlai dang nen a inkar thlak a chin tur. Rannung in a bei tih kan hriat veleh a kung leh rannung chu tih ral vek tur. Carbyl 0.15% a kah hian a ti reh thei bawk.

## **2) Leaf eating beetle (*Epilachna vigintioctopunctata*)**

Pangang ten a hnahn leh a kung no lai an bei in an ei chhe thin a ni. A tam viau chuan a hnahn te lo tla kawlh in a thar nasa takin alo ti chhe thin bawk.

Enkawl dan :

Pangang awmna hnahn te chu lakkhawm a tih ral tur, Malathion tui liter khat ah 2 ml pawlh in leh carbyl 2-4 g/L a kah bawk tur.

## **3) Leaf roller (*Eublemma olivacea*)**

Heng pangang te hian a hnahnkhawr in a chhungah an cheng a, thlai an ei chhe thin a ni. A hnahnkhawr te chu a lo vuai in a ro thin a ni.

Enkawl dan :

A tir atang a pangang vai hian nasa takin a ti ziaawm. Carbyl 0.1% emaw malathion 0.05% a kah bawk tur.

**Natna :**

### **1) Damping off (*Pythium spp.*, *Phytophthora spp.*, *Rhizoctonia spp.*)**

Hei hi nursery bikah a hlular hle. Hnawng lutuk leh lei hnawm ah a nasa bik.

Enkawl dan :

Enkawl nan hian nipui laiin a chi te chu pan te te a kui tur. A chi hrisel tha chauh hman tur a ni. Thiriam 2 g/kg a chiah tur a ni.

### **2) Phomopsis blight (*Phomopsis vexans*)**

He natna hian a rah leh kung a bei thin. Nursery ah a tiak tir a bei bawk a, a hnahn te a tla kawlh thin a ni. A rah te chu lo val in a hnu lawk ah a lo tawih chhe thin a ni.

Enkawl dan :

Kan chinna ram chu thenfai that tur, a chi kan kui tiah tur te hi a hrisel tha tur a ni. A chi te chu Thiriam 2 g/kg a chiah tur a ni a. Dithane Z-78 (0.2%) a kah bawk tur a ni.

### **3) Fruit rot (*Phytophthora nicotianae*)**

A natna lan chhuah dan chu tui far val ang deuh in a rah ah alo lang chhuak thin. Hmun hnawng ah a hlular bik hle.

Enkawl dan :

Dithane M-45(0.3%) a kah tur. Hei bakah hian natna in a tlakbuak kung leh rah te chu tih boral vek tur a ni.

### **4) Mosaic**

Thlai thang thalo, hnahn vuai leh pangai lo te hi he natna lan chhuah dan tlangpui a ni.

Enkawl dan : A kung natna in a tlakbuak leh rannung awm n ate chu thlawh fai a tih ral tur a ni.

### **A seng dan :**

Bawkbawn rah te hi phunsawn atanga ni 60-160 thleng a seng theih a ni. A seng hun dik tak a seng hian a rah a ti tam a a rah a tui bik a ni. A rah te chu han hmeh a ruh deuh talh a ni hunah seng tur a ni. Hectare khatah 20-30 quintal vel a thar theih a ni.

## **ZIKHLUM :**

### **Thlai chungchang :**

Zikhlum hi thlai upa tawh tak leh pawimawh tak pakhat a ni. He thlai hian hmun vawt leh hnawng deuh a mamawh ber a, Mizoram ah pawh hetiang ang hmun deuh ah hian chin uar a ni. Kan state ah hian zikhlum hi kan ei nasa a, mahse kan duh ang hu in a thar chhuah lamah hian hmasawn na tur a la tam hle.

### **Sik leh sa, Lei :**

Zikhlum hi lei tui luan ral zung zung theih na ah a tha duh bik. Lei al zawng pH 6.0-6.5 a mamawh a, lei hnawm deuh hi a chin nan a duhthusam a ni.

### **A chi hrang hrang te :**

Zikhlum chi thenkhat te -

- |                   |                 |                    |
|-------------------|-----------------|--------------------|
| i. Pusa drum head | ii. Golden acre | iii. Kaveri        |
| iv. Ganga         | v. Sri Ganesh   | vi. Pride of india |

### **A chi mamawh zat :**

Hectare khat atan 500-750 gm hi a tawk a ni.

### **A chin hun :**

Zikhlum hi thlasik thlai a nihna ang in August-November ah chin thin a ni.

### **A chin dan :**

Zikhlum chi te chu a hmasa in nursery ah kui tiah thin a ni a, heng kui tiah sa te hi kar 3 atang a kar 5 vel an lo nih, a hnah no 5-6 vel a lo neih hunah phunsawn leh tur a ni. Kan phun sawnna tur chu vawi 3-4 vel kan cho phut tur a ni a, a inkar hlat zawng atan 45x45 cm hman tur a ni. Zikhlum chin nan hian zingkar emaw tlailam a tha bik. Phunsawn tur te hi a zung chu bavistin 2 g/L ah chiah hmasak ni se, a hnah chawr no hmun thum a then a hmun hnih paikh bawk tur a ni. Hei hian tui mamawh a ti tlem thei bawk.

### **Lei tha pek :**

Hectare khat atan chuan bawng ek leitha ton 25 emaw leitha tawih pek tur. Lei tha hi N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O 150:100:125 kg/ha a pek bawk tur. P<sub>2</sub>O<sub>5</sub>, N leh K<sub>2</sub>O te hi dose chanve phunsawn hunah pek phawt a, a bak zawng te chu phunsawn atang a thla khat hnuah pek zawh tur.

### **Hlo thlawh :**

Hlo thlawh hi vawi 2-3 a kung bul hnaih a tih hian lei a tiche in thlai in a that pui hle. Hlo tur hman dawn chuan hlo alo to tan ah hman tur a ni. Hei hi kut a thlawh chhunzawm tur a ni bawk. Hei hian nasa takin hlo a ti tlem.

### **Tui pek dan :**

Phunsawn a nih veleh tui tha tak a pek tur a ni a, hemi hnuah hian ni 10-15 inkar danah tui pek bawk tur. Zikhlum bawk insiam tan lai hian tui pek that bik tur a ni a, thlai a lo puitlin hian tui uchuak lutuk a pek hian a bawk a ti chhe thei tih hriat bawk tur.

## **Rih vur :**

Zikhlum kan phunsawn atanga thla khat hnuah a bul vel rih vur tur, hei hian a bawk a ti tha hle. Kan rih vur hian a bul te ah lei vung te hi a kung chhawmdawl tur in kan dah khawm tur a ni.

## **Thlai enkawl dan :**

### **Rannung :**

#### **1) Diamondback moth (*Plutella xylostella*)**

He pangang hian a hnahn ei in a hnahn te an ei kaw thin. A hnahn pangang in a beih nasat zual chu lo ro in an ei ral hneh thei hle.

### Enkawl dan :

Malathion (0.1%) a kah tur. Hemi bakah hian antam nen a chin pawlh tur.

#### **2) Leaf webber (*Crocidolomia binotalis*)**

Pangang bawk ni in hei hi chuan a hnahn ah ril an zam a, chumi chhungah chuan an chen chih thin. Heng pangang te hian zikhlum par a ti chhia a, a bawk insiam a ti chhe tel bawk.

### Enkawl dan :

Zikhlum hnahn ril in zam na te chu mal khawm a pahi vek tur. Hei bakah hian carbyl 4% a phul in leh Malathion 0.05% a kah hi a tha bawk.

#### **3) Cabbage butterfly (*Pieris brassicae*)**

Heng hi phengphehlep var te tak te an ni a, a note pangang te hian nasa takin zikhlum an ei chhe thin. Heng pangang in a beih zikhlum te chu zawrh atan an tlak loh thin.

### Enkawl dan :

Pangang te chu kut a man khawm a tihhlum vek tur. Malathion 0.1% emaw carbyl 0.15% a kah hi a tha hle bawk.

#### **4) Aphids (*Brevicoryne brassicae*, *Myzus persicae*, *Lipaphis erysimi*)**

Heng hi rannung var te tak te te an ni a, a puitling leh note te chuan zikhlum chu Zuk in a lo hrisel lo thin a ni. Heng rannung in a beih zikhlum te chu a rawng lo danglam in a lo sikhaw thin a ni.

### Enkawl dan :

Malathion (0.1%) a kah tur

Rannung tur kan hman te hi kan seng hma ni 15-20 hma in tih tawp vek tur a ni.

**Thlai natna te :**

**1) Stalk rots (*Sclerotinia sclerotiorum*)**

He natna hian thlai chu kan chin lai te, dahkhawm lai te leh hrallh na kawngah te nasa takin a ti chhe thin. Natna in a tlakbuak lo lan dan chu tui far val ang deuh in a lo awm a, hei hi lo tui hnang in zikhlum chu alo tawih chhe thin a ni.

Enkawl dan :

He natna lo awm tawh na thin ramah chuan zikhlum chin loh hram tur. Hemi bakah hian zikhlum seng tawh sa te chu dimdawi takin, kan sawngbawl tur a ni.

**2) Black rot (*Xanthomonas campestris* pv. *campestris*)**

He natna vei zikhlum chu lo uk in a hnahn te a lo tla kawlh thin a. A zung leh a kung lo dummin a hlum tha theilo a, zawrh atan leh ei atan a tlak lo ah a chhuak thin a ni.

Enkawl dan :

Zikhlum lam chi thlai chu ram ah chuan chin tluk tluk loh tur. Tin, a chi tha, heng natna ngam deuh chi chin tur. Zikhlum chi chu agrimycin-100 (100ppm) emaw streptocycline (100 ppm) a chiah hmasak tur.

**3) Downy mildew (*Perenospora parasitica*)**

A hnahn chunglamah chuan rawng eng lam deuhin a lo lang chhuak phawt a, a hnu lawkah chuan vut buak rawng in a hnahn hnuai lamah a lo in thlak leh thin. A hnahn te chu lo ro in lehkha ang takin a lo awm a, a thi ta thin a ni. Zikhlum hlawm te chu a dum in a lo val thin bawk.

Enkawl dan :

Fai tak a hlo thlawh leh copper oxychloride 0.3% a kah hi he natna enkawl nan a tha hle.

**4) Damping off (*Pythium debaryanum*)**

Zikhlum kui tiah lo tawih in a kung a lo nem a, a thi ta thin a ni.

Enkawl dan :

Trichoderma viride 3-4 g hi a chi kg 1 atan emaw thiram 2-3 g kg1 a a chi kui tur te chiah hmasak phawt tur. Hei hian he natna lak a ta a veng thin a ni.

**A seng dan :**

Zikhlum hi chin atanga ni 90-120 ah a seng theih tlangpui. A hlum te chu a khal deuh talh leh a puitlin hnuah seng vat tur. Seng har lutuk hi natna in a tlakbuak duh a, hemi bakah hian a hlum a te chu a in then hrang duh. Seng hma leh lutuk pawh hian a thar a ti tlem a, a lo nem bakah dahthatna lamah harsatna a thlen thin. A hlum chu han kawih thlek deuhin chem hriam tak a tan chum tur. Zikhlum hi a tlangpui in hectare khatah 25-30 ton a thar theih a ni. Kan seng sa te chu leiah dah mai lo in dah chhan tha tak neih tur. A hun tak a seng zikhlum te chu a dahna a zirin kar engemaw zah a dahthat theih a ni.

## **PARBAWR :**

### **Thlai chungchang :**

Parbawr hi chawhmeh thlai lar tak zing ami niin Mizoram ah pawh kan ching uar hle. A parbawr lai hi kan ei ber chu niin a bak hi chu ran ei ah kan hmang thin. Tha zawk a chin dan leh thar hlawk dan hi kan thiam a pawimawh em em a ni.

### **Sik leh sa, Lei :**

Parbawr hi temperature 15-21°C inkarah a tha duh hle. Sik leh sa 10°C aia hniamah hi chuan thlai a puitlin har duh mai bakah a bawr a tha lo in a te bik em em a ni. Lum leh lutuk ah ve thung chuan a hnah te a lo eng thin a ni. Lei, tui luan ral that theihna, leitha tawih ral tha tam na a mamawh a. Lei al zawng pH 5.5-6.5 hi duhthusam a ni.

### **A chi hrang hrang te :**

Parbawr chi hrang thenkhat te chu -

- |                         |                |             |
|-------------------------|----------------|-------------|
| i. Pusa early synthetic | ii. Himani     | iii. Swathi |
| iv. Pusa deepali        | v. Early patna | vi. 74-6-C  |

### **A chi mamawh zat :**

Hectare khat atan a chi 600-750 a tawk vel a ni.

### **A chin hun :**

Thlasik thlai a nihna angin August atanga November thla te chi duhthusam a ni.

### **A chin dan :**

A chi chu nursery ah kui tiah hmasak phawt tur a ni. Nursery hi lei atanga 10-15 cm a pawng, 3.0x0.6 m a inhlat a siam tur a ni. A chi kui hma hian Trichoderma viride 4g a chi kg 1 atan enkawl hmasak phawt tur a ni. Hei hian a chawr tir hnah tla lakah a veng. A chi te chu pan te in 1-2 cm a thuk leh 5-7 cm a inhlat in kan kuih tur a ni. A chi kui hnu hian chhawl emaw him ro in khuh hnawn tur a ni a, hei hi tui tha tak a pek zui bawk tur. Kar 3 atanga kar 5 alo nih in a phunsawn theih a ni. Phunsawn hian a bi inhlat zawng ah 60x45 cm hman tur.

### **Leitha pek dan :**

FYM emaw ran ek leitha hectare khat atan a chhut in 25 ton leh N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O 0:100:125 a pek tur. Phunsawn hma in P<sub>2</sub>O<sub>5</sub> hi pek tur a ni a N leh K<sub>2</sub>O te hi dose chanve in phunsawn hma bawk in pek tur. Thla khat hnu ah ala bang zawng fertilizer te chu pek zawk tur.

### **Hlo thlawh :**

Vawi 2-3 kut a hlo thlawh fai thin tur. Tin hei bakah hian a zung ti chhe lo tawk velin a kung bula chu rih fai tur, hei hian hlo lakah a ven mai bakah lei a ti thawl in parbawr tan a tha a ni.

### **Tui pek dan :**

Parbawr hi a thanlai leh a bawr in siam lai in duhtawk hnawng a hmu tur a ni. Phunsawn anih veleh tui pek nghal tur ni in a hnu ah chuan ni 8-10 inkar danah tui tha tak a pek tawh tur a ni.

## **Rih vur :**

A bawr lian tha chhuah tur chuan parbawr chu phunsawn a nih hnuah rih vur ngei ngei tur a ni. Rih vur na lei hi a kung chhawmdawl tur a dah tur a ni.

## **Thlai enkawl dan :**

### **Rannung :**

#### **1) Diamondback moth : *Plutella xylostella***

Sik leh sa sang lutuk, khawlum ah a hluar hle. Pangang te chuan a hnah an ei chhe thin a ni.

### Enkawl dan :

Malathion (0.1%) a kah hian pangang note a ti rem hneh hle. Antam nen a chin pawlh hian he rannung lakah hian a veng bawk. Dichlorvos (1ml/litre) a kah bawk tur a ni.

## **Natna:**

#### **1) Stalk rot : *Sclerotinia sclerotiorum***

He natna lo lanchhuah dan ber chu tuifar val bial ang deuh in a lo lang chhuak a, hei hi lo nem in a lo tuihnang thin a ni. He natna hian parbawr chu hralth atan a tlak lohah a siam thin a ni.

### Enkawl dan :

Seng leh dahthat lamah uluk tak a hna thawh tur. Thlai dang nen a inkar thlak a chin tur.

#### **2) Black rot: *Xanthomonas campestris* pv. *campestris***

Thlai kung te chu lo eng deuh in a hnu lawkah lo ukin a thi thin. A hnah te lo tla kawlh in a then ah chuan alo dum vek thin a ni. Heng natna in a tlakbuak parbawr te chu zawrh atan a tlak loh thin a ni.

### Enkawl dan :

Parbawr chiah ram ah chin ngar ngar loh tur. Agrimycin-100 (100ppm) emaw streptocycline (100ppm) in a chi enkawl hmasak tur. Nursery chu a pawng tur, hei hian tui luan ral na lamah a pui. Natna vei thlai te chu lakkhawm a tihral vek tur.

## **A seng dan :**

Parbawr chu phunsawn atanga ni 90-120 ah a seng theih. A bawr te chu dimdawi tak leh a bawr that lai tak a seng tur. Seng har hian a bawr a ti nghet lo a, a tla duh hle. A thar hma chi hi hectare khat ah 6-10 ton, a thar hun laihawl te hi hectare khatah 12-20 ton leh a thar tlai chi hi hectare khatah 20-30 ton a thar theih tlangpui a ni.

## **TOMATO :**

### **Thlai chungchang :**

Tomato (*Solanum lycopersicum* L.) hi thlai chin nasat ber pawl a ni. A lar em em a, mi tam tak in kan ei a ni. A hmin in emaw a hel in kan ei tlangpui a, a tui siam te, sauce leh soup siam nan te kan hmang nasa hle. Tomato hi mihring tan chaw hrisel tak ni in vitamin A leh C a pai hnem hle.

### **Sik leh sa, Lei :**

Tomato hi lum ngaina a ni a, a rah that ber nan temperature 21-24°C a mamawh. Temperature 32°C aia sang ah chuan a rah insiam leh a than len a tha lo thin. Khawvawt lutuk leh hnawng lutuk ah a tha theilo a, ruah tui a tawk chauh, nasa lutuk lo a mamawh bawk. A rah lai a ni a tawk chauh a sa hian a rah a ti sen mawi bik, Temperature 10°C aia hniam hian a kung hnathawh a ti khawlo thin a, leitha leh tui tlin theih loh na, tawih ral awlsam leh lei thur zawng pH 6.0-7.0 ah hian a tha duh hle. Tomato hi thlai dang nen a chin pawlh a tha duh hle.

### **A chi hrang hrang te :**

Tomato chi thenkhat te chu -

- |               |                     |               |
|---------------|---------------------|---------------|
| i. Sakthi     | ii. Mukthi          | iii. Anagha   |
| iv. Pusa ruby | v. Pusa early dwarf | vi. Arka alok |

### **Chi mamawh zat :**

Hectare khat atan a chi gram 400 a tawk.

### **Kui tiah dan :**

Tomato hi kui tiah chi ni in nursery atangin thla khat hnuah an phunsawn thin a ni. A chi kan chinna tur hi a pawng kang deuh tur a ni a, 90-100 cm a inhlat ah kan kui tiak tur a ni. Thlai chawr tirte hi a hnah tla kawlh a a thih loh nan kan chin hmain tuiah chiah hmasak phawt a , chumi hnuah Bavistin (15-20 g/10 litres of water) a chiah leh tur a ni. A chi te chu a lo tiak hunah khuhhnawn nate kha kan la sawn tur a ni a, phunsawn hma kar khat ah tui pe lo vang vang in phunsawn hma ni khat a la awm tih ah hneh tak a tui pek tur a ni.

### **A chin hun :**

October-November ah tomato hi phunsawn tur a ni.

### **A inkar hlat zawng :**

60 x 60 cm a inhlat in phun tur.

### **Leitha pek dan :**

Hectare khat atan FYM tawih tha tak 20-25 ton, kan chin na tur lei kan sawngbawl lai in lei nen tha takin chawhpawlh tur. Fertilizer 75:40:25 kg N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O hectare khat ah pek bawk tur a ni. Nitrogen dose chanve, potash chanve leh phosphorus vaiin a tirah pek tur a nia, Hmun li a then a hmun khat nitrogen leh potash chanve kha ni 20-30 ah pek leh tur niin a la bang zawng kha chu phunsawn atang a thla hnih hnuah pek zawh tur a ni.

## **Hlo thlawh :**

Hlo tha tak a thlawhfai tur, a bik takin thlai a to tan tirk ah. Hlo te hian leitha eiral ve zelin tomato thar NASA takin a ti tlem thei a ni. Han thlawh fai hrim hrim hian lei a lo ti che in tomato tan hian a tha em em a ni.

## **Thlai enkawl dan :**

### **Rannung :**

#### **1) Tomato fruit worm (*Heliothis armigera*)**

Heng pangang te hian a hnah leh thlai kung an eichhe phawt a, a hnuaah tomato rahte pawh an ei chhe tel bawk thin. October-March ah an hluar bik hle.

### **Enkawl dan :**

Eenvalerate (50g a.i./ha) emaw deltamethrin (10g a.i./ha) a tawk chauh a hman tur.

#### **2) Epilachna beetles (*Epilachna vigintioctopunctata*)**

Heng rannung te hian a hnah leh a kung an bei NASA hle. A hnah te lo tla kawlh in a thi thin a ni.

### **Enkawl dan :**

Rannung leh a hnah an bawm lai te chu lakhawmin tihral vek tur. Malathion (2ml/litre of water) emaw carbaryl (2-4 g/litre of water) a kah hi a tha hle bawk.

#### **3) Jassids (*Amrasca biguttula biguttula, Cestius phycitis*)**

A note leh puitling te hian a hnah hnuaai lam an zuk thin. Lo eng in a vuai chhe thin a ni. A rah a thalo a, hemi avang hian natna dang pawh tomato thlai hian a vei thei a ni.

### **Enkawl dan :**

Malathion (0.1%) emaw dichlorvos (0.05%) phunsawn atanga ni 20 ah kah tur.

#### **4) Tabacco caterpiller (*Spodoptera litura*)**

Pangang te hi zan lamah an che tlangpui a, a hnah no lai leh a rahte NASA takin an eichhe thin.

### **Enkawl dan :**

Nuvan (0.5 ml/ 2 litres of water) a kah tur. Damdawi chak lutuk hman loh tur a ni.

## **Natna :**

#### **1) Bacterial wilt (*Pseudomonas solanacearum*)**

Tomato natna lar tak ni in leisa lutuk leh hnawng lutuk ah a NASA bik. He natna hi a thawk chak hle a, reilote ah a kung a thi mai thin a ni. Tui hnang var deuh hmuh tur a awm thin a ni.

Enkawl dan :

He natna in a tlakbuak thlai te chu pawh phawi a tih ral vek tur. He natna ngam chi chiah, *Sakthi*, *Mukthi* leh *Anagha* te chin hram hram tur. A tiak tirte hi streptocycline (1 g/40 litres of water) in minute 30 chiah tur.

## **2) Early blight (*Alternaria solani*)**

Hemi natna in a khawih ber chu a hnah leh kau te a ni. A hnah upa lam deuh tawhah a lo lang chhuak phawt a, a dum in a lo val thin. Lo dum zual zelin a hnuah a lo eng ta thin a ni. Khawlum lutuk leh hnawng lutukah he natna hi a hluar hle. A kung a beih chuan a zung bulah a lang thin a, reilo te ah thlai a thi thin a ni.

Enkawl dan :

He natna in a tlakbuak thlai te chu paihfa vek tur. Thlai dang chin pawlh bawk tur. Dithane M-45 (0.2 %) emaw bavistin (0.1 %) a kah hi a tha hle bawk.

## **3) Late blight (*Phtophthora infestans*)**

Hemi natna hi chuan a rah a bei a, a rah hnun bulah intan in a uk chhe thin a ni. Vutbuak ang deuhin a hnah leh a rah ah te a lo lang thin. Khawhnawng leh khaw dai rei lutuk a lo thlen hian he natna hi a tam bik. Tomato thar nasa takin a ti hlawk lo.

Enkawl dan :

Tomato hi alu bul hnaih ah chin miah loh tur. Tin, thlai inkar thlak a chin thin tur. A chi te chu thiram (2-3 g/kg of seed) a chiah tur chin hma in. Dithane M-45 (2 g/kg of seed) in ni 15 in kar thlak a kah tur a ni. Kan kah hi phunsawn atang a ni 30 a ni tur a ni.

**A seng dan :**

A chi a zirin tomato te hi phunsawn atanga ni 60-70 inkarah a rah a lawh theih. Kan hman duh dan a zirin tomato te hi a lawh hun a dang thei a ni. A tlangpui thu in hectare khat ah 20-25 ton a thar theih a, hybrid chi te hi hectare khatah ton 50-60 vel a thar theih bawk.

## **CHANGKHA :**

### **Thlai chungchang :**

Changkha hi Mizoram a thlai pawimawh tak pakhat a ni. A rah hi nasa takin kan ei a, natna tam tak lakah min veng tu a ni. A rah hian vitamin C a pai tam a, taksa tan a hrisel hle.

### **Sik leh sa, Lei :**

Changkha hi phaizawl atanga tlang lam 1000 m velah a chin theih a ni. Temperature 24-27°C hi duhthusam ni in 18°C a hniam berah a tha bawk. Khawvawt hi engnge maw chen a tuar thei a, mahse khaw vawt leh lutukah chuan a than a tha theilo. Lei tuiluan ral awlsam theihna leh leitha tawih ral thei tamna ah a tha duh hle a ni. Lei al zawng pH 6.0-6.7 a mamawh bawk.

### **A chi hrang hrang :**

Changkha chi thenkhat te chu

- i. Priya            ii. Preethi            iii. Priyanka            iv. Arka harit

### **A chi mamawh zat :**

5-6 kg hectare khat atan

### **Chin hun :**

Changkha chin hun tha te chu January-March and September-December

### **Chin dan :**

Ruahtui chawm atan chuan May-June ruahui tla tir hunah chin tur. Lei chu tha tak a thlawh fai a, khur 60 cm a bial leh 30-45 cm a thuk, 2x2 m a inhlat ah chin tur a ni. FYM tawih tha tak lei pawn lang nen a chawhpawlkhur ah chhun tur a ni a, a chi te chu tui ah darkar 24 chiah bawk tur. Hei hian a chawr a ti tha bik. Bavistin (0.2%) a a chi chiah hian nasa takin natna lakah a veng bawk a ni.

### **Leitha pek :**

FYM 20-25 t/ha hi a tirah pek tur a ni a tin, Nitrogen leitha kg 35 leh P<sub>2</sub>O<sub>5</sub> (25 kg) and K<sub>2</sub>O (25 kg/ha) pek bawk tur ani. Nitrogen kg 35 bawk a zam tan leh a par hunah pek leh bawk tur. Leitha hi duhthusam ah chuan khur khatah 28:10:10 g N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O pek tur a ni.

### **Hlo thlawh :**

Ruahsur tam lai in rih vur tur a ni a, mamawh dan a zir in hlo hi thlawh fai reng tur a ni. Khuh hnawn hi changkha kan chinna a pawn chuan tih bawk tur. Khuh hnawn hi phun sawn hnuah tih hian a thar hlawk hle.

### **Tui pek dan :**

Changkha hian khawro tui awmlo a haw hle. Tha tak a tui pek hnawn reng tur a ni a, thlai a to hunlai hian ni 3-4 inkar ah tui tha tak a pek tur a ni. Tin a par a chhuah hnuah in kar thlak a tui pek reng bawk tur a ni.

**Thlai enkawl dan :**

**Rannung :**

**1) Epilachna beetle (*Epilachna spp.*)**

Pangang eng lam deuh niin a note leh puitling te hian a hnah leh kung no lai an ei chhe hnem hle. A hnah te chu lo ro in a ziarang a lo lang thin a ni. Heng rannung te hi an tam viau chuan a hnah lo tla in a thar nasa takin a ti tlem thin a ni.

Enkawl dan :

Pangang leh a tui te chu thenfai in tih ral vek tur, tin Carbyl 0.2% a kah bawk tur a ni.

**2) Pumpkin beetle (*Aulacophora fevicolis, A. cincta and A. intermedia*)**

Heng rannung puitling te hian a hnah an ei a, hei bakah hian a zungte pawh an ti chhe thin a ni. A par leh a rah ah te kua hreuh in a thar an ti hlawk lo thin.

Enkawl dan :

A khur ah khan carbyl 10% chin hma in leivung nen a pawlh hian a ti rem thei a ni.

**3) Aphids (*Aphis gossypi*)**

Heng rannung te tak te te te hian a kung no lai leh a hnah atang te in tuiril an hip chhuak a, tichuan a hnah lo kir in a lo vuai thin a ni. Fanghmir te hi a thehdarh tu pawimawh tak an ni.

Enkawl dan :

Dimethoate 0.05% a kah tur a ni.

**Natna:**

**1) Downy mildew (*Pseudoperonospora cubensis*)**

Lapua ang deuh a hnah ah hmuh tur a lo awm thin. Ruahtui tlak tam laiin a nasa zual a kang ang deuh takin a hnah chunglam ah a lo lang chhuak thin.

Enkawl dan :

He natna in a tlakbuak hnah te chu kim tak a lak khawm a tih riral tur a ni. Neem emaw kiriyath 10% a kah bawk tur. A nasat viau chuan indofil M-45 0.2%, akomin leh mancozeb 0.2% a kah tur.

**2) Powdery mildew (*Erysiphe cichoracearum*)**

A hnah leh a tang ah var bial deuh takin a lo lang chhuak thin. Heng val te hi lo lian zel in a hnah chunglam ah vut buak ang in alo lang ta thin a ni. A natna in a khawih nasat na ah chuan a hnah lo eng in a hnu lawkah a lo uk a, a ro thin a ni. A hnah te lo tla kawlh in nasa takin a thar a ti hlawk lo thin a ni. Boruak hnawng lutuk ah he natna hi a hluar bik hle.

Enkawl dan :

Dinocap 0.05% a kah tur.

### **A seng dan :**

Changkha rah seng dawn hnaih ah hian uluk tak a en chian tur. Chin atanga ni 90 emaw a rah insiam atanga ni 15-20 ah seng tur a ni. A rah kan seng te chu a hring da lam, ruh tha tak leh a mu no tak an ni tur a ni. Hectare khatah 15-20 tonnes a thar tlangpui.

## **MAI :**

### **Thlai chungchang :**

Mai (*Cucurbita moschata*) hi Mizoram thlai pawimawh tak pakhat ni in a rah hi a no lai leh a hmin hnu in kan ei nasa hle. Maian hi a hnah no ni in zawrh nasat tak a ni. Mai hi potassium and vitamin A chakna pai tam a ni a, serthlum rawng anga a awmna chhan pawh hi antioxidant leh beta carotene a pai tam vang a ni. Beta-carotene hi mihring taksa a vitamin A siam tu pawimawh tak ni in hrisel na atan a tangkai hle.

### **Sik leh sa, lei :**

Mai hian a hniam berah temperature 18°C a than tirh ah a mamawh a, mahse duhthusam ah chuan temperatures 24-27°C a tawk chiah a ni. Sik leh sa hniam leh sang a ngam em em a, ruahui tla pawh a tlem leh tam ah a tha thei hle. Lei chi hrang hrang ah a tha duh a, leitha tawih ral, tui luan ral awlsam theihna a ngeih bik. Lei al lam pH 6.0-6.7 duhthusam ni in pH 8.0 tleng pawh a tuar thei a ni.

### **A chi hrang hrang :**

Mai chi thenkhat te chu-

- |                 |                    |            |
|-----------------|--------------------|------------|
| i. Arka chandan | ii. Ambili         | iii. Saras |
| iv. Suvarna     | v. Arka suryamukhi |            |

### **A chi mamawh zat :**

Hectare khatah a chi kg 1-1.5 a tawk a ni.

### **A chin hun :**

Mai hi January-March leh September-December ah te chin tur a ni.

### **A chin dan :**

Ruahui rinchhan a chin dawn chuan May leh June thla ruahsur tir lamah chin tur a ni a, lei chu thlawh fai a chawh leh vek tur. Khur 60 cm a bial 30-45 cm a thuk, 4.5x2 m a inhlat laih tur a ni a, FYM leh lei chunglang hang tha chawhpawlkhur ah chuan dah tur a ni.

Mai chi pali panga vel khur ah chuan 1-2 cm a thuk in tuh tur a ni a, tuh thuk lutuk hian a chawr a ti tlai. A chawr nan hian tui a mamawh hnem deuh avangin tuh tak tak hma ni 3-4 ah hian tui pek lawk tur a ni.

### **Leitha pek :**

Hectare khatah FYM ton 20-25 hi a tirah N (35 kg) dose chanve leh P<sub>2</sub>O<sub>5</sub> (25 kg) leh K<sub>2</sub>O (25 kg/ha) dose full in pek tur. Nitrogen (35kg) a la bang chu a in zat chiah in mai a zam hunah leh a par vanglai in pek zawh tur a ni. Khur khat atan leitha pek tur zat chu hetiang hi a ni - 28:10:10 g N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O.

### **Hlo thlawh :**

Leitha pek hunah hlo thlawh fai tur. Rih vur hi ruahsur lai in tih bawk tur a ni a, kut a thlawh tur a ni. Mai kan chin na a pawn chuan khuh hnawn tur a ni.

## **Tui pek dan :**

Mai kung a than tan tirhah hian ni 3-4 kar danah tui pek tur. A par leh a rah tan ah ve thung chuan ni inkar thlak a tui pek bawk tur. Kan chin na a zirin a pawng ah chuan a bi inkar a tuiluan tir hi a tha ber a, mahse tui harsatna hmunah chuan drip emaw trickle irrigation hman tur a ni. Ruahtui tlak tam lai chuan tui tlin tir loh a luan ral tir kha a pawimawh em em a ni.

## **Thlai enkawl dan :**

### **Rannung :**

#### **1) Epilachna beetle : *Epilachna spp.***

Heng rannung te hi a eng deuh ni in a puitling leh naupang ten mai hnah leh a kung no lai te an eichhe thin a ni. A tam dan a zir in a hnah in a tuar a, mai thar a ti tem thei hle a ni.

### **Enkawl dan :**

Rannung chu a tui, a pangang leh a puitling te chu vai khawm a tih hlum tur a ni. Carbyl 0.2% a kah a tha bawk.

#### **2) Pumpkin beetle : *Aulacophora fevicolis, A. cincta and A. intermedia***

A puitlingin a hnah an ei chhia a, a zung leh a peng hrang hrangte pawh an ti chhe tel bawk. Pangang (a note) pawhin a zung ei chhia in mai par leh a rah in siam tir lei hrul ami an hreuh thin bawk.

### **Enkawl dan :**

Khurah khan mai chi tuh hma in carbaryl 10% DP lei nen khan chawhpawl tur a ni.

## **Natna :**

#### **1) Downy mildew : *Pseudoperonospora cubensis***

A hnah ah khan lapua ang deuh in zam hmuh tur a lo awm thin a, kang ang deuhin a hnah chunglam ah a lo lang thin bawk. Ruahtui tlak tam lai in a hluar bik.

### **Enkawl dan :**

Mai hnah he natna in a tlakbuak te chu thenfai a tih ral vek tur. Neem emaw kiriath 10% a kah tur. Natna a nasat viau chuan mancozeb 0.2% a kah tur a ni.

#### **2) Powdery mildew : *Erysiphe cichoracearum***

He natna lanchhuah dan chu a tang ah leh a hnah ah te bial te tak te in a lo val thin a ni. Lo val lian in a in fin khawm a, mai hnah chunglam ah vut buak in a lo awm ta thin a ni. Natna a nasat chuan a hnah lo eng in reilo te ah lo uk leh in a vuai zo thin. He natna hian a rah thar a ti tem thin a ni.

### **Enkawl dan :**

Dinocap 0.05% a kah tur.

### **A seng dan :**

Mai seng hun dik tak chu mai kuang kha a lo sawng in a ni. Mai kha serthlum rawng tak lam anih in seng tur a ni. Mai hmin chianglo hi a dahthat rei theih loh avangin a hmin that hunah chiah seng tur a ni. Hectare khatah a tlangpui in ton 30 vel a thar theih a ni.

## **FRENCH BEAN :**

Bean hi vai tawng chuan Rajma an ti bawk. Bean hian protein a pai tam hle a, 23% lai hi protein a ni. Hemi bakah hian calcium, phosphorous leh iron te pawh a pai hnem a ni. A hnah leh a rah te hi chawhmeh tangkai tak ni in, Mizoram ah pawh kan ching uar hle. Ant-metabolites a pai avangin ei hma in chhum emaw sil fai tur a ni.

### **Sik leh sa, Lei :**

Duhthusam ah chuan bean hian temperature 16-24°C a mamawh. Temperature 10°C aia hniamah chuan thlai than a tawp thei. Temperatures 35°C aia sang ve thung ah chuan thlai a par tha theilo a, hei hian a thar a ti hlawk lo. Ruahtui tlak tam zawng 50-150 cm kum khatah a tawk. Tui tling chambang hi thlai tan engtik lai pawn a tha lo. Bean hi lei vut tha leh dur tha ah a tha duh hle a, tui a luang ral tha thei bawk tur a ni. Lei al lutuk ah a tha theilo a, leitha tawih ral tha leh pH 5.2-5.8 hi a than that nan a tha hle a ni.

### **A chi thenkhat te :**

YCD 1, Ooty 1, Ooty (FB) 2, Arka Komal (Sel.9), Premier, Arka Bold, Arka Sampoorna and Arka Karthik te hi a chi lar thenkhat te a ni.

### **A chi mamawh zat :**

120-140 kg seed/ha hi an chin dan tlangpui a ni.

### **A chin hun :**

October-November hi thlai chin nan duhthusam a ni.

### **A chin dan :**

Bean hi a tlangpui in 30 cm inkar danah an ching thin a, a zam na tur hi siam tur a ni.

### **Leitha pek dan :**

Bean hian nitrogen a siam theilo a, chuvang chuan nitrogen (100-120 kg) hi pek tur a ni. 60 kg P<sub>2</sub>O<sub>5</sub>/ha a mamawh bak ah chaw tha thenkhat hi chu pek vak a ngailo a ni.

### **Hlo thlawh :**

Hlo hi thlawh fai that hle tur. Thlawh hmasak ber hun chu chin atang a ni 20-40 ah thlawh tur. Tin, ni 30-35 hnu a thlawh hi a tha hle tih finfiah bawk a ni. Pendimethalin @ 1.0 kg/ha emaw 1.0 kg/ha fluchloralin chin hma a kah hi a tha hle bawk.

### **Tui pek dan :**

Bean hi a zung a awm pawnlang em avangin hnawng awmlo hi a haw hle a, ruahtui tlak lai chuan a hrarpa a tui pek a ngailo.Ruahtui tlak loh lai chuan chin atang a ni 25 ah tui tha tak a pek tur. Chin atang a ni 25, 50 leh 75 hi tui pek hun tha thlai than that nan a duhthusam te an ni.

### **Thlai enkawl dan :**

### **Rannung leh natna :**

Bihar hairy caterpillar, blister beetle, bean bug leh aphids te hi rannung beitu thenkhat te an ni a, natna ah chuan a lar pawl chu Rot (collar, stem and pod) leh bean golden mosaic virus te a ni.

**A seng hun :**

Bean chu a lo upat hnu chuan a hnah leh a rah a lo eng deuh a, a hnah te pawh a tla then thin. A chi atana kan hmang dawn anih chuan seng har lutuk loh tur, seng har lutuk hian a rah a keh in a thar a tlem phah. A hel ei atan chuan a kung a puitlin lutuk loh lai a seng thung tur.

## **ANTAM :**

Antam (*Brassica spp.*) hi Europe atanga lo chawr chhuak ni in mihring in thlai kan chin hmasak ber a ni. A pawimawh em avang hian thlai chin nasat ber pawl a ni a, Asia ah leh a bik takin Mizoram ah pawh kan ching uar in thlai kan ei hnem ber pawl a ni. Antam hi hmun dangah chuan a tel atan a chin ber a ni a, mahse, Mizoram ah ve thung chuan anhnah atan kan ching ber. Antam chi hi a chaw tha duh hle a, mahse a than erawh a muang deuh. Sik leh sa leh tui a that chuan kar 4-5 ah a chawr duah hluah thin.

### **A chin hun :**

Antam hi a tlangpuiin September atang a October thla ah an ching thin.

### **A chi :**

India ram a antam chi lar deuh te - Pusa Vijay, Kranti, Pusa Mustard 27, Sita, Pusa Mahik, Pusa Tarak etc.

### **A chi mamawh zat :**

4-6 kg hi hectare khat chin nan a tawk thei ang. Thlai dang nen a chinpawl tur chuan a chi 2-3 kg hectare khat atan a tawk.

### **Lei sawngbawl dan leh chin dan :**

Antam kan chinna tur lei chu tha takin kan lai phut tur a ni a, hlo kan thlo fai in a hma a kan chin thlai hnuhma pawh fai takin kan thlo fai tur a ni. Lei chu a muk lutuk tur a ni lo a, lei thaw tha deuhah hian a tiah that bik avangin lei chu ka cho thaw deuh tur a ni.

### **Leitha pek dan :**

FYM/compost @ 7-12t/ha, 20-25 kg Nitrogen hi lei chunglangah pek tur a ni a, hei hi chin pah in pek a tha. Leitha pek dan tur duhthusam ah chuan 135kg N, 65 kg P<sub>2</sub>O<sub>5</sub> leh 15 kg K<sub>2</sub>O hectare khat ah pek tur. P<sub>2</sub>O<sub>5</sub> leh K<sub>2</sub>O hi hmun 3 a then a hmun 1 pek tur a ni a, a bang chu a in zat chiah in vawi hnih chin atang a ni 30-40 ah leh ni 60-70 ah pek zawh tur a ni.

### **Enkawl zui dan :**

Hlo thlawh leh samfai hi vawi 2-3 kar hnih danah tih chhunzawm tur.

### **Tui pek dan :**

A chi kan tuh hma hian tui pek hmasak phawt tur. Vawi 3 tuipek tur niin hei hi kar li dan zelah pek bawk tur a ni.

### **Rannung leh Natna :**

Rannung -

### **1) Mustard Aphid**

Heng rannung naute leh a puitling hian antam chu Zuk in tuihnang an siak chhuak thin a, antam tan hian a hlauhawm hle. An beih hnu hnah te chu lo vuai in a tla thin a ni. Hei bakah hian thil thlum an siam chhuak a, a dum in a lo awm thluah thin a ni.

### **Enkawl dan :**

1. Khawvawt leh ni eng tha lo ah an awm duh avangin khawlum deuh lai a chin hmasak deuh tur.

2. Dimecron 100 hi 250 millilitre hectare khat ah emaw Metasystox 25 EC litre khat hectare emaw Rogor 30 EC a kah tur.

## 2) **Painted Bug of Mustard**

Heng rannung te hi 6 mm a sei, a dum deuh emaw tuiet rawng deuh an ni. A hnah an bei NASA hle hei bakah hian a kung no lai an ei chhe bawk. A rah alo awm hnu pawhin an ei zel a, antam thar a hlawk loh phah hle thin.

Enkawl dan :

1. A note te hi 5 percent BHC dust, 20-25 kg hectare khatah phul hi a tha hle.
2. Dimecron, Rogor emaw Metasystox A naute leh puitling thah nan a tha hle bawk.

## 3) **Cabbage Butterfly**

Pangang puitling te chu 3 to 4 cm an ni a, a eng lar deuh rawng an ni. Heng pangang te hian a hnah leh a zar te an ei ber. A hnah te lo tla kawlh in antam a thi thin.

Enkawl dan :

- Pangang te chu man khawm a tihhluum vek tur.
- Malathion 50 EC 1 litre hectare khatah kah tur. A nasat viau chuan Nuvacron 40 EC 1 litre tui liter 1000 a pawlh in hectare khat ah kah bawk tur a ni.

**Natna :**

## 1) **Alternaria Blight**

Fungus (*Alternaria brassicae*) in a thlen thin. A chi ah lo awm lawk in thlai a ti chhe thin a ni. He natna vei thlai te chu a hnah leh kung ah te a dum in a lo val thluah thin a ni. A nasat chuan antam chi a tawih a, a lo te bawk thin in thar a ti hlawk lo hle thin.

Enkawl dan :

1. A chi hrisel tha leh thiaghlim chiah hman tur.
2. Duter, Difolatan emaw Dithane M-45 tui liter 1000 ah kg 2 zel pawlh hectare khat atan a hman theih. A natna lo lan chhuah ah kah tan ni in ni 10 danah zel kah tur a ni.
3. He natna in a bawm antam te chu vai khawm a hal ral, tih fai vek tur.

## 2) **White Blister:**

Fungus (*Albugo candida*) in a thlen thin. Natna dang nen a awm kawpin a hlauhawm leh zual. Antam kung peng hrang hrang leh a hnalah te pilh ang deuhin a var in a awm thin. Heng hi lo keh leh vut buak rawng ang in a lo awm thin a ni. Antam par in a tuar nasa bik zual.

Enkawl dan :

- A chi hrisel tha hman tur.
- Zineb emaw Difolatan 0.2% a kah tur. Hei hi ni 10 dan zelah kah tur a ni.
- Hlo tha tak a thloh bawk tur a ni.

### **A seng dan :**

Antam hi chin atang a ni 110-140 ah a seng theih. Hei hi a chi tel siam nan a hman dawn chuan a ni. Mizoramah hi chuan anhnah atan a kan hman thin avang in a no lai a sih mai tur a ni. A tlangpui in hectare khat ah hian antam hi kg 400 a thar theih a, duhthusam a enkawl chuan kg 1000 thleng pawh a thar theih thin a ni.

**BUL UIH :****Thlai chungchang :**

Bul uih (*Beta vulgaris*) hi Chenopodiaceae family ni in he thlai hian ram vawt leh hnawng than nan leh thar hlawk nan a mamawh a ni.

**Sik leh sa, Lei :**

Bul uih hi thlai khawvawt ngaina a ni a, mahse khawlum lutuk lo ah pawh a tha thei tho a ni. Temperature 18-21°C hi thar hlawk nan chuan duhthusam ni in a bul tha, chakna pai tam leh a rawng sen tha a thar duh bik. Temperature 10°C aia hniamah chuan a bul a tha lo in zawrh tlak loh a chhuah thin a ni. Lei tui luan ral theihna hi a chin nan a tha hle. pH 6-7 hi lei thur zawng atana duhthusam a ni bawk.

**Varieties :**

Bul uih variety thenkhat te -

- i. Detroit dark red
- ii. Imperator

**Thlai chi mamawh zat :**

A chi 7-8 kg hectare khat atan.

**Chin hun :**

August-January

**A chin dan :**

Lei chu thlai zung in siam awlsam nan tha taka tih phut tur. FYM hectare khat tan 20-25 tonnes vel chawhpawlhi tur a ni a, chumi hnuah a chi kg 7-8 chin tur. A chi hi chin hma in darkar 12 vel tui a chiah hian a chawr a ti tha bik a, thiriam emaw captan kg 22.5-3 nen a chawhpawlhi hian a hnah tla leh hrisel lo lakah a veng bawk.

**Leitha pek :**

FYM 20t/ha hi a tir ah pek tur. N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O 75:37.5:37.5 kg/ha hi duhthusam a ni a. P<sub>2</sub>O<sub>5</sub> leh K<sub>2</sub>O hi a zavai a pek tur. Tin, nitrogen hi a chanve pek phawt in a bak chu thlai a than that lai a pek zawh tur a ni.

**Hlo thlawh :**

Hlo thawh hi a zing thei ang ber a tih tur a ni a, damdawi hmang lo a kut ngei a thlawh fai hi duhthusam a ni.

**Tui pek :**

Thlai chi a lo chawr nan leh a than that nan tui tha tak a pek tur. A chi chin zawh veleh theih hram chuan tui pek nghal tur. Nipui laiin ni 4-5 danah tui pek tur a ni a, thlasik lai erawh chuan ni 10-12 danah pek thung tur a ni.

**Rih vurh :**

Rih vur hian thlai a din that tir bakah a zung nisa in a em ro loh nan tih tur a ni. A zung a in siam that hunah rih vur hi tih ngei ngei tur a ni.

**Thlai enkawl dan :**

**Rannung :**

**1) Beet leaf miner : *Pegomyia hyocysti***

Pangang in a hnahn a ei chhia a, a khawih ho chu a lo tle deuh thin a ni. A hnahn he pangang in a khawih chhiat te chu lo eng da deuhin a lo vuai a, a lo ro thin bawk, tichuan a tla thin a ni.

Enkawl dan :

A hnahn tla te chu char fai in hal ral tur a ni.

**2) Web worms: *Hymenia* sp. or *Loxostege* sp.**

Pangang hring ni in a hnahn ah ril a lo zam thin. Thlai par leh a rah insiam a tichhe thei a ni.

Enkawl dan :

A hnahn ril in zam nate chu lak bo a hal ral vek tur a ni. Hei hian a pung tur a veng.

**3) Semilooper : *Plusia* spp.**

Pangang bawk ni in thlai hnahn leh kungte a eichhe thin a ni. Thlai nasa takin a ti chhe thei.

Enkawl dan :

Pangang te chu man khawm a thah tur. Tin carbaryl(0.1%) hmang a kah bawk tur.

**Natna:**

**1) Leaf spot: *Cercospora beticola***

A hnahn ah bial deuh in a lo val thin, chu chu lo ro in a lo kaw thin a ni. Natna a nasat chuan a hnahn lo ro in a tla thin bawk.

Enkawl dan :

He natna in a tlakbuak thlai chu hal ral tur. Thlai dang chin emaw copper oxychloride (0.3%) a kah tur.

**2) Downy mildew : *Perenospora schachtti***

A hnahn hnuai lam ah vut buak hmuh tur a awm. Natna vei hnahn te chu lo ro in a khawr thin, a par ah chuan a than a tawp a, a lo khawn thin bawk.

Enkawl dan :

Chin hma in a chi te chu thiriam (2.5-3g/kg) a chiah tur. Tin, dithane Z-78 (0.3%) a kah bawk tur.

**3) Purple leaf of beetroot: Tobacco mosaic virus (TMV)**

Thlai chu a than alo chawlh bakah a lo te bawk. A hnahn te chu bawkbawn rawng ang in nasa takin a lo in thlak bawk.

**Enkawl dan :**

He natna in a tlakbuak thlai te chu phawi a hal ral tur a ni.

**A seng dan :**

Bul uih hi chin atang a ni 60-75 ah a seng a lo hun a, a zung in 3-5 cm bial a awh hun ah seng tur a ni. Kut a pawh phawi mai tur a ni a, a hnah pawh thuai chum mai tur a ni. Hectare khatah 20-25 tonnes vel a thar thei a ni.

## **BEHLAWI :**

Behlawi hi mizo ten kan ei nasa hle a, tui tlem na hmun leh in leh a velah awlsam takin a chin theih a ni. Asia, Africa Europe leh America ah te nasa tak a chin a ni bawk. Thal khawkheng ngam tak leh khawlum lam a tha duh tak a ni a, thlai tam tak chin that theih loh na hmunah pawh a tha duh hle. A hnah leh a rah hi ei ber a ni.

### **Sik leh sa, Lei :**

Lei tui luan ral zung zung theihna hmunah leh khawlum hnawm hmunah behlawi hi a tha duh hle.

### **A chi mamawh zat :**

A buk chi: 20-25 kg/ha

A zam chi: 4-5 kg/ha

### **A chin hun :**

A chi a zir in behlawi hi February-March, May-June leh October-November ah te an ching tlangpui.

### **A chin dan :**

Behlawi chin na tur ram chu vawi 2-3 uluk tak a leh tur, hlo leh lung lian lutuk te thenfai vek bawk tur. Ruahtui tling tur ven nan behlawi kan chinna ah chuan tui luan ral theih na tur 30 cm a vang zawng 2 m a in hlat siam bawk tur a ni.

### **Leitha pek dan :**

Hectare khat atan FYM ton 20 pek tur. NPK bik hi 20:30:10 kg hectare khatah pek bawk tur a ni. Chinai kg 250 lei ah chawh leh lai a telh bawk tur. Nitrogen chanve leh phosphorous leh potash te hi a zavauin lei kan chawh leh lai khan pek tur a ni a, Nitrogen la bang zawng kha behlawi chi kan tuh zawh hnu ni 15-20 ah pek zawh tur a ni.

### **Hlo thlawh :**

Nitrogen kan pek vawi hniih na ah khan hlo thlawh pahin lei kha kan chawk let tur a ni. A par dawn hnaih ah tui pek rih loh tur, potash pek hian a par a ti tha bik.

### **Tui pek dan :**

Vawi hniih tui pek tur. Chin atanga ni 15 ah leh a, a rah in siam dawn ah pek tur a ni.

### **Thlai enkawl dan :**

### **Rannung :**

- 1) **Pod borer** : Heng pangang te hian a rahchhung an hreuh a Neem oil emulsion 5% / Carbaryl 0.2% / Fenthion (Labacid 50EC) 1 ml per litre te a enkawl tur a ni. Huan chu fai tak a vawng tur.
- 2) **American serpentine leaf miner** : Behlawi hnah an ei chhia a, a hnah a lo vuai thin. Neem oil emulsion 10% a kah tur. Huan chu fai tak a vawng tur.
- 3) **Black pea aphids** : Heng rannung te hian a hnah, a par, a kung leh a rah a tuiril an zuk chhuak thin. Neem oil emulsion 10% / *Nattappochedi* –soap emulsion/ fungus *Fusarium pallidoroseum* at 300 g/cent a kah tur (vawi khat chiah kah tur). Malathion (0.05%) or quinalphos (0.03%) a kah a tha bawk.

- 4) **Pod bug** : A puitling leh note te hian behlawi rah atangin tuiril an zuk chhuak thin. A rah lo sawng te in a rawng a lo danglam thin. 20 gm garlic paste in Malathion 50 EC @ 4 ml per litre a kah tur. Then fai a tha bawk.

[Note : Damdawi hman hian a rah lawh zawh ah chiah hman tur. Tin, rannung hlo a kah hian ni 10 hnuah chiah a rah lawh tur a ni.]

**Natna :**

1) **Anthracnose of cowpea (*Colletotrichum lindemuthianum*)**

Tui far val ang deuh in a hnahn ah alo lang thin. A kung ah te pawh a darh zau thei bawk a hnahn te a tla kawlh thei a ni. A chi hi Thiram @ 3g/kg a chiah in leh Carbendazim @ 0.05 % in a chawr tirk ni 15, 30 & 45 ah kah bawk tur.

2) **Dry root rot of cowpea (*Macrophomina phaseolina*)**

He natna in a tlakbuak thlai chu lo vuai in a thi thin. A kung chu lo ram in khawro lutuk ah a hluar bik. *Trichoderma viride* @ 4 g/kg of seed emaw Carbendazim 0.05 per cent of seed emaw *Pseudo-monas fluorescens* @ 10 g/kg of seed in a chi chu enkawl tur. Neem cake 20 kg/ha lei ah pawlh bawk tur.

Malathion (0.1 per cent) emaw quinalphos (0.05 per cent) a kah hian rannung a ti rem bawk.

Carbaryl 0.2 % kah hian a veng a, a tul dan a zir in kahnawn tur a ni. A rah lawh zawh hnuah emaw lawh hma ni 10 ah damdawi kah hi tih tur a ni.

**A seng dan :**

A chan lutuk hma in a rah te hi seng tur. A ro a seng tur chuan a rah a ro vek hunah seng choh tur a ni. A hring hi hectare khatah ton 10-20 a thar theih a. A chi tur a ro chu ton 1.2-1.5 a thar theih thung.

**Seng hnu a enkawl dan :**

Seng zawh veleh dah daih tur a ni a, tel te tak te te a tel khawm leh in nisa ah pho tur. A ro thap thengin pho tur a ni.

## **VAIMIM :**

Vaimim hi thlai pawimawh tak pakhat ni in kumtluan in a chin theih. Tuipei atanga meter 300 a sang ah chin ni in ruahui tla 600-900 mm ah a tha duh hle. Vaimim hian leitha, tui luan ral zung zung theih na leh lei al zawng pH 5.5-8.0 inkar a mamawh a, duhthusam ah chuan pH 6.0-7.0 ah a tha duh ber.

### **A chin hun :**

Ruahtui chawm thlai anih angin vaimim hi June-July emaw August-September ah chin tlangpui a ni. Tui pek tur hnianghnar na hmun ah erawh chuan January-February ah chin a ni.

### **A chi hrang hrang te :**

Hybrids: Ganga Hybrid-1, Ganga Hybrid-101, Deccan hybrid, Renjit, Hi-starch

Composite varieties: Kissan Composite, Amber, Vijay, Vikram, Sona, Jawahar

### **Thlai chi mamawh zat :**

Hectare 1 ah kg 20

### **Lei sawngbawl dan leh chin dan :**

Vaimim chin na tur ram chu tum thum lehphut tur. A chi pakhat zel in 60x23 cm inkar ah tuh tur a ni a, hei hi ruahtui chawm tur bikah a ni. Tuipek tur awlsamna ah chuan seed bed siam a chin tur a ni. Hetah hian rih vur hi thlai khup chen vel a lo nih in tih bawk tur a ni.

### **Leitha pek dan :**

Hectare khat atan FYM 25 ton, chin hma lei kan sawngbawl lai a telh tur. Fertilizer mamawh zat chu 135kg N, 65 kg P<sub>2</sub>O<sub>5</sub> and 15 kg K<sub>2</sub>O hectare khat atan a ni. P<sub>2</sub>O<sub>5</sub> leh K<sub>2</sub>O hi a zavaiin pek nghal tur a ni a, nitrogen erawh hi chu hmun thum a then a hmun khat a tirah pe in, a inzat in ni 30-40 ah leh ni 60-70 a pek leh tur.

### **Enkawl chhunzawm dan :**

Hlo thlawh leh vaimim bul lei khawih chet hi ni 21 na leh ni 45 na ah tih tur.

### **Tui pek dan :**

Tui hi tuh atanga ni 3 na ah pek tur a ni a, a bak chu ni 10-15 inkar danah pek chhunzawm tur a ni.

### **Thlai enkawl dan :**

### **Rannung :**

#### **1) Stem borer: *Chilo partellus***

He pangang te hian a kung hreuhkua in a chhung nem lai an ei chhe thin a ni. He rannung beih vaimim kung te chu a kung ah pangang hmuh tur a awm thin.

### **Enkawl dan :**

- Phorate 10% CG10 kg/ha
- Carbaryl 4% G 20 kg/ha.

- Egg parasitoid Trichogramma chilonis @ 2,50,000/ha a tui lai in chhuah tur. Vawi thum kartin chhuah hi a tha hle.

## 2) Pink stem borer : Sesamia inferens

Heng pangang senno deuh te hian a kung ah lut in an ei chhe thin a ni.

Enkawl dan :

Phosaloneb 35% EC in ni 20 danah kah tur.

**Natna :**

### 1) Bacterial stalk rot

A lan chhuah dan :

- A kau tawp lamah lo tawih in a lo tuihnang thin. Heng tawihah te hian zu rim a lo nam chek bawk.
- A hnah lo vuai in a lo tla kawlh thin a, ni reilo te hnuah a kung a tlu thin.

Enkawl dan :

- Heng natna lak a him chi hman tur, i.e. Hybrids Ganga Safed-2, DHM 103
- Tui tlin tir loh a luan ral tir.

## 2) Common rust

A lan chhuah dan :

- A hnah chunglam leh hnuai lamah uk rang deuhin leh vut buak in a lo lang thin.
- Vaimim kung a lo than len in rawng uk deuh in a kawm ah leh peng hrang ah te a lo lang thin.

Enkawl dan :

- Heng natna lak a him chi hman tur Deccan, Ganga-5, Deccan Hybrid Makka-103 leh DHM - 1
- Mancozeb 2.5g/lit emaw Dithane M-45 spray tur. A par hma in ni 10 dan zelah kah tur.

**A seng dan :**

Vaimim hi September thla tawp lam emaw October thla tirah a seng theih. A sam a lo lan hunah seng tur ni in a than a tawp emaw a hnah a lo eng deuhin seng tur. A kung kha meter 2 vel a ni tur a ni a vaimim kawm a a mu te kha a hmin rual thap tur a ni.

## **Topic 9 – Ni hmasa lama zir thlirletna**

### **Objectives :**

Knowing the trainees understanding from the previous day training

**Duration :** 15 minutes

**Expected outcome :** Participants will learn scope of improvement from previous day learning

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Recap of previous day	* Gap analysis * Learning from previous day * Scope for improvement	Group discussion	Small group of 5 members each will be formed where the trainees will discuss the entire previous day topic with his/her partner. Quick recap will be done by representative of each group	Chart paper, Marker

## Topic 10 – Hmathlir (Vision)

### Objectives :

Understanding the needs and importance of good visioning

**Duration :** 45 minutes

**Expected outcome :** Participants will learn the importance and needs of good vision

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Vision	* Importance of visioning * Making a vision into reality * Planning : MCP, CBA	Lecture through powerpoint presentation	Resource person will facilitate the session with brief lecture, the participants will then be divided into groups to share their vision and present in a chart paper	LCD projector, Laptop, Chart paper, Marker

Vision chu *Hmathlir* ti in kan sawi thei ang. Mi hlawhtling nitur chuan hmathlir tha neih a pawimawh a ni. Intihsakna khawvela cheng kan ni a. Hnathawhna leh eizawnna emaw, hmasawn tuma kan chenna khawvela nung khawchhuak turin hmathlir fel tak kan neih a ngai. Tui tak leh nuam ti taka ka thawh theih tur, mi hlawhtlinna leh nuam tih zawng anih vang mai ni lovin, nakina nih emaw, thlen emaw, tihhlawhtlin tum kan neih emaw tinzawn fel tak kan neih a ngai. Eng ang harsatna pawh lo awm se, kan tumah kan chian chuan, kan theihna leh chakna zawng zawng hmangin chung harsatna chu kan pal tlang thei ang.

“Hmathlir a awm loh chuan mipui an boral phah thin” tih Bible-ah kan hmu a. Ruahmanna chu mitin tana beiseina nung min petu, ei leh barah kan intodelhna tur leh khawtlang pum huapa rahbi thara min chuan kaitir tura kailawn hmasa ber a ni. Tin, mahni chhungkua tana ruahmanna neih chu kawng engkimah thil phurawm tak niin, Zoram mipuite pawhin beiseina nena hmathlir kan neih chhung chuan engtikah mah kan tlu hlen ngai lovang.

Ramin hma a sawn dawn chuan sawrkar chak tak a mamawh a, sawrkar chak nei turin roreltu dik leh huaisen, dawhtheihna nena hmahruai thei a mamawh ber. Tichuan, sawrkar (government) chuan mipui phalna hmangin an chunga rorel theihna a neia, sawrkar inrelbawlna tha (good governance) erawh kan zavai kuta awm a ni thung.

Ram inawpna fel leh tha (good governance) awmnaah chuan mipui an zalen a, ramin hma a sawn thin. Mizoram bikah chuan dan tha siam chhuah emaw, rorelna dik kalpui aiin, tlachawp ‘policy’ kan la hmang tam hle. Kalphung rintlak chet chawt, mumal leh tha (Right System) neih a, sawrkar tha siam turin inrelbawlna kalphung (system) tha neih a tul bawk. Chutihralin, sawrkar tha neih hi thil awlai a ni lova. Mitinin aman kan pek ngam a ngai a, sawrkar tha siam hi kan vaia mawhphurhna a ni. Kan mawhphurna erawh a in ang vek kher lo. Chuvangin kan aiawh tur kan thlanin hmathlir nei tha leh chumi ti hlawhtling tur a, a ngaihna hria kan thlan thiam a ngai a ni.

## **Engtin nge hmathlir tha kan neih theih ang?**

1. Hmun fianral ah kal la, pen leh lehkha chiah keng ang che.
2. Phone leh thildang, nangmah tibuai thei engmah keng suh.
3. Tih tak zetin tawngtai rawh, a chhan chu Pathian in a siam chhan leh i duh dan inan theih nan.
4. Nangmah a thil i duh lo apiang kha ziak thla rawh, hemi ah hian thildik tak ziah a tha. Thilthleng i duhlo atang khan pail tur leh tel belh tur i hre thei dawn a ni.
5. Tunah chuan thil thleng tur a i duh te ziak leh rawh. I thil ziah te hi tuna thleng mek ang in ziak ang che.
6. I thilziah hi midang chhiar tir thin ang che. Hei hian nangmah ah phurna leh tum ruhna a pe ang che.
7. I thilziah te hi nitin chhiar thin ang che. Chu chuan tih tak tak na a thlen dawn a ni.

Khitiang ho khi kan zawm chuan nasa takin min pui thei dawn a ni. Thil kan tum leh ngaihtuah te ziak a kan dah thlap a, chu chu nitin kan chhiar thin chuan tumruhna thar min pe leh thin a, chauh chang pawn chakna thar min pe leh thin a ni.

## **Hlawhtling tur a thil pawimawh te :**

1. **Hmathlir tha nei rawh** – Hmathlir tha neih hian thil tih a awlsam phah thin. Mahse kan hriattur chu hmathlir tihhawhlin theih ngei kan nei tur a ni.
2. **I thil tum ah chiang rawh** – Hmathlir nei tih vangin thiltih theih loh lo ngaihtuah ve chiam khan awmzia a neilo. Ti hlawhtling tur a thil pawimawh zawng zawng ngaihtuah hmasa la, chu chu i tih theih dawn leh dawn loh ngaihtuah leh ang che.
3. **Ruahmannu nei ang che** – I hmathlir te ti hlawhtling tur chuan ruahmannu tha i neih a ngai a, chumi tur chuan i chakna te, chakloh na te, hmanrua i neih te leh khawi atangin nge buaina leh harsatna i tawh theih tih i hriat hmasak a ngai.
4. **Hmalak** – Hemi hi i thlen tawh chuan hmala turin i impeih tihna a ni. Chuvangin in fuih phur la, taima tak leh awmze nei takin hma la ang che.

Mi thahnemngai leh ram hmangaihna thinlung tak tak neitute hmalaknain, Mizoram hian hmasawnna kawngah ke a pen ve mek a. Inkaihruaina mumal leh awmze nei tak kan neiha, mimal atanga chhungkua, khawtlang leh kohhran leh, kan ram roreltute nena theihtawp kan chhuah phawt chuan, tunah hian Mizoram hi hmasawn turin a impeih reng tawh a ni.

## Topic 11 – Plantation tree chungchang

### Objectives :

- 1) To improve the income pattern of the traditional farmers through sustainable and simple method of farming practice
- 2) To introduce secondary crops for maximum utilisation of agricultural land and waste land

**Duration :** 60 minutes

**Expected outcome :** Participants will learn the importance plantation tree for maximum utilisation of land

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Plantation (Coffee, Rubber, Tea, Broom, Arecanut, Oil palm)	* Introduction to plantation * Promotion of healthy nursery * Land preparation * Spacing requirement * Seed quality * Weed management * Diseases and pest management * Harvesting * Post harvest management * Inter cropping * Marketing	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on plantation through powerpoint followed by an interactive session with the participants	LCD projector, Laptop, Leaflet

### COFFEE :

Scientific name : *Coffea canephora*

Family : Rubiaceae

Variety : Arabica, Robusta, Dwarf and San Ramon varieties

Coffee hi thingpui dawta kan in nasat ber a ni. Ethiopia ram Abyssinia plateau an tihah chin hmasak ber a ni a, chuta tang chuan kum zabi 11 vel khan Arabia ah an ching leh a, khawvel hmun hrang hrangah chin darh a ni ta a ni. Kum zabi 17-na velah khan Indian mi Babu Budan chuan Arabia ram atangin coffee chi hi India ramah a rawn hawn a, Karnataka tlang ramah te an ching darh tan ta a ni.

### Sik leh sa, lei :

Coffee chinna tur hian lei chhah tha, eng hmu tam, thlaitawih pai tam leh lei thur lam pang a tha hle a. Coffee hian ram lum leh hnawng tha tak, temperatue 15°C and 28 °C leh ruah thla khat a 150-250 cm a tam tlakna ram a ngeih hle a. Nisat thatna hmun a mamawh rualin hliah

kuhhu tur thing lian leh buk tha tak a mamawh a ni. Khawkheng rei lutuk te a hua a, amaherawh chu a rah seng dawnin khawtha a mamawh hle a ni.

### **Leilung sawngbawl dan :**

Ram thlan chung changah hian fimkhur a ngai hle a, Coffee hian nikang tha mamawh mahse hliah khuhtu thingbuk hlim a mamawh hle a, hliah khuhtu a awm loh chuan coffee hi a damrei thei lo a ni. Chuvangin a hliahkhuh tur a khat tawkin thing zuah tur a ni a. Tin, ram awihah chuan terrace farming laih hi tih ngei ngei tur a ni. A chinna tur hian metre 2.5 m kar danah khur 45 cm a thuk, 45cm a zau (i.e 45 X 45 cm) a laih ni se. Khur laih sa hi kar hnih tal phun hmain a awm tur a ni. Khur chhungah hian lei chunglang leitha leh rock phosphate gram 500 chawhpawl thun a, coffee tiak hi phun tur a ni.

### **A kuitiah dan :**

Coffee chi siam nan chuan hmun awih lutuk lo thing hlim lian deuh deuh awm lohna ni se. Nursery hi chi hnih a awm a, chung chu Primary bed (Kuitiahna) leh Secondary bed (Phunsawnna) te an ni. Dan naran in nursery bed hi a zau zawng 1.0 m x 6.0 m in an siam ber. A chhuat hi 15 cm (feet chanve) talin a pawng tur a ni. Chu chu tui leh ruahui khan nursery chim lovin a luan san zung zung thei nan a ni. Tin, a zau lamah hian a vang 1.0 m or 3 ft kha zawm hram tur a ni a, a chhan chu bed chungah lut lovin bed chhak lam leh bed thlang lam atangin kan thlofai in kan enkawl thei a. A dung sei lam hi chu a ram remchan dan a zirten kan tiseiin kan titawi mai tur ani. Nursery-ah chuan Coffee Board approved coffee chi chauh kui tur. Kui tiah nan hian December-January a tha. Coffee chu a khup zawngin dah la, insi thap in rem rawh, nem pil lutuk suh ang che. Chin zawahlei dipin (balu in) vur den den tur a ni a, chu chu buhpawl emaw di ro emawin khuh la, tui leih hnawng reng tur a ni. Tui hi huh kawi lutukin leih suh ang che, chutilo chu coffee chi kha a tiah hmain a tawih mai ang. Ni 4-45 inkarah coffee tiak chu kawrkilh/lukhum ang (topy/botton stage) a lo awm fir fer ang a, dimtein poly-bag-ah phun sawn tur a ni. Secondary nursery a phunsawn hun chu hnahpui a chhuah hnuah a ni.

### **A kung kar hlat zawng :**

Tlangramah chuan square system an tih mai killi neia phun mai hi a fuh. Tin, a kung leh a kung inkar zauh zawng pawh hi a variety kan chin dan a zirin a dang leh bawk. A tlangpuiin a kung leh kung inkar hlat lam (spacing) hi 2 m. (6X6) a ni a. Tin, a phunna tur khur hi March/April thla velah coffee khur 1"x1"x1" in i lai ang a, hemi aia zauva i laih theih chuan a tha lam a ni. Tin, i khur laih inhlata kan phun hian hectare khatah coffee kung 2000 a leng thei a ngaih a ni a. Hei hi sawrkar department in subsidy a coffee tiak a pek zat pawh a ni.

### **A chi tha :**

Coffee hi chi hrang hrang a awm ve nual a. Chung zingah chuan heng Arabica Robusta, leh Dwarf te hi a lar zual deuh te an ni. Arabica hi a lar ber a, chi hrang hrangah then sawm leh a la ni a. Chungte chu Sln. 5, Sln. 9, Sln. 795. Arabica kan tih hi a tuiin in a nuam hle a. Tin, a rim pawh a tuiin, chini nena tih thlum a inhme em em a ni. Arabica te chu hmun sang lam 600 m-2000 m vela chin chi an ni a. Tin, ram lum leh hnawngah an tha duh. Coffee tui leh tha tak, khawvelah pawh han lang tham ve ni tur chuan a chinna hmun hi ram tha leh thlai tana chaw tha tamna hmun a ni tur a ni. Robusta pawh hi chi hrang hrang a awm a. A chi tha te chuan Arabica aiin mi chawkphur theihna (caffeine) a letin a pai tam zawk a. Robusta pawh hi tui tak, inzawh

hnu pawha la tui veng veng thei khawp a an fak a ni ve a. Robust hi chu hmun hniam lamah pawh a chin theih a. Tin, ram tha lo leh boruak tha lo deuh zawkah pawh a tha thei a, a thar hmain arabicas aiin a thar hlawk zawk bawk a ni. A thatna riau pakhat chu rannung leh thlai natna hrik lakah pawh a tha thei mai zel a ni. Kan hriat reng tur chu coffee robusta aiin coffee arabica te hi khawvel hmun hrang hrangah chuan zawrh lar zawk a ni.

### **Thlaidang nen a chin kawp :**

Coffee hi thil dang te nena chin pawlh hian kan senso tam lutuk tur nasa takin a pui a, tin, lo neitu ten thlai pakhatah chhiah insawrbing lovin thlai tam zawk an lo ching a, chu chuan sum hnar tam zawk a lo siam ta a ni. Coffee te hi thingbuk zar hliah hnuaih chin tur a ni a, nisa lutuk hnuaih an tha thei lova, chuvang chuan ngaw hnuaih an ching tlangpui, ngawin hliah khuh nasa lutuk tur ven nan ngaw a thingzar te chu thlakin an ti thawl mai thin a ni. Thingbuk hliah khuhtu a mamawh tho vang hian sum chang thei chi thing phun a, nakin hun thlira ruahmanna fel tak siam tur a ni. Rubber te hi an lian duhin an sang thei hle a, khat deuh hleka phun chuan coffee nena chinpawlhi chi tak a ni.

### **Hnim sam fai :**

Coffee hmun hi thlasik lai October- December vel hian sam fai fo a tha a. Hnim lutuk a dah loh tur a ni. Thlasik laia sam hian hnim than a ti thu thin a, thil tih chi tak a ni. A theih hram chuan hlo kahna ang chi hi hman loh theih a tha hle a. Coffee thlai te hi rei tak daih tur an ni a, hlo kahna damdawi kan hman nasat lutuk chuan lei thatna a ti chhe thei a, kan coffee in rei a daih theih nan leh hrisel tak a lo nih theih nan chemical fertilizer leh hlo tur lam hman tam loh a tha.

### **Natna leh enkawl dan :**

Coffee hi rannung thenkhat ten an ti chhe thei a, chung zinga lar zual te chu Berry borer, White stem borer, Shot hole borer beetle, Green scales leh mealy bugs te an ni. Tin, heng natna hrik te hian coffee an bei thin bawk - Leaves Rust, Black rot or Koleroga, Collar rot, Brown eye spot. Coffee Arabica hi kan ram in kan chin remchang ber anih avangin Arabica natna lar zual te lo tarlang ila :

**1) Leaf Rust :** (A hnah ti rautu) A awm tir tu hrik chu *Hemileia Vastatrix* a ni.

A ven dan : Fungicide, 0.5% Bordeaux Mixture a coffee hnah hnuailam kha (spray) a tha.

**2) Black Rot :** A hnah dum tawih a ni. A awmtir tu hrik chu *Koleroga noxia* a ni.

#### A enkawl dan :

- 1) Coffee shade tree tih thawl deuh tur a ni.
- 2) Coffee buk tih en deuh (centering) tur a ni.
- 3) 1.0% Bordeaux Mixture in fur ruahtui tlak hmain kah a tha.

**3) Brown eye spot :** A hnah ro a bial kulh kulh. A awmtir tu hrik chu *Cercospora coffeicola* a ni a, nursery chung nei tha loah a tam.

#### A enkawl dan :

Hei pawh hi Black Rot vei enkawl anga enkawl tur.

**4) Root Rot** : A zung lam natna leh eitu a ni. A hrik chu Fomes noxius te, Nematode te an ni.

A enkawl dan :

He natna in a ei chu coffee hnahn a lo eng tial tial a, a tlakawlh a, a tawpah a kungpui a thih phah thin. A ei chhiat coffee chu a zung nena phawi a, hal ral vek a tha. A khur ruak chu Brodeaux mixture a kah a, thla khat vel hnuah seedling thar hrisel taka thlak mai a tha.

**5) Berry Blotch** : A rah pang ro a ni a. A hrik chu *Cercospora coffeicola* a ni. He hrik in a ei chu a rah hring kha alo buang deuh a, a lo val bial thluah thlauh thin.

A enkawl dan :

- 1) A rah kha ni in direct taka a en loh nan shade buk deuh siamsak tur a ni.
- 2) 0.5% Bordeaux mixture a September thla a kah a tha.

**6) Stump Rot** : A kung mawih a ni. A awmtir tu hrik chu *Fomes Noxious* a ni.

A enkawl dan :

- 1) Coffee shade tih pan deuh a ngai.

**7) White Steam Borer** : He hrik pawh hi a kung nget tho a ni a, Coffee huan hmelman lian leh lar tak ni.

A enkawl dan :

Coffee kung kha BHC tuiin hru chhuak (BHC Swabing) vek ila, tichuan coffee kungah an tui ngam lo ang. Teak thing hi Coffee Steam Borer in hnang fakna (alternate hose) anih avangin teak hmun bula coffee huan neih a him lo a ni.

A seng hun :

Coffee rah lawh hun hi a tlangpuiin November thla tawp lam atanga December thla pum te a ni a, a chang chuan January thla kai changte pawh a awm bawk thin. Coffee te hi an par atanga thla 6-8 in kar velah seng theihin a awm thin a. A rah hi lawh dan chi hniah a awm a, pakhat zawk chu kut a hmin hmaa apiang vai a lawh a ni. Hei hian coffee seng nan hun leh tha tam tak a mamawh a, amaherawh chu coffee tha leh tui ber ber a lo chhuak thin a ni. Tin, pahnihnaah chuan coffee zar te chu thliakin coffee hmin leh hmin lo pawh an lo vek thin a, hei hian coffee tui lo leh tha lo chi a siam chhuak thin a. Mahse a awlsam a, khawl hmaingin a tih theih avangin tha a heh lo hle a ni. Coffee quality tha nei tur chuan a hmin leh a hel hi thliar hran vek tur a ni.

**Seng hnu a sawngbawl dan :**

Huan puitling (Established Estate) ah chuan Coffee rah lawh hi round thum/round li lai an nei thin.

- (a) A hmin hmasa lawr hi (Fly Picking) an ti a.
- (b) A hmin tam tawh, mahse a hmin kim hmaa lawh hi first round an ti a.
- (c) A lawh runpui hnuhnung zawk hi second round an ti a.
- (d) Third round leh Final round-ah chuana rah la awm zawng zawng peaberry te, a hel te, sun burnt te leh sava ei hek te nen lam an lo vek thin.

Heta tang hian coffee quality chu a inthen nghal thlap a ni tih kan hmu thei ang. Coffee lawh dan round hrang hrang a awm angin coffee quality pawh a insiam nghalin, a,b,c,d te khi chu an quality a sang deuh ngei anga, tin, Pulping Machine ah an kheh fai ang a, Clean Coffee

Bean Packing a nih ngei ang. Amaherawhchu (d) khi chu a pil pawh kheh theih anih loh avangin a nih ang ang khian Drying Yard ah an phoro ang a, Coffee Cherry (a hum ro) packing anga hralth loh theih loh a chhia a ni.

Tin, Coffee tihrona hi drying yard a ni a, nikang lam van hawng zau deuhah cement concrete in an siam thin. Mizoram-ah chuan pawisa harsat vang bawkin hetiang drying yard hi kan siam thei lova, Zopa buh phona angin dapin kan siam ber thin a ni. Mahse concrete drying yard emaw, leirawhchan phah cement-a zut mam tluka tha a awm lo.

#### **A hralthna :**

India rama coffee te hi thawn chhuah tura hisap nimahse coffee chingtu tam tak chuan ram chhungah hralthna tha tak an hre mek tawh a,. Khawvel changkang zelah miin coffee in te kan uar chho zel a, kan coffee ei ral zat pawh a pung chho ve zel a ni. Kum 1998 khan India ram hian coffee matric ton 50000 chiah kan in ral a, kum 2011 ah chuan kan inral hi a lo pung nasa ta mai a, matric ton 115,000 lai a lo kai chho ta a ni. Tunlaiah chuan coffee zuar leh hralth lampang ti thin ramchhung leh pawnah an awm ta teuh mai a. Heng Lavazza, Café Coffee Day, Costa, Gloria Jean's Coffee, Coffee Bean & Tea Leaf leh Tata Global Beverages te hi han lar zual deuh te chu an ni. Heng mite hian India rama coffee chingtu te tan hma nasa takin la chho zel anga, coffee pawh manman zawkin kan la hralth theih ngei ang. Mizoram chhungah ngei pawh Central Coffee Board chu Bualpui khuaah awmin coffee quality tha zawk kan thar chhuah theih nan leh awlsam zawka kan hralth theih nan hma an la zel a ni.

## **HMUNPHIAH :**

Common name	: Broom Grass
Scientific name	: <i>Thysanolaena maxima</i>
Family	: Poaceae
Variety	: N.A

Ramngaw leh ramhnuai thing atanga kan hmun ni lem si lo thil thenkhat te pawh hi hna tha tak siamtu leh sum lak luhna tha tak an ni thei a ni. Amaherawhchu an chindan leh enkawl dan erawh a danglam deuh thei. Kan ram mamawh leh kan leilung leh ram neih a zirin kan thil chin tur pawh kan thlan uluk tur a ni. Hmunphiah hi chung zinga sum hmuh theihna thlai pawimawh tak North East chhunga kan uar em em, a par kan hman tangkai tak si chu a ni. A par mai bakah, a kung leh a zung te pawh tangkai takin a hman theih vek a ni.

### **A kuitiah dan :**

Hmunphiah hi a chi siam chawp leh ramhnuai atanga laka phun sawn ang chi hmangin a tihpun theih a. A chi hi March thla velah a lak theih thin a, heng atang pawh hian neih theih a ni. A chi kan kuitiah tirna hmun tur chu 2 m x 1 m vela sei leh zau nursery bed ah ni se, a bed pakhat zelah khan 5-10 gram a chi dah tur. A chi kha vaivut tlema vura emaw lei emawa vura, kan dahna hmun pawh hnime hnah hmanga khuh thlap tur. Tin, chu chu tui pek a ngai ve bawk. Kar hnih emaw thum emaw velah a lo tiak thina, a tiah hnuah chuan hnim kan khuhna kha laka mumal taka tui peka a awmna tihfai bawk tur.

Kar li atanga kar ruk hnuah kan dah khawmna hmun atanga lak sawn tur, hmun zau zawk 10 m x 10 m vel a zau ah phun tur. Ramhnuai/phunsa atanga kan lak dawn erawh chuan hmunphiah kan keh tawh hnu atangin a zung laih chhuah a, a zung achin chunglama 15-20 cm vela sei a tan tur. Kan phunna hmuntur ah chuan kung hnih/kung thum vel zela phun tur. Kan phun sawn lai hian lei a hnawng tha tur a ni. Hetiang a zung nena laka phun sawn hi hmunphiah chi lak nan a tha leh awlsam tak si chu a ni. Hmunphiah hung atanga a tuai-te-rek lo awmve hi a chi atan a tlak loh. A puichang tha chauh puanchhuah atan a tlak a ni.

### **Sik leh sa, lei :**

Hmunphiah hi a thanlen nan leh chinna hmun tur atan hmun tha tak a ngai lem lo a, tuipei zawl atanga 2000 m velah nithei se. Hmunawl rem laiah te, ram tha vak loah te leh lo atana kan duh loh ang chi ah pawh a chin theih vek a. Tin, lei ro lai atanga lei hnawng thlengin a tha duh vek bawk. Khawkheng, boruak lum leh vawt lutuk leh ruah tui tam lutukna ram angah te pawh a chin theih viau tho mai. Lui kam leh hmun rual rem lo laiah pawh a tha duh em em tho. Tin, thlaidang an that duh lohna hmunah pawh hmunphiah chu a chin theih viau zel mai bawk. Hmunphiah chinna hi kum nga hnuah thlak ve zel a ngai a, a kum khatna leh a kum nga na ah hian a tharhlawk lo thin, kum hnihna leh kum thumna hi a thar hlawk lai ber a ni thung. Hmunphiah chin hi a kum khat naah chuan mihring tha a ngai tam deuh hlek a, a hnu zelah erawh chuan a ngai tawh vak lem lo thung.

### **Leilung sawngbawl leh a phun dan :**

Fai taka lo vah a, perh te leh hruizam pawh/phiih fai vek tur a ni. Hal hun pangaiah lo chu hal tur a ni. Kangvarah thlam rinawm tak sak ngei a ngai. A kumhnhna (2) naah hmunphiah in sak a ngai. Hei hi hmunphiah tihro nan emaw phoro tawhsa dahkhawm nan hman tur a ni. Hmunphiah chu humhalh a, luang leh rairuang te chu a bulah kar emaw hlotur ‘weedicides’ a kahhlum tur a ni.. A inkar zau zawng chu 2.5 m x 2.5 m vel hi hmun zawlah chuan duhthusam a ni. Tlang ram bikah chuan Contour terrace ft. 9 danah feet 3 ( leivung tel lovin ) vel a zau laih

tur a ni. A chi 1600 vel zel hi hectare khat a zau ramah a chin theih. Terrace zawl thungah erawh chuan 1.5m x 2.0m a inkar hlat zawngah a hman theiha, Hetiang spacing ah hian 2,500 – 4000 seedling /Hectare khatah a phun theih.

#### A chi tha :

Hmunphiah chi thum Mizoramah hian kan nei a. Mahse, a tharchhuak tam thei ang ber chi a sawngbawl erawh tih a ni lo thung, a chhan bulpui ber chu Mizorama hmun phiah chingtute ah hian nursery siama uluk taka a chi buaipui an awm lo a ni. Mizoramah chuan hmunphiah te hi a tlangpuiin a kung atanga tla a chi te a tangin a lo awm darh tlangpui. A chi hi dan naranin Februry leh March velah a puitling thin a, a chi te hi an zan em vangin thliin a len darh nasa thin hle bawk.

#### Hnim sam dan :

Phun tawh hnuah chuan hmunphiahte hi enkawl zui lutuk a ngai lem lo. Amaherawhchu, hlawk tak a thar tur chuan a kumkhatnaa vawi 3 emaw 4 emaw a hmun tihfai ve a, a awmna lei that ve deuh dan turtre ngaiituah ve a ngai. Chutianga a kum leh zela tih peih chuan a thar hlawk hle. A hmun vawi hnih kan tihfaina ah khan leitha han pe ila, chuchuan a kum khatna thar hlawk lo tur pawh a veng thei hle bawk. Tin, ran ten an tihchhiat loh nana hung hi finthlak bawk.

#### A seng hun :

Hmunphiah keh hi January thla-ah tan ni sela Febuary thla thleng pawh kai ila a pawi. Hmunphiah hralth tur keh hian, a parah hum a pawh dawh mai theih an nih lai hi a hun dik tak chu a ni. A hmin hnuah chuan a par chu a sen emaw a hring eng lamah a rawng a inthlak thin. Keh hun a thlen chuan a kung bul lei hnaih lamah tan tur, a kung leh a par kan la hrang ang. A hmin that chuan a par atangin a pawh dawh daih theih. Phoro hnuah phiah khatah kuang 30-35 vel dahin bazaraha a zawrh mai theih. Tin, a kumhnihna atangin August thla velah a hnah hi ranchawah a lak theih bawk.

#### Seng hnuah sawngbawl dan :

A hmunphiah lai tur chin kan lak tawh hnuah chuan ng het vak lova tawn khawm a, nisaa pho ro tur. A ro hnuah ng het tako tawn khawma zawrh chhuah mai tur. A hnah leh kung te hi tangkaiah hmanna tur atam hlea ranchawah te leh fuel siam nan te pawh mau ang tho in a hman ve theih ani. Tin, hmunphiah hi ramtha lo laiah pawh a chintlak tho avangin ram rualrem lo lai hnawh khah nan a tha hle a, lei chunglang tha luang ral tur a ven mai bakah sik leh sa mumal lohna hmunah pawh a chin theih em em ani.

#### A hralthna lam:

Hmunphiah hi chhung tin ten kan mamawh anih avangin mamawhna sang hle maia, ramchhungah hian a hralthna ah chuan buaina tur awm lo tura ngaih a ni. Kan tharchhuah tam ber hi chu hlawk tura kan thar nilo in kan dam khawchhuah nana kan thar atanga kan hmuuh leh ramngaw hmun darh sarh tak tak atnaga kan neih te an ni hlawn tlang pui. Chu chuan hmun khat atanga hmundanga hralth tura ken kual naah buaina nasa takin a siam a ni. Tin, a tam lai chuan leisen loh khawpin a tam thin thung, chuchuan a man nasa takin a tihniham thin. A hlawa hralh leh zawrhnaah hian a zuar chhuaktute an hlawk em ema, a man an thunun theih avangin a tharchhuak tute hnen atangin tlawmte in an lei a, marketah to tak takin an hralth leha, a hlawkna tam ber chu kharchhawngtute hian antel ani. A thar chhuak tute leh a tharchhuah zelnaa hmasawn tur chuan ng het tako sawrkar lam leh Forest lam hotu te leh a tharchhuak tute pawh an tanrual angai ani.

## **KUHVA :**

Common Name	: Arecanut
Scientific Name	: <i>Areca catechu</i>
Family	: Piperaceae
Variety	: Subamangala, Mangala, Sumangala, Mohitnagar, Hirehalli dwarf, Samruthi, VTLAH 1. 2, Thirthahalli dwarf and Srimangala

Kuhva hi Mizoram leh kan chhehvelah te nasa takin kan ei a. Mizoram chhungah pawh kuhva ei hi mipui tam zawk kan ni awm e. Hetiang khawpa eitu kan tam avang hian kuhva huan siam hi a hralthna a lungngaihthlak vak lo a ni.

## **A kuitiah dan :**

Lei laih khuara dah te, tukri-a dah te, buara bag-a khunga dah a, a uingho (tiak) hmasa apiang bed/phunna hmuna phun nghal mai a theih vek mai. A chi hmin tha pangai kan lak turah chuan 35 gram aiin a zang ani tur a ni lo. Nursery bed pangngai siamsaah insi thapa a hmun van lam hawia dah tur, thingzai nawi leh lei dipa inches khat vela chhaha vur tur, chumi hnuah di, buhpawl, hnime hnaha khuh tur, tui hneh tako pek reng tur a ni. Tui pek that loh chuan kuhva kha a ro a, a sawng te a, tiak mah se a fere bik. A tiah hun hi a inang lova, thla hnih atangin a tiak tan a, thla li hnua to ve te pawh a awm thei.

A to hmasa apiang kha secondary bed 150 cm vela zau leh a inkar hlat zawng mawi tawk vela phun sown tur. Tin, kan phun sown hnuah bawng ek lei tha a chawm zui tur, Secondary bed hi chu Nursery bed pangngai anga siam a tul hrarpa lo. Tin, a to hmasa apiang hi a hmun tur, a khur kan laihsaah a phun nghal mai theih bawk.

## **Leilung ngeih zawng :**

Lei tak tha leh nghetphai lei ban hmunah a tha duh a, sawn tlung lei-lei sen ang chhiah a tha duh bawk. Tin, lui tui leh tuipuiin a hnawl lei ang chi ah te pawh a tha duh hle bawk. Chung zawng aia a that duhna chu thlai tawih leh hnime tawih tamna lei emaw lei tui pai tam reng lohna leiah a tha duh. Phai boruak lum leh hnawng tamna a tha ber. Ruah tui tlak tamna leilungah a tha duha, kum khat chungin 750 mm atanga 4500 mm rauhtui a mamawh a ni. A phunna hmun tur hi tuipui zawl atanga teha 2475 feet vel asang ni thei se. A than len nana khawlum dan/ vawh dan zawng duhthusam chu 15°C atanga 40°C a ni.

## **Leilung buatsaih dan :**

A hmasa berah chuan a phunna hmun tur vah/sam faia hal phawt tur. Chumi hnuah a lei chu vawi hnih tal leh tur, chu chuan a hmaa thlai/hnim lo awm tawk sa atanga buaina lo awm thei a ti bo dawn a ni. A tiak phunna hmun leh thlai kha nisa lutuk in a em ro theihna hmun a ni tur a ni lo, tlak-deng nisa lutuk in a em tur a ni lo bawk. Chumi veng thei tur chuan thing thang duang tak kuhva tiak phun hma in phun hmasak a fuh. Tin, phunna hmun tur thlan thiam angai hle bawk. Hmun hnawng leh huh a tlakchhamna hmunah chuan a chhe hma hle a, chuvangin tui kawng tha tak leh tui an hniang hnarna theihna hmun ah phun ngei tur. June leh December thla inkar hi a phun nana hun tha ani.

## **A phun dan tur :**

A hmasa berah chuan a tiak bul hnaiah tak-deng ni in a chhun theih loh nan thing thangduang hlim tha tawk tak nei thei tur phun hmasak tur, chu chuan ni sa in a em chhian theihna tur lakah a tiakte chu aveng ang. A phunna tur khur chu feet khat a zau feet khata thuk (1

feet x 1 feet) a laiha, a in kar zau zawng chu 9 ft x 9 ft ( feet kaw danah a ni tur a ni). Tin, a mawng phah atanga 15 cm vel lei chunglang leitha dah tur, kan thlai phun tur chu a khur lai taka daha leia vur tur. Leiin tui a pai reng loh na lei lungah chuan (well drained soil) May leh June inkaran phun zawk tawh tur, tlak lei leh lei ban hnawn na hmunah erawh chuan August leh September inkaran zawk tawh a tha thung, hei hian leia tui tam lutuk tur a veng thei ang. Kuhva kan phun atanga kum li atanga kum nga thleng chu a inkaran balhla a phun theih, hei hian a tiak te chu hlim a pe thei dawn ani.

#### **A chi that dan leh thlan dan :**

Thiethahalli dwarf leh Srimangala te hi India ram chhunga kan chin lar deuh te chu an ni a. A chi tha leh tiak tha thlandan tur chu kum khat atanga kum khat leh a chanve vela upa, hnah kau panga aia tam nei chin leh a kung hniam te te si thlan tur.

A dang lehah chuan, a rah lian leh bawr tha, a kungah pawh kau li aia tlem lo rah thin. Han sah phela a nget dummin a pawlh loh a tak lian tha leh kawr pan. A kung upa, kum 20 aia naupang lo, a kung him dam tha a ni tur a ni. Hetiang a ni tih hriat loh chuan phun loh mai a tha zawk. A chhan chu tlakdeng ni sa lakah venhim a tul a, ni sa lutukin a em lohna turin hmun daihlim deuh thlan a tha

#### **Hlo thlawh fai dan tur :**

Pangai tak leh hun bi neitaka kan phunna hmun tihfai hi thil pawimawh tak a ni a, hei hian hnime leh hlo lakah kuhva tiak te kha veng him dawn a ni. A hmun thlawh fai hi kum khatah a tuldan a zirin vawihnih emaw vawithum emaw thlawh fai tur. Nipui ruahui tla a zawk hnua a bul hnai han rih dur vel hi a ngeih hle a. Tin, a kung thi leh a hnah ro chu pah zel tur. Bawng ek emaw leitha emaw hmanga a kung bul han vur/khuh(mulching) hian leitha kal ral thei leh hlo in a tihbuai theihna lakah nasa takin a pui ve thei bawk. Tin, lei chhawrdawh(terrace) siam pawh hi lei tha luang ral tur venna tha tak ani. Tin hei hian kan tui pek leh thlai tui dawn luang ral zung zung tur nasa takin aveng ve bawk.

#### **Rannung leh natna laka ven dan :**

Kuhva hi rannung eichhe thei leh natna lakah ven uluk a ngai em a, a tichhe thei rannung leh natna lar zual deuh te chu tar lang ila, mites(hrik), spindle bug, inflorescence caterpillar, root grub leh adangte. Natna lar zual deuh te chu - koleroga, bud rot, basal stem rot leh adangte. Heng natna leh rannung eichhe thei laka veng him thei tur leh a natna leh eichhe thei rannung hrechiang thei tur chuan sawrkar department lama mithiam te zawk fiah a finthlak hle.

#### **A rah seng hun :**

Kuhva hi a puitlin tak tak nan chuan kum 4 atanga kum 5 vel a ngai. A rah tan tirh chuan a rah chu a hrung a, a rei deuh hnua a eng deuh, a hmin tak tak hnua erawh chuan a rah sen thin. A rah tan tirh atanga thla riat atanga thla kaw hnua an puitling hman tlangpui. A kung khat hian kum khatah a rah/par bawr pali atanga panga nei tlangpui.

A hmin hnua a rah seng hun chu bazar leh a leitu turte lamin an duh hunah a inngat ber a. A hmin tir uluk taka sawng bawl leh a ngai, a hmin tir te chu July atanga December inkar velah an seng tlangpui. A rah hi a chan lai leh a no laiin lawh thin a ni, a no laiia thar duh chuan December leh March inkar velah emaw May leh July inkar vela lawh tur a ni.

#### **A rah seng zawk hnua sawngbawl zui dan :**

A rah lawh zawk hnua dahthat hi thil pawimawh tak pakhat a ni. Mahse kan dahthat chhung hian rannung leh hrik eichhe thei tam tak an awm reng a ni tih hriat reng a tha. Chutiang eichhe thei te pumpelh thei tur chuan 0.5% Lindane tuiah buara ip chhunga thun chungin chiah

tur. Lindane tuia chhiah buara chhunga thun hian rannung leh hrik eichhe thei lakah thla 5-6 vel a venghim thei. Tin, phostoxin tablets hman pawh hi rannung leh hrik ven him nan chuan thil tha tak ani bawk.

#### **A hralthna :**

Kuhva hi sumdawnna atana thlai chin hlawk tak a ni, a zawrh leh hralthna lam hriatchian hi thil pawimawh tak a ni bawk. Asia khawmualpui ram pakua te chuan chin nasat ah an nei hle a, India hi kuhva chinna ram hmang zau ber kan ni nghe nghe a, a dawt chiahah Indonesia a awm bawk. Tin, kuhva chingtute pawn a hralthna lama a hlawk zia an hmu ve zel bawk. India ramah coffee mamawhna a pung chho zela, chutiang bawk chuan kuhva mamawhna pawh pung hluia tla leh duai duai tura ngaih a ni lo. Chuvangin a hralthna lamah chuan buaina a awm lo tura ngaih a ni.

#### **Tuikhuah :**

Tuikhuah hi thlam bul ni ngei se, ruah tui khawl hi thal nisa leh khaw ro laka veng turin kuhva kungte pek tur a ni.

#### **Thlai dang nen a phun :**

Kuhva te hi kum hnih khat leka puitling zung zung an ni lo a, an puitlin hun chhung a rei tham avangin phun tirh atanga kum 3 leh kum li vel lai chu pawisa lak luhn tur a siam bawk si loh avangin a kar laka thlai dang phun (inter cropping) hi ngaihdan finthlak tak a ni. Lakhuihthei, panhnah, balhla, sawhthing leh thlaidang dang phun a theih a. Chutih lai chuan kan thlai chin ho kha uluk taka leitha nena enkawl vek tur a ni. Sum lalut lo thlai leh thing te chu sum la lut thei chi thai hmanga thlak a fuh hle. Chu chuan kan huan thlai thar leh sum hmuh a ti pung dawn a ni.

## OIL PALM :

Common Name	:	Oil Palm
Scientific Name	:	<i>Elaeis Guineensis</i>
Family	:	Arecaceae
Varieties	:	Tenera ,Dura,Pisifera

Oil palm hi thlai kumhlun leh hriak ngah tak mai a ni a. Oil palm atang hian hriak chi hnih an la chhuak thin a. Pakhat chu oil palm rah (fruits) atanga lakchhuah a ni a, hei hi Palm oil an ti a. A dang leh chu oil palm mu (seed) atanga an lak chhuah a ni a, hei hi palm kernel oil an ti deuh bik kher thin. Oil palm hriak hi a ei theih a, tin, enkawl uluk chuan a thar hlawk hle a ni. Tum thing lamah chuan a hlut em avang hian Golden Palm tiin hming lem an vuah nghe nghe a. India rama kan hriak lakluh tam lutuk tur lo vengtu ber a ni ve a ni.

### Sik leh sa, lei :

Oil Palm hi hmun lumah a tha duh. Ruahtui thla khatah 150 mm emaw, kum khatah 2500-4000 mm a mamawh a. Ruahtui tlak mumal lohnaah chuan a than a tha mawh hle. Tui pek theihna hmun a chin a tha. Temperature 22°C-33°C inkar velah a tha duh hle. Kan ram boruak mil tawk vel a ni. Eng ang leilungah pawh a chin theih a, hmun hnawng, tui hul, lei thawleng tha, hnime hnah tawih tamna hmun a ngaih leh zual. Duhthusamah chuan ni khatah darkar 5 zel ni eng in a chhun tur a ni.

### A chi kui tiah :

Oil palm hi a chi atanga tih pun a ni ber a, a rah chang atangin a chi chu la chhuakin temperature 40°C ah ni 75 vel an dah phawt a, hei hian a ti tiak hma hle a ni. Hemi zagh hian tui luangah tihu lehin ni 4-5 vel an dah leh a. Hemi zagh hian nursery bed ah dahin ni 10-12 inkar velah a lo tiak tan a, chung tiak te chu poly bagah dim taka sawn luh tur a ni.

### Leilung sawngbawlo dan :

A hmun tur vah leh hal a hmasa ber a, chumi zagh chuan khur feet 2 a zau leh feet 2 a thuk, meter 9 dan zelah laih tur a ni a. Khur hi phun hma daiha laih lawk tur a ni, nisa te lo em tir char char tur. A hmun hi thlawhfai ngun a ngai bawk. Tin, a kung bul vel han leh dur hi a tha ve hle. A tiak tha chauh phunsawn tur a ni a. Kan phun hian lei vur zagh velah tui pek nghal tur a ni. Oil palm phun hun atan June thla hi duhthusam a ni a, mahse December thla thlengin a phun theih. Thlasika phun chu, tui pek a ngaih avangin a buaithlak deuh.

### A phun kar hlat zawng :

Oil palm tiak hrisel tha, kum khat vela upa ni thei se. Tin, metre khat vela sei leh hnah 12-13 vel nei hi phun sawn atan chuan duhthusam a ni. Kil thum neia phun hi a lar hle a, a bi inkar hlat zawng hi metre 9 tal a ni tur a ni. Ram hectare khatah hian metre kua dan zela kan phun hian kung 145 vel lai a phun theih a. Tin, phunna tur khur hi feet hnih bial a zau, feet hnih vela thuk a ni tur a ni.

### A chi tha :

Oil palm hi chi hrang hrang a awm a. Heng Tenara, dura leh Pisifera te hi khawvek hmun hrang hranga chin an ni a. Dura (a kawr chhah chi) leh Pisifera (a kawr neilo) te inthlah pawlh tir atanga siam chhuah, khawvela chin lar ber a ni. Kawr pan te, tak ngah tak leh hriak (oil) ngah tak a ni. Dura hi chu zawrh sum atan an ching ngai mang lo a, tin, Pisifera pawh hi a thar hlawk lutuk lem lo. Tenera hi khawvel hmun hrang hranga chin lar ber a ni.

### **Hnim samfai :**

Oil palm hmun hi kuta thlawh emaw, damdawi hmanga kah theih a ni a. Kuta thlawh hi tha zawk mahse a hautak em avangin tunlai chuan hlotur hmanga kah hi a tam hle. Damdawi hmanga hnimek hi kan kah dawn chuan mithiam te rawn hmasak zel tur a ni a. Mithian ten hman zat tur an tih aia tam hman reng reng loh tur. Tin, hnimek to tur vennan hian oil palm kung bul leh a chhehvel lei chu a khuh theih bawk. A khuh nan hian silpoulin emaw oil palm hnah leh kau pahih hun tawh te pawh a hman theih a ni.

### **Rannung leh natna :**

Oil palm hian natna hrik leh rannung beitu a ngah ve hle a, heng Pestalotiopsis leaf spot, Ganoderma butt rot, Bacterial bud rot, Oil palm wilt, Rhinoceros beetle leh Mealy bugs te hi oil palm tana ven ngai natna leh rannung te an ni a. Kan oil palm huanah diklohnna engemaw a awm anih chuan kan hnaih ber Agriculture department ah zawhfiah vat tur a ni.

### **A rah seng :**

Oil palm hi kum thumna velah a rah tan a. A rah, a lawh hun tak a lawh tur. Hei hian a hriak that leh that loh, a hlawk leh hlawk loh a hril em em a ni. A rah lawh tlak zawng zawng lawh fai vek tur. Tin, lawh laiin a hriak hlauh lo thei ang bera fimkhur tur. A rah lawh hun chu :

- i) A rahte chu serthlum rawng a lo nih in.
- ii) A rah pali panga vel amah a leia a tlakin.
- iii) A rah chu kuta hmeha hriak a lo chhuahin.

A rah lawhin a kung 5 cm aia sei zuah loh tur. A rah chu ni 10-12 inkar dan a lawh tur. Fur lai chuan ni 6-7 danah lawh tur. Thlai naupangah chuan a rah bawr a tam a, a buk rit lo. Kum upa ah chuan a rah a bawr tlem, a buk a rit thung.

### **Thlai dang nen a chin kawp :**

Oil palm te hi inkar khat tak tak chin thin an ni a. Heng a hmunawl te hi a tir kum thum chhung chu thlai dang chin nan a hman tangkai theih a. Heng a kar awla chin chi te chu chuktuah huana kan chin heng hmarcha, bawkbawn, vahlo, sawhthing leh lakhuihthei te hi an ni a. Oil palm hnaih lutuk lei te chu oil palm zung kan tih chhiat theih avangin cheh emaw laih dur emaw loh tur a ni.

### **A hralhna lam :**

Eng thlai pawh hi a hlawk leh hlawk loh chu kan chinna ram that leh that lohah te, ram boruak a zir te leh a chi kan phun a zir te a ni a. Oil palm hian dan pangngaiah chuan ton 12 hi hectare khatah kum 5 hnu velah a thar chhuak tura ngaih a ni a. Kum 8 vel hnuah chuan ton 18 vel thar chhuak tura ngaih a ni. India hi palm oil ah hian a intodelh hrih lo a, chuvang chuan ram pawn atangin a lalut reng a ni. Rampawn a tanga kan lakluh te ti tawp tur hian nasa tako oil palm thar chhuah lamah hma kan lak angai a. India hian kum khatah oil palm ton 70000 vel a sawngbawl thin a, chu chu khawvel pumpui a oil palm thar chhuah 0.2% vel lek a ni a. Chuvang chuan oil palm hralhna hi a la tha dawn chauh niin a lang.

## **THELRET (RUBBER) :**

Common name	: Rubber
Scientific name	: <i>Ficus elastica</i>
Family	: Euphorbiaceae
Variety	: Tjir 1, PB 86, BD 5, BD 10, PR 17, GT 1, RRII 105, RRIM 600, PB 28/59, PB 217, PB 235, RRIM 703, RRII 5, PCK-1, 2 and PB 260.

Rubber hmanna hi a tam hle a, sikul naupang nawhrehna atang motor ke siamna thlengin rubber vek hman a ni. Khawvel industry lian leh hlawhtling te pawh hian an thil siam chhuah nan rubber hi NASA takin an mamawh a, an la mawmawh zel dawn chauh a ni. Rubber kung puitling hi metre 30 vel laiin a sang thei a, phun atanga kum 6-7 na velah thar theia ngaih a ni. India hi rubber thar chhuah tam lamah khawvelah pathumna a ni a. Tin, India ram state ah chuan Kerala hian a thar chhuak tam ber a ni.

### **A kui tiahna :**

Nursery hi thlai chi tin tiah nan te, thlai tiak lo enkawl lai lawknan te a tul a. Nursery siamna hmun tur atan hian eng hmu tha leh lei rual rem deuh thlan tur a ni a. Lei tha leh thawleng, tui pai rei lo chi thlan a fuh. Thlai chi tih tiahna tur hmun germination bed hi 120 (4 ft.) vela zau, a sei zawng chu a remchan dan ang ni se, 15 cm vel a pawng a hai vum tur a ni a. Hemi chungah hian a theih chuan balu lei 5 cm vel rual taka dah leh tur a ni. Hemi chungah hian rubber chi te chu insi thapa daha, buara emaw buhpawl emaw a khuh leh tur a ni. Ni 6-7 velah a lo tiak a, a tiak hmasa apiang chu secondary nursery ah sawn mai tur a ni a. Secondary nursery ah hian 30 cm vela inhlata dah tur a ni. Secondary bed ah hi chuan thlai tiak dah tur te kha a lo khah deuh tak avangin lian deuh hlek leh sei deuh hleka sak a tih chi fu. Secondary bed hi thuk deuh hlek thlenga cheh dur a, lung leh thlai zung lo awm te pah bo vek tur a ni.

### **Sik leh sa, lei :**

Rubber hian leitha leh chaw tha a mamawh, chuvang chuan thlaitawih pai tam lei ah a tha duh. A chinna hmun hi lei thur lutuk lo, a pH pawh 5- inkar vel lek leh lei sakhat lutuk lo, tui luanral zung zung theih na a ni tur a ni. Rubber hian ruautui tlak tamna hmun leh lum, hnawng bawk si a mamawh bawk a. Kum khatah ruautui 2000 mm-3000 mm tal tlakna hmun leh ram hnawn lam (humidity) 75%-80% vel hi duhthusam a ni a. Tin, temperature pawh hi 20°C - 35°C vel a ni tur a ni.

### **Leilung sawngbawl leh a phun karhlat zawng :**

Rubber chinna tur ram chu vahfaia hal tur a ni. Lo hal fai zawh tawh hnu hian ram awih tlan dan a zirin contour terrace 25 ft danah 6 ft vela zauin lei luangral tur leh hnawng humhalh nan laih tur a ni. Khur 2.5ft a thuk 2.5ft a zau contour terrace-ah 10ft inkarak Rubber phunna tur laih a, lei chunglang hang tha leh ran zun leh ek chawhpawlha vur leh tur a ni. Rubber chu khur lai takah phun a, hnimhnaha khuh hnawn tur a ni. Ram zawlah chuan square planting system-a phun a tha a. Tlangram leh ram remlo kan ram angah chuan contour line a a tlara phun kha a tha ber a ni. Ramawih a rubber chin anih dawn chuan lei luangral tur venna leh lei tihthat nan leh hnim tinemu atan thlai kawm nei leh zam chi, entirnan Behlawi angte chin tel a tha a ni. Budded Rubber Stump phun dawn chuan Ha.1-ah rubber kung 300-400 phun tur a ni a. A chi kuitiah seedling phun dawn chuan Ha.1ah 445 atanga kung 520 a phun theih a ni.

## **Khuh hnawn (Mulching) :**

Rubber phun tharte chu an la tet avang leh an nun that theih nan an bul velah hnimhnah hring emaw hnimhnah ro emaw in a bul lei vel kan khuhhnawng tur a ni. He khuhhnawn hi ruahui tlak reh dawn lamah tih ngei tur a ni, hei hian lei ro mai tur a veng a, thlai tan hun rei tak hnawng kan humhalh thei a ni.

## **A chi tha :**

Rubber hi chi hrang hrang a awm a. Chung zinga lar zual te chu han tarlang ila; Tjir 1, PRII 100, PRII 200 PR 17, BD 5, BD 10, GT 1, PB 28/59, PB 217, PB 235, PB 260, RRII 5, RRII 105, RRII 414, RRII 430, RRIM 600, RRIM 703 and PCK-1. Heng zingah te hian ; RRII 105, PB217 leh GT1 te eng lei leh boruakah pawh an that theih avangin chin lar nasat ber pawl an ni a. Amaherawhchu tunhnai mai research chuan heng chi PRII 100, PRII 200 leh PRIM 600 te hi thar hlawk ber pawl an ni tih a hmu chhuak a ni.

## **Hnim thlawhfai :**

Rubber huan thlawhfai hi thil tul leh tih ngei ngei tur a ni a, Rubber phun hlimte chu an bul vel a hnim nen hnawngte, ni engte, thlai chawte an inchuh (compete) avangin, heng hnimte hian natna hrik leh thlai eichhetu rannungte tan hmun an siam avangin thlawhfai hi thil tih makmawh a ni. Hlo thlawh hi a hautak a, sum leh tha sen a ngai a, mahse cover crops te an lo len tawh chuan a hahthlak tawhlo a. A theih chuan ‘integrated weed management’ an tih mai hmanga Rubber phun te kan enkawl chuan hnimte kan veng thei deuh ang. Chutiang ti tur chuan rubber phuntirh atanga kuta hlo thlawh leh damdawi hmanga hnim tihhlum leh cover crop chinte nen tangho kawpin hnim/hlo kan tifai thei ang. A chang chuan rubber kung bul vel damdawi hmanga hnim tihhlum leh rubber inkar hnimte thlawhfai ni lova samfai hian sum leh tha sen a tlem an ti bawk. Hlo thahna damdawi thenkhat Diuron, Simazina, Alochor etc. te hi chu hlo thlawh hmaa hman tur a ni a, chutih lai chuan hengho lo thahna damdawi Paraguat leh Glyphosate te hi chuan hnim e.g. Di te angte an chawrno laia suat nan an tha hle a ni. Hlo thahna damdawi hman a nih pawhin fimkhur takin cover crop khawih pawilo tura hman tum tur a ni.

## **Natna leh a enkawl dan :**

Rubber hi rannung leh natna hrik lak ven ngai tho a ni a. Heng rannung te hi rubber tana hlauhawm thei te an ni - Scale insect, Termite (White ant), Mealy bug. Tin, rubber hian natna tam tak a neiin uluk taka enkawl a mamawh hle a, heng natna - Leaf spot, Powdery mildew, pink disease, patch canker or bark cankers, dry rot, stump rot, collar rot or charcoal rot leh brown root te hi natna lar zual deuh te an ni a. Rubber kung chu rannungin a bei emaw, natna hrikin a bei emaw anih chuan rang taka enkawl nghal tur a ni a. Natna in a beiha a lo lan chhuah dan leh a kung hrisel lote hre theia enkawlna dik pe thei tur chuan mithiam te rawn vat vat thin tur a ni.

## **A seng leh sawngbawl dan :**

Rubber thar hlawk leh hlawk loh hi phun dante leh a variety kan chin dan a zirin a danglam nasa em em a. Amaherawhchu eng ang pawn ching ila rubber hian a kum telin a thar hlawk tulh tulh a ni. Kum 15 vela rubber kung a lo upat hian a thar hlawk bera ngaih a ni a. A tlang puiin rubber a tiak atang lian chho ho (seedlings) hian kum khatah kg 375-400 hectare khatah a thar thei a ngaih a nih laiin budded plant ho chuan kum khatah kg 800-1000 hectare khatah an thar thei thung a ni. Rubber hi an hnai thin a, chu chu latex an ti a. He latex hi kawng hrang hrang a sawngbawl thin a ni. Latex thar chhuah tawh te chu kawng hrang hranga sawngbawl turin market ah hrallh thin a ni a. Heng latex kan tih te a lakkhawmna hmanrua storage tank an tih maia hmangin an la khawm thin a. Chu chu a hmun pui lamah kal pui lehin thil hrang hrang siam nan an hmang ta thin a ni.

**A hralhna :**

Rubber hi a hralhna lamah a hlawk em em a. India ramah phei chuan demand a san avangin eizawnna tangkai tak a ni thei. Department lam mi te rawn chunga a hralhna lam kawng zawn a tha.

**Thlai dang nen a chin kawp :**

Rubber kung karah hian sawhthing, aieng, lakhuihthei, balhla leh ramhmul lam damdawi te a chin theih a. Heng hian leilung luangral tur a hipkhawm thin bawk. Tin, lei chunglang hangtha tur te pawh a siam belh a, kawm nei a rahchi chin hian leilungah nitrogen a ti tam thei bawk.

## **THINGPUI :**

Common name	:	Tea
Scientific name	:	<i>Camellia sinensis</i>
Family of tea	:	Theaceae
Variety	:	Camellia sinensis var. sinensis and Camellia sinensis var. assamica.

Thingpui chu thing hnah ro chikhat, mi chawkphur thei leh Mizo ten kan intlang lawn tak a ni. Tui so a thlak a, bawngnute leh chini te nena in thin niin thatho na min petu tha tak a ni. India ram pum puiah hian thingpui hi kan intlang lawn ber a ni awm e. Thingpui hi chi hrang hrang a awm a, heng te hi thingpui hnah kan sawngbawl dan a zir maia lo awm a ni. Thingpui kan tih ber mai *Camellia Sinnensis* atang hian heng green tea, black tea, white tea, herbal tea leh oolong tea kan tih te hi sawngbawl dan hrang hrang hmangin an siam vek a ni. *Camellia Sinnensis* hi Asia ramah awm hmasa bera ngaih a ni a. Tunah chuan khawvel hmun hrang hrang heng ram lumna deuh tropical areas kan tihah te hian an ching mek a ni.

## **A kui tiah :**

Thingpui tiak siamna hmun (Nursery) hi tui thatna bulah ni thei se. Nisa lutuk laka a him theih nan zar hliahna coir-mat hman a tha hle. Nursery lei atan chuan lei tak tha a ni tur a ni. Tin, tuihawk leh luang lak a him theih nan tui luan kawr tha tak siam tur a ni. Nursery a kan lei hman te hi a pH test vek tur a ni a, pH 4.5-5.5 inkar hi duhthusam a ni. Thingpui chi kan han tih tiahna tur (germination bed) chu metre khat vela zau leh 15 cm vela pawng sang tura siam tur a ni. Thenkhat chuan super phosphate te nen lei hi an sawngbawl thin bawk. Nursery bed metre 1.2 a zau leh metre 30 vel sei ah hian thingpui chi hi 20 cm inkar danah zel ching ta ila Thingpui chi 1300 vel lai kan ching thei a ni. Tin, thingpui chi chu polythene/polypot hmangin an ti tiak thin bawk.

## **Sik leh sa, lei :**

Thingpui huan hian ram lum leh hnawng a ngeihin, a thang duh bik hle a. Thingpui thar hlawk leh hlawk lohte, a that leh that lohte hi ram leilung hian a nghawng theih avangin, uluk taka a hmun thlan tur a ni. Tin, thingpui huan hian ruahui tlak thatna hmun leh a luan ral zung zung theihna a ngeih hle a, ruahui tlak tam zawng hi kum khatah 250-300 cm vel ni thei se duhthusam a ni. Ramsan zawng hi ngaiantuah ngai tak a ni bawk a. Thingpui huan tur hian ramsan zawng (elevation) hi 1000-2500 m tal ni thei se a tha bawk.

Thingpui huan hian leitha, tui kal ral zung zung theihna leh thlaitawih tamna ram te hi a ngeih hle a. Duhthusam chuan ram changtha leh lo atana la neih ngaih hi a tha hle. Darjeeling thingpui tui tak leh lar tak paw hi a chhan nia an sawi chu a ramah hian potash leh phosphorus a tam hle a, chu chuan thingpui ah khan tuina (flavour) a pe a ni an ti. Tin, nitrogenous fertilizer chi ho heng ammonium sulphate leh thlaitawih atanga leitha pek te leh lei pH 4.5-5.5 inkar te hi thingpui huan siam dawn chuan hriat reng tur a ni.

## **Ram buatsaih dan :**

Thingpui china tur ram buatsaih hi thil pawimawh tak mai a ni a. Kan siamna tur ram han vah leh hal te, lei kalral nasa lutuk tur veng zawnga leilung buatsaih te, a ram leilunga thil tawp hnawk leh thlai dang zung leh lung te thlengin tih fai vek tur a ni a. Hemi zawn hian lei chu inches 18 vel a thuka cheh phut leh tur a ni a, hei hian thlai zung hlui tawphnawk leh lung lo inphum te tih fain an a tang kai hle a. Tin, thlaiin a ngeih bawk em em a ni. Lei chunglang hang

tha kalral tur ven nan terrace siam hi a tangkai hle bawk. Lei thatna chu thingpui huanah kalral mai lova a awm reng theih nan mana grass an tih ang chi hi hmun thenkhatah chuan an ching bawk a, hei hian kum hnii vel chu lei chunglang leitha kal tur a veng thei a ngaih a ni. Thingpui tiak te chu thla 8-10 inkar vel a upa an nih hunah a phun tur hmunah chuan uluk tak phun tur a ni.

#### **A phun karhlat zawng :**

Thingpui hi chi hniihin a phun theih a. Pakhatnaah chuan kung tin chu khur bik theuh laih sak a phun mai a ni a. Hetiang a phun hi chuan a inkar hlat zawng hi a zau tlangpui a. Pahnihnaah chuan terrace ang deuha line mumal tak nei a laih zawm put a phun a ni a. Hetiang hi chu lei sakhatna hmunah an ti deuh bik a, tin phun dawn pawn bit deuh zawkin phun tur a ni a. Thingpui te hi nursery atanga a tiak laka phun an ni deuh ber a. Ram hectare khata zauah hian terrace line 105-110 cm inkar danah siam ila, thingpui tiak chu 60-75cm vela hlatah phun ta ila, kung 14000-17000 lai a phun theih a ngaih a ni.

#### **A chi tha :**

Thingpui hi chi hrang hrang kan hmu thin a. Khawvel hmun hrang hranah hian green tea, white tea, black tea kan tih ang te leh chi dang tam tak hmuh tur a awm a. Mahse, heng thingpui chi hrang hrang te hi thingpui chikhat *Camellia sinensis* atanga siam vek a ni a. *Camellia sinensis* hi chi hniihah an then leh a, chungte chu *Camellia sinensis* var. *sinensis* and *Camellia sinensis* var. *Assamica*. Mizoramakan chin ang hi chu *Camellia sinensis* var. *Assamica* hi a ni a. *Camellia sinensis* var. *Sinensis* hi China atang lo chhuak a ni a, hmun sang leh zo deuhah an ching tlangpui a. *Camellia sinensis* var. *Assamica* hi chi India rama an chin thin niin hmun hniam leh lum deuh a ngeih hle.

#### **Hnim thlawhfai :**

Thingpui huan hi uluk taka enkawl tur a ni a. Mumal taka hlo thlawh fai leh enkawl hian a thar hlawnka kawngah nasa tak a puih avangin hunbi neia thlawhfai leh enkawl hi tih ngei tur a ni. Kum khatah vawi thum tal thlawh fai thin ni thei se, tin hnim te hi 15 cm aia an san hmain thlawh hman zel ni thei se a tha hle a ni. Hei hian hnim chu par hman lovin a siamin hnim inthlah punna kawng nasa takin a dal a ni. Huan chhehvel hrim hrim pawh hi a theih chuan hnim tam lutuk lo tura thlawh ve thin tur a ni. Kut a hlo thlawh hi hautak deuh mahse damdawia kah aia chuan a tha zawk a, tin hnim zawng zawng fai taka leilung lang rata thlo lovin a then a zar chu zuah hi leichunglang veng turin a tha hle a ni.

#### **A seng :**

Thingpui chu kan chin atanga kum hniih hnu velah chuan lo bukin a chinna hmu lei pawh lang thei mang lovl a lo hliah tana. Uluk tak enkawl leh a zik leh tangte sang lutuk lo tura hlawi anih chuan kum thum hnu hi chuan a thar theih mai a. Thingpui sih hi ni riat kar danah te an ti thin a, tin kum 40 vel thleng thingpui huan hi tha takin a awm thei a, mahse chinna ram leilung leh boruakin a zir a ngai ve hle a ni.

#### **Sih hnu sawngbawl dan :**

Thingpui hi sih zawh chiah anih hian sawngbawl nghal char char ngai a ni a. A hmasa berin thingpui sih te chu tih ro tur a ni a. Chumi zawh chuan sawngbawl dan hrang hrang a sawngbawl zuiin a tih rimtuina leh tih tuina turin thil dangte nena chawhpawl a ni a. Kan sawngbawl dan a zir chuan green tea, white, black tea leh a dang dang te hi a lo chhuak ta a ni.

## **A hralhna :**

India ram hi khawvela thingpui thawnchhuak tam ber kum rei tak chhung a ni tawh a, mahse ram chhunga kan thingpui eiral a tam zel avang leh khawvel ramdang ten an lo thawn chhuah tam ve deuh deuh avang hian India ram tan pawh thingpui thawn chhuak tam ber nih reng chu thil harsa tak a ni. Ram chhung mamawh leh ram dang te thawn chhuah pun dan hre reng chungin nasa taka thingpui thawn chhuak tam ber ni tur chuan tan lak a ngai a ni. Thingpui hi khawvel ram hrang hrang ten kan in avangin hralhnaah hian harsatna a awm mai dawn lo va, chin uar deuh deuh bakah, ramdanga thawn chhuak thei tura kan inbuatsaih a ngai a ni.

## **Thlai dang nen a chin kawp :**

Thingpui hi ram lum hnawng leh eng mamawh tak thlai a nih rual hian thing leh thlai dang hlimah pawh hian a tha duh hle a. Nikang lutuk leh hliahtu nei miah lova awm chi a ni lova, chuvang chuan thlai dang nena chinpawlhi tak a ni a. Thlai dang chin pawlh loh pawh hina zar hliah deuh tu thing a mamawh tho vangin sum chang thei thing then khat nena chinpawlhi a fin thlak hle. Sri Lanka Rubber Research Institute chuan kum rei tak enchhinna a lo neih tawh atangin rubber leh thingpui chinpawlhi a that thu a hmu chhuak a. Rubber kung hi metre 12 dan zelah chin tur a ni thung a ni.

## Topic 12 – Theirah chungchang

### Objectives :

To enhance productivity through best management practices and sales through proper channel of marketing

**Duration :** 60 minutes

**Expected outcome :** Participants will learn the importance best management practice for fruit production

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Fruits (Pineapple, Orange, Banana, Assam lemon, Gooseberry, Grape, Passion fruit, Papaya, Mango)	* Introduction to fruits * Soil management * Spacing requirement * Pest management * Irrigation * Climate * Healthy seedlings * Harvesting * Post harvest marketing	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on fruits through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

### LAKHUIHTHEI :

Common Name	:	Pineapple
Scientific Name	:	<i>Ananas comosus</i>
Family	:	Bromeliads
Variety	:	Kew, Mauritius, Queen , Charlotte, Rothchild, Jaldhup, Desi, Lakhat Smooth Cayenne, Abacaxi, Red Spanish

### Sik leh sa, lei :

Lakhuihthei hi eng leiah pawh hian a tha thei tih mai tura thlai nung duh tak mai a ni a. Lei thur lampang hret leh tui tlin theih lohna hmun hi a ngeih a. A chinna hmunah hian tui luang ral zung zung thei tur leh hmun rual rem deuh a ni tur a ni. Tlak lei lampang hi lakhuihthei chin nan a tha lem lo. Balu lei leh lungthil deuh hmunah pawh a tha thei em em a ni. Ruahtui tlak tamna hmun kum khatah 1500 mm aia sang hi ni thei se. Ram lum leh hnawng lam pang, luipui kam te hi lakhuihthei chinnan a tha em em a ni. Tin, temperature hi 29°C-32°C inkar ni se.

### Leilung sawngbawl dan :

Lakhuihthei hmun siam tur hian a hmasa ber chuan a hmun tur kha kan vah a ngai a, vahchap chu a ro that hunah hal leh tur a ni. Tlang ramah chuan mumal taka terrace laih hi duhthusam a ni a. Kan chinna tur lei hi cheh dur a, rual tak a hai rem leh tur a ni. Ram leilung awm dan a zirin lakhuihthei phunna tur chu khur feet khat vela zau, feet khat vela thukin line

mumal tak nei a laih tur a ni a. A phunna tur leh lei kal ral tur vengtu ni nghal kan khur laih sei zawng chu a remchan ang ang ni mai se. He kan khur laih (trench line) hi feet 12 vel danah laih thluah mai tur a ni.

#### **A phun inkar hlat zawng :**

Zawrh tur anga kan chinchuan lakhuihthei hi zing deuh taka phun pawh a pawi miah lo. Ram hectare khatah hian lakhuihthei hi 20,000 vel lai a chin theih a ni. Ram lumna leh hnawng bawk siah chuan hemi let pawh hi a chin theih. Lakhuihthei chin hian a phunna tura kan terrace line kan laihah chuan 45 cm vela inhnhaih a phun tur a ni a, a thlur kan siam erawh 60 cm vela inhlat ni thei se. Sawi tawh ang khan terrace line (trench line) hi feet 12 vela inhlatin laih tur a ni.

#### **Rannung leh natna :**

Lakhuihthei hian natna hrik leh rannung beitu a ngah hran lo a. Mealy bug leh Heart rot te hi han buaipui tur deuh te chu an ni mai. Hetiang ang veng tur hian a zung lam ka phun tur kha methyl parathion tuiah chiah zeuhin a ven theih a ni. Tin, carbofuran an tih mai chu rannung ten an beihna laiah tah mai tur a ni a. Carbofuran hi kg17 vel hectare khat tan a tawk viau a ni. Tin Heart rot kan tih ang chi veng tur chuan Bordeaux mixture (4:4:50) emaw copper oxychloridegram 2 vel hi tui liter khatah pawlha tah chuan lakhuihthei zung lam pang chu chiah zeuh tur a ni.

#### **Tui mamawh dan :**

Lakhuihthei hian tui a mamawh tam vangin ruah tui tlak tamna hmunah an ching tlang pui a. Ruah tui tlak that lohna hmunah chuan tui hnianghnar tak a hmuh theih nan tui lakna mumal tak siam ngei theih ni se. Tui a hmuh that leh that loh hian a rah len lam te leh a tui leh tui loh tlengin a hril thei a ni. Tui lak harsatna hmunah chuan ni 20-25 kar danah tui pek pawh a pawi lutuk lo.

#### **A chi tha :**

Lakhuihthei chin tur hi a inrual khai tak ni thei se duhthusam a ni a. Hei hian a rah rual khai taka kan seng theih nan min pui dawn a ni. A rah seng hun a inrual loh zung chuan hun leh tha a hek hle a ni. Lakhuihthei hi chi thumin a chi a laktheih a. Pakhatnaah chuan lakhuih chip (crown) an tih ami hi a ni a. Lakhuihthei rah tawp chiahah chuan sah buna phun mai theih a ni. Pahnihnaah chuan a lakhuih kuang atanga lo chawr (slip) an tih hi a ni a. Tin, lakhuih bul lama lo chawr ve (sucker) an tih chu an chin tam ber pawl a ni. Sucker a kan tih ho hi an rah hma ber a, phun atang a thla 15 velah an rah thei a. Slip hian dawt lehin phun atanga thla 18 naah an rah thei a. Crown an tih ho hi an rah har ber a, phun atanga thla sawmhnih leh palina velah an ran thei chauh a ni.

#### **A seng hun :**

Lakhuihthei te hi a tlangpuiin phun atanga thla 15-18 velah an rah a, a rah hma leh rah hma loh chu a chi kan hmanah te, khaw lum dan a zir te leh kan phun laia a len leh tetah te nasa takin a innghat a ni. Dan pangngaiah chuan lakhuihthei te hi May-August thla inkar hian a rah an seng thin a. a lo par atanga thla nganaah a hmin tlangpui a ni. A rah rual khai lo hian a rah seng hun a ti reiin, hun leh tha a heh hle a, chuvang chuan a lo rah rual theih nan a chi inrual khai phun te leh mithiam te rawn mai tur a ni. Mahni ei tura kan duh chuan a hmin en tlengin zuah a lawh tur a ni a, sumdawnna lama sawngbawl tur erawh chuan a hmin eng kher lo pawn an lo mai thin.

### **A seng hnu leh hralhna lam :**

A rah kan seng hnu hian tih tam tak a la awm a, tawih lo tura dahthat te, a quality a zira grade pek te leh hmun dang thawn chhuah tur a buatsaih te angai a. Hetiang hian zoramah chuan kan sawngbawl ngai lem lo a, mahni remchan danin kan lo a, kharchhawng tu hnenah a nei tam deuh chuan an pe mai a, nei tam vak lo chuan kan zuar nghal mai zel. India ram lakhuihthei hi Nepal, UK, Spain leh UAE ah te thawn chhuah a ni a. Amaherawhchu a puma thawn chhuah a ni lem lo a, a tui te leh zei lep ten an thawn chhuak thin a ni.

## **SERTHLUM :**

Common Name	: Orange
Scientific Name	: Citrus
Family	: Rutaceae
Variety	: Valencia, Hart's Tardiff Valencia, Hamlin,Mandarin Orange.

Mandarin/Serthlum hi India ramah chuan ser (Citrus) zing a chin tam ber a ni a. Ser lam chi kan chin zawng zawng zing a za zel a sawmnga (40%) hi serthlum hian a awh a ni. India ram chhunga serthlum kan chin lar zual deuh te chu mandarin, sweet orange leh acid lime te an ni. Serthlum chin tamna state te chu Maharashtra, Madhya pradesh, Tamil Nadu, Assam, Orissa, West Bengal, Rajasthan,Nagaland, Mizoram leh Arunachal Pradesh te an ni.

## **Boruak leh Lei Mamawh Dan :**

Serthlum hian khawvawt lutuk lo leh khawlum lutuk lo, vur in a hmeh lohna tur boruak a mamawh a. Tlangram hmun sang deuh, 1500 meter (above MSL) vel a hmun sang ah an tha duh hle a. Ruah tui kum khat chhunga a mamawh zat chu 100-200 cm vel a ni tlangpui. Khawlum lam 10-35°C vel hi a mamawh tawk a ni.

India ram hmun dang zawng zawng aiin NE India (India hmarchhak lam) ah serthlum hi a tha duh bik a ngaih a ni. A rawng a mawi bik bakah serthlum pawh a tui duh bik a ni. Lei thawl lam deuh leh lui leh tuilian in a hnawl khawm lei ang chi ah india ram hmar lamah chuan an chinga, deccan plateau ah leh india hmarchhak lam tlang hmunah te chuan tlak leiah leh lei thur deuh ah te pawh an ching bawk. Mahse lei thawl leh tui pai tam loah a tha duh ber thung. Tui tlin theih lohna hmun, lei al lutuk lo leh thur lutuk lo (pH 5.5-7.5) vel hi duhthusam lei chu a ni a. Mahse, ph 4.0-9.0 ah pawh a chin theih tho bawk. A zung innghahna lei lama calcium carbonate a tam lutuk chuan a than a tithuanawp ve thei bawk. Chuvangin chin hmaa kan chinna tur lei test hma sak a tha hle.

## **Leilung sawngbawl dan :**

A chinna tur lei chu hneh taka leh a rual taka siam tur. Tlangram ah chuan ram a awih a vangin lei chhawrdawh ah an ching mai thin. Mahse hei hian boruak lamah hmunawl zau zawk a siam thung. Serthlum te hi fur ruah tui tlak tam lai chuan tui tam lutuk avangin a chhe fo a, chuvangin tui luan chhuahna tur khur fel tak serthlum chinna bulah feet 3-4 vela thukah siam thin tur.

## **A phun inkar hlat zawng :**

Mandarin serthlumte hi a chi atanga neih theih an nia ,tin budding hmang pawn a tih pun theih bawk. Budding kan ti dawn anih chuan January kar tawp lam ah emaw february kar tir lamah emaw a tih tur.

Mandarin serthlum te hi a phun dan tur chu khur 50 cmX50 cmX50 cm vel kil li in chen ah phun tur. Tin, a inkar zau zawng hi kung 350-450/ha ah chuan 4-6 m vel tal a ni tur ani. Khasi mandarin ser te erawh hi chu tlem in an phun zing deuh a, kung 500/ha ah chuan 4.5mX4.5m vel a inhlat ah an phun thin. Mahse tun dinhmunah chuan kung 120/acre atan chuan 6mX6m spacing hi duh dan chu a ni.

## **Tui chungchang :**

Serthlum hian phun tirh lamah chuan tuikawng tha a mamawh hle a. Tui a dawn that chuan a rah tla a tlem mai bakah a rah pawh a lian thin a ni. Tui len tamna hmunah chuan a zung lam tichhe thei natna a awm thin bawk. Tui tam lo te te a zing taka pek a ngai thin. Kan tui kawng atanga kan tui pek khan 1000 ppm aia tam a pai chuan serthlum tan a hlauhawm thei ani tih hriat a tha. Kan chinna hmun lei azir leh a than duan dan azirin tui pek dan pawh tih tama tih tlem tur. Tuikawng lian lo te te siam hian tui hman ral a tih tlem mai bakah ser kung than dan a ti mumal .Serthlumin tui a mamawh zat hi khawlum lutuk lo leh vawt lutuk lo hmuna chin chi thlai dang aiina than duan avangin a tam tlangpui ani. A kung upat leh naupan dan azirin tui a mamawh dan pawh a dang lam ve ani. kum 1-4 inkar chuan litre 5-15 nikhatah an mamawha, kum 5-8 chuan 35-105 litres vel nikhat ah an mamawha, a puitling kum 9 chin leh a chung lam chuan litres 60-170 inkar vel an mamawh bawk.

## **Natna leh rannung :**

Natna leh rannungin an beih laka chhan hi a hautak em em a, natna awm tir tu ber te chu fungi, bacteri, virus, leh adang te an ni. Natna tlang lawn zual deuh te chu gummosis, powdery mildew, citrus canker, citrus tristeza disease, citrus greening disease, citrus scab te an ni. Rannung bawm thin tu tlanglawn deuh te chu - citrus leaf miner, citrus leaf flies, lemon butterflies, fruit sucking moths, aphids, shoot borer te an ni.

Heng rannung leh a natna hrang hrang laka veng him thei tur chuan sawrkar lam a, serthlum enkawl lama mithiam te pan afin thlak hle.

## **A chi tha :**

Serkung kan phun tur te hi budding hmangin a neih theih a. A chi atanga a tiak siam pawh hi a hluar viau tho. Nursery bed klan siam hmasak ber a chi tih tiahna turah chuan leitha tlem te chiah hman tur. A chi tha lo leh a tiak tha lo chu pah zel mai tur. A chi te hi polythene bag hmangin a enkawl mai theih. 30-40 cm vel annih hnu ah kan phunna tur hmunah a phun theih tawh.

## **A seng :**

Serthlum te chu a rah a len hun, a rawng a en mawi tawk leh han ei chhin pawha a thlum tui tawk hunah lawh a hun tih na. a hnun a tanga tan chhumna tur chemte emaw bakchheh emaw hriam tak hmanga lawh tawh mai tur. Madarin serthlumte hi fur ruah tui tlak lain an loi ngai lo. Kum li na velah an ral tan tlangpua, mahse an rah that tak tak hun chu kum ruk an tlin hnu ah ani tlang pui. Kum 9 leh kum 10 vel an nih tawh chinah chuan kung khat pawn pum 500 atanga 800 vel anthar chhuak theih tawh. Mahse a thar tam theih lai ber kum chu kum 10 atanga kum 12 inkar an nih lai hian a ni. Mandarin serthlum te hi rah an thar hlawk theih chhung hi kum 15 atanga kum 20 vel an ni tlangpui.

## **Serthlum chi hrang hrang te -**

- 1. Coorg Serthlum :** India khawthlang lamah chuan serthlum chin nasat ber a ni. Serthlum thang duang tak, hnah nghah tak leh hling nei chi a ni. February - March velah a hmin thin.
- 2. Khasi Serthlum :** Hetiang serthlum hi India hmarchhak lamah kan ching nasa hle, a bikin Assam ah leh Meghalaya ah te. Sikkim serthlum ti in emaw Kamala Serthlum tih pawh in an koh thin bawk a ni. A kung a lian vak lova, hnah ngah tak a ni a, hling nei chi leh nei lo chi pawh a awm bawk a ni.

**3. Nagpur Serthlum :** Serthlum tui tak a ni a, khawvel a serthlum tui ber pawl ni te pawh in an chhal hian thin. Ponkan tih hming pawh in an koh thin a ni. January-February vel ah a lawh theih thin.

**4. Kinnow Serthlum :** Thlahpawl (Hybrid) a ni a, King leh Willow leaf serthlum thlahpawl a ni. USA lam chhuak niin Punjab ramah lakluh hmasak ber a ni. January thlalai hawl velah a hmin thin.

#### **A senghnu leh hralthna lam :**

A rah lawh zawk hnuah pawh thliar hrana, dahthat, zawrchhuah tura siam leh phurh chhuah te hi thil tul tak a la ni. A hrath ral hi thil harsa a ni lo a, a ching tu ten an than hmaa lei duh lo awm sa tawh te hnenah an pe mai thin, chumite chuan kharchhawngtute kutah an lei tir leh a, chungmi te chuan a zuartu lian tham ni lem lo te hnenah te pe chhawng leh in mipui te hnenah te an hrath chhawng leh thin bawk. Boruak nuam tawkah chuan serthlumte hi an chhe mai mai bik lo a, hmun hla tak taka hrath tur pawn a ken theih ani. heng serthlum te hi ram dangah te pawh thawn chhuah a ni thin bawk. Tin, serthlum atanga thildang siam thin te pawn mandarin ser hi an hmang nasa hle bawk. India chuan heng ser thlum te hi France, UK, Belgium, Indonesia, Netherlands, Sri Lanka leh Bangladesh ah te an thawn chhuak nasa hle.

## **BALHLA :**

Botanical Name	:	<i>Musa paradisiacal</i>
Family	:	Musaceae
Common Name	:	Banana

Balhla hi Mizorama thei kan thar tam ber a ni a. Kan thar chhuah te hi ram chhung ei ralah kan la hmang vek rih a. Kan taksa mamawh zat chanve pawh kan la thar chhuak lo ani. Ram pawn a thawn chhuak tur phei chuan tuna kan thar aia tam fe hi la thar chhuah a la ngai dawn a ni.

### **Sik leh sa, lei :**

Balhla hi ram lum leh hnawng tamna atanga ram ro lam leh tuipui zawl atanga 2000 MT thlenga sangah a chin theih a. A variety a zir in phai leh zo ah chin theih a ni. Mizorama kan chin ber hi Cavendish a ni a, boruak lum leh hnawng tam lam 600-900 MT a sang, nipui leh thlasik inhlauhna nasa lutuk lo, temperature 20-30°C velah leh lei khal ban tui inhlithlawr that theihlohna hmunahte a tha theilo. Keimahni leilung ami ngei balhla thur (thurte) leh banria-te hian phai leh khawlum an duh deuh a. Natna an tuar chak bawk a chin chi tak an ni ve tho.

### **A chi tha thlan dan :**

- a) A peng thang chak, 80-120 cm a sang, 1-2 kg a rit
- b) A bul vawng tha, a ler lam zuih zak si, a hnah zum kawh vah
- c) A bul bawk leh a zung pu tel ngei, a chawr na tur mit pawh nei
- d) Natna leh rannung bawm loh, huan tar lo leh enkawl that ami ni bawk se.

### **A phun dan :**

- a) A khur 60 cm biala laih lawk a, lei chunglang lei tha balu leh FYM/compost inzat pawlh a hnawhkhah hnuah uluk taka phun a, tui pek nghal tum hram tur a ni.
- b) A kar hlat zawng chu variety a zirin a dang thei a. hmun awihah chuan leilung luang ral ven nan terrace buatsaih nghal a tha. Contour lines-ah 1.8-2.5 m a bi leh bi inkar leh 3 m a tlar inhlat in a tawk tlangpui.
- c) March-April thla hi a hun tha ber a ni a. Tui pek tur neih chuan January-March thla a phun hi a tha ber a hriat a ni. September leh October fur zawh lam te pawh a tha tho a. Fur laia khua a that deuh reng lai June-July ah pawh a chin theih bawk. Mahse ruahsur thut thulah, a kung tan chum lova phun tur a ni.

### **Leitha pek :**

Balhla hi tui leh chaw mamawh hnem deuh mai anih avangin enkawl ngun loh chuan a thang chaklo a, a peng pawh a chhuah harin a thar har a, a thar hlawk lo thin. Kung khat zelin chaw NPK a mamawh dan chu Urea ( 217-413g), SSP (220-550g), leh MOP (334- 1000g) a ni a, dose hniha pek tur a ni, a phun tirh leh thla ruk hnuah a in zatin pek tur a ni. Nitrogen leh potassium a mamawh hnem avang hian bawngk leitha/compost leh vut te pek tam tur a ni.

### **Tui pek :**

Balhla hian tui a mamawh hnem em em a, thal laia tui pek theih chuan a thar hlawk duh a ni. Drip system hi a tha ber a, hnim leh hnah ro tea a kung si phaklo a khuh (mulching) – in tui a mamawh nasa takin a phuhrukin leitha a pe bawk.

### **A peng paih :**

A peng kan paih that loh hian a thar hlawk tur angin a hlawk theilo a. Tin, a tar hma phah bawk. Kan duh ber chu a kung niloin a rah anih avangin a rah hnem theihna tur ber a enkawl hi kan tih tur a ni. A kumkhatnaah chuan a peng paih hian awmzia a nei lemlo a, mahse a kum hnih na atang chuan awmzia a nei thui hle. A peng pakhat zuahin 12253 kg/ha. A peng pahnih zuahin 8606 kg/ha, a peng pathum zuahin 8879 kg/ha, a peng paih miahlo in 6720 kg/ha a thar a ni.

### **A kung do :**

Vau hrulah emaw thing hmun thli dan zuah/phun tur a ni. Thli chhem tluk leh rannung vangin a kung tlu a tam thin em em a ni.

### **A bu tuam (Wrapping) :**

Balhla a kung ami hi sarang var emaw a hnah veka tuam hian nisa leh thli lum lakah a veng a, rannungin a tih hmelhem loh nan te a pawimawh a, a rah rawng pawh a mawi phah a ni.

### **Rih vur :**

A kung bul rih vur pawn hian tui tling tur a veng a, a zung a chhuah belh tirin a kung a ti nghet a a ngeih hle bawk a ni.

### **Enkawl fai :**

Balhla hmun enkawl fai loh hi a tam kan tih thlentu bulpui a ni a, tumbu khailengte pawh a rah a pui tlin chuan sah thlak a paih fel nghal zel a tha.

### **Thlai dang chin pawlh :**

Balhla hi shade-cum- nursing crop an ti hial a, balhla hi phun phawt in a hnuah thlai dang phun leh mai tur a ni. A zar hlim tu a niin, hlo ti awl tu ani bawk.

### **A thar dan :**

Phun atanga thla 9-ah a vui tlangpui a. A vui atanga thla 3-4 hnuah tuk a hun thin. September-April hi a thar vanglai a ni.

### **Seng hnuua sawngbaw dan :**

Balhla hi a hmuar natna avangin a hnun atang leh peng dang atangin a tawih duh a. A ven nan chuan Aieng/sawhthing/purun var leh neem tui atanga siam (extract), 1000ppm (1ml/lit water) ah chiahan a tawih lakah a ven mai bakah a dah that theih. Heng zingah hian aieng atha ber bawk.

### **Rannung leh natna :**

a) **Pseudostem borer (a kung ng het) :** Hei hi balhla eichhe tu rannung langsar leh pawimawh ber a ni a, rannung/tuaingawt ang deuh hi a ni a, a dum leh sen a awm. Balhla kung leh bul ker kua in a chhungah a in thlahpung a, a naute leh a puitlingin nasa takin balhla an ei chhe thin a, balhla kung a ei chhia in a thih phah thuai thin a, a tluk sam phah bawk.

### **Enkawl dan :**

- i) Balhla chinna tur khurah furadon 100 gm leh neem cake 5kg khur khat zelah pawlh tur a ni.
- ii) Balhla tiak hrisel tha leh a hmun upa lo ami chauh phun tur a ni.

- iii) He rannung hi a hluar viau chuan nuvacron emaw dimecron/100ml leh tui 250 lt chawhpawl a kah tur a ni.
- iv) Neem cake 5kg kung tina pek leh neem oil a kah.

**b) Flea beetle (*Nodostum subcostatum*) :** Hei hi kel te laimawn ang deuh te reuh te te, balhla hnah zik inzial chhung leh balhla hnah no leh balhla rah nasa taka zig zag anga he thintu hi a ni

Enkawl dan :

- i) Balhla hmun fai leh tha taka enkawl
- ii) Endosulfan 35EC (0.05%) ni 10 dana kah tur.

**c) Banana aphid (*Pentalonia nigronervosa*) :** He aphid hi balhlaa virus natna chi hrang hrang theh darhtu anih bakah balhla kung leh hnah atanga a tui hip in a ti than thu hle thin.

Enkawl dan :

Nicotine sulphate 1:800 ratio-a balhla kah tur. (1 litre nicotin sulphate, 800 lits tui)

**A natna langsar zualte :**

**1. Bunchy top :** A zik leh hnah chawr a bawrchhawr a, a rah a chhuah theilo

Enkawl dan :

- i) A lan chhuah veleh a bulah rawt a pahi bo nghal tur.
- ii) A natna pu darhtu (Banana Aphid) vennan neem oil leaf/kenel extract emaw Endosulfan 5 gm leh tui 10 lits pawlh a ni 10 danah vawi thum kah thin tur a ni.

**2. Leaf spot (C.O: *Cercospora Musae*) :** Balhla kung upa lam hnalah a nasa bik. Balhla hnah sir leh laiah spot a awm thluah a, a chang chuan zau tak tak a thi ruah thin.

Enkawl dan :

He natna hi Dithane M-45 hmanga tih rem a tha ber.

**3. Panam wilt of banana (C.O.) :**

*Fusarium oxysporium* (*F. cubesa*) : Balhla natna zinga hlauhawm berte zing a mi a ni a. balhla hnah a lo eng vak a, a hnah keng kawhtu a lo tliak hnup a, ni reilo te hnuah a tam ber chu a lo ro uai thla suau thin. Hei vang hian balhla kungpui alo keh sung a, a lo rem hial thei thin.

Enkawl dan :

- a) Balhla natna nei chu kih daih a pahi bo mai ni se.
- b) Balhla tiak/khi hrisel chauh phun tur.
- c) Chinai hman a tha hle
- d) Balhla hmun thla hnih atanga thlaruk chhung tui chimtirin a natna a um bo thei.
- e) Bavistin/ Benlate-a kah tur.

#### **4. Moko disease or Bacterial wilt of banana (C.O. : Pseudomonas solanacearam) :**

Balhla he natna veite chu a rah a kung chunga awm te kha a uk vek a, a ro mai thin a, a zik hnah no 3 kha a hring eng dang vek thin. Balhla kung tan chum chuan hnai ang deuh a chhuak pur thei.

**Vector :** He natna thehdarhtute chu khawivah, khawidang leh fruit flies-te an ni.

Enkawl dan :

- a) Balhla chi hrisel chauh phun
- b) Crop rotation ( thlai kum tina chin thlak) hman ni se. heng – vaimim, fu leh buhte nen tih hian a veng thei.

## **GRAPE :**

Common Name	:	Grape
Scientific Name	:	<i>Vitis vinifera</i>
Family	:	Vitaceae
Variety	:	<i>Vitis Lubrusca</i> and <i>Vitis vanifera</i> .

Grape hi khawvel puma thei chin hluar ber leh pawimawh ber a ni a. Zu siam nan an hmang nasa hle a. Tin, hriselnan a ei atan mai bakah a rep te pawn an zuar nasa hle bawk. Grape chin hi an intih hmuh tanna chu Caspian Sea bul velah niin hriat a ni a, mahse India ah thung chuan Rom hun lai vela an hriat kha nia ngaih a ni. India ram puma grape chin nana ram kan hman zauh zawng chu 40,000 ha vel nia chhut a ni. Maharastra, Karnataka, Andra Pradesh leh Tamil Nadu velah an uar hle.

### **Sik leh sa, lei :**

Grape hi hmun lei/ram hrang hrangah an ching nasa hle a, mahse a that duhna ber leilung chu lei thur lo leh tuipai tam lutuk lo tlem lutuk si lo, lei thawleng leh thlaitawihna lei pai, pH value 5.5-7.5 inlar velah a tha duh ber a ni. Grape hi climate hrang hrang hnuaih a chin theih a, ram lum lutuk lo leh vawt lutuk lo ah te, boruak zang deuh vah na hmunah te leh hmun lum deuh ah te pawh an ching nasa viau. Grape hi a hmin lai vela tui a hmuh that loh pawn a tha em em tho. Hmun lum a haw lem lo a, a chinna atana temparature duhthusam pawh 15-40°C vel lai a ni.

### **Lei buatsaih dan :**

Grape chinna tur lei chu leh vek a tih rual vek tur a ni. Tlangram ah chuan a chinna tur lei kha laih zawl deuha metre 3 vel a in kar hlata chin tur. A phunna tur a khur kan laih chu 2x2x1 ft vela a ni tur a ni. Kan phunna tur khur kha kan phun hma kar 5-6 velah lo laih lawk tawh tur. Tin, a khur chhung chu leitha leh bawng ek leitha te a tih khah hmasak tur.

### **A phun karhlat zawng :**

Grape te hi hrui nei annih avangin engemaw zamna atana hmanga nung thei tur an ni. Grape kan phun hmain a zamna tur wire in emaw tha takin kan siam tur a ni. A inkar hlat zawng tur hi kan grape chin a zirin leh a lei a zirin tihzaua tih zim pawh a theih tho bawk. Tlang ramah chuan hrui 1000-1500 vel chinna chinah chuan 3 m x 3 m spacing vel atawk viau.

### **Natna leh rannung :**

Grape hian natna chi hrang hrang kai theih a ngah ve hle a, natna tichhe thei langsar zual deuh te chu - anthracnose, downey mildew, poiwdery mildew leh bacterial leaf spot te an ni. Tun hnaiah hian natna dang an hmu chhuak leh bawk.

Rannung ei chhe thei te pawh an awm bawk a, rannung ei chhe thei lar zual deuh te chu - flea beetles, thrips, mealy bugs leh leaf hoppers te an ni. Vawi leh khata heng natna leh rannnung te tih bo duak theih pawh an ni lo a. Hetiang ti reh thei tur chuan sawrkar department lama mithiamte rawn a tha ber.

### **Tui :**

Grape hi mumal taka tui pek ngai reng an ni a. Mahse tui tam lutuka pek erawh a tha lo thung. Hriatreng tur chu tui pek laiin tlem te te a pek tur a ni. Phun zawh veleh tui pek nghal an ngai a, a ni thum niah pek leh tur a ni a, kar khatah vawikhat pek tawh tur a ni. A kung kan suat

hma ni 15 velah tui pek tur a ni bawk, a rah lawh hma ni 15 ah tui pek bawk tur. A zung hnaih deuh hleka tui pek hian tui luang ral mai mai tur leh tuihu a kalral mai mai tur NASA takin a hip lut a, a tha hle. Kan grape chinna hmun ruahtui tlak tlemna hmun anih chuan drip system (a zung hip luh theih tura tui far tir keuh keuh) hman a tha hle. Hetiang system hman chuan grape zung khan tui a mamawh ang tam lutuk si lo in a hmu ve reng thei a ni.

#### **A chi hrisel :**

Grape hrui leh a chi tur kan neih dan lar ber mai chu hard wood cutting kan tih a zar chang lai phui tura tan hi a ni. Tin, a tang zawm leh a tang nem deuh lai a chi atana lak te pawh hi a hluar ve hle bawk. Hard wood cutting hi thlasik laiin an ti tlangpui, hetih hun lai hian thlai te hi an chawl ve a ni. Grape phun tur kan cut dawn hian thui deuha cut a ngaia, a chhan chu a mit leh mit inkar hi a thui a, mit pathum nei ta la cut a ngaih avangin thui taka cut a ngai a ni. Hard wood cutting tur hian grape hi a lo berah kum khat aiin a upa tur a ni. Tin, a mit hnuai lam leh chung lamah cut tur a ni bawk. Kan cut na hmawr leh bul chu a mit atanga thui lutuk tur a ni lo. Kan cut sa chu nursery bed kan siamah chuan 30 x 10 cm vela indanin lin tur a ni. Tin, poly pot ah pawh a dah theih bawk.

#### **A rah seng :**

Grape kan chin thin pangai hi chu February thla atanga April thla tawp vel thleng in a seng a hun chho thin. A rah a hmin that hunah seng chauh tur a ni a. Vawikhata a bawrkhat ami a hmin rual vek loh chuan lawh nawn te pawh a ngai thin. A hmin leh hmin loh hriatna chu a rawng leh ei chhin te pawn a hriat theih bawk. Kum khat chhung hian India ramah hian maktaduah 1 vel kan thar chhuak tlangpui. India rama kan grape thar hi a tam tham em em a, Hyderbad velah hian an thar tam zual deuh. An thar tam ang hu chuan an grape chi hi a tha tawk lo viau thung.

#### **A seng hnu leh hralthna lam :**

A rah hmin lawh hnua hnuah pawh hian tihtur ala tam em em a, thliar hran te, dahthat te leh zawrh tur a phurh chhuah te pawh thil pawimawh tak a ni. Thar tawh sa chu kg 2-4 vela thliarin bawmah an thun thin a, hmun hla tak taka thawn turte annih thin vangin a chhiat mai loh nan thil dup lam deuh bawm chhungah an dah hnan thin. Ramdanga thawn chhuah tur chi ah phei chuan hmun vawta dahthatna a awm ngei ngei a ngai a ni. Ramdanga thawn chhuahna hmun te chu Kolkatta, Ahmedabad, Patna, Bangalore, Jamshedpur leh Hyderabad te an ni.

80% aia tam zawk kan tharchhuah te hi chu keimah ni ei turah ram chhungah hralth thin a ni a. 70% aia tam zawk hi chu March leh April velah an seng tlangpui. Mahse a dahthatna lamah hian buaina kan tawk nasa hle thung. 2.5 % vel hi chu European countries leh Middle East velah kan hralth chhuak a, a tam berte erawh hi chu kan ramah kan hralth thin. Agent hrang hrangte hmannin kan hralth chhuak thin a, chungte chu - Grower exporters, Grower cooperatives leh trade exporters te an ni. Heng agencies te erawh hi chuan a dah thatna tur anmahnin in an nei thlap thin.

## NIMBU (ASSAM LEMON) :

**Botanical name :** *Citrus limon L*

**Family :** Rutaceae

Assam lemon hi India hmarchhakah chuan thei pawimawh berte zinga pakhat a ni kan ti thei awm e, thei kung lian lo tak nimahsela sumchang thlai pawmawh tak a ni. Thei hrisel leh pawimawh tak anih avang hian khawvel pawh hian a hmelhriat a, ramtin leh hnamtin te hian a hming kan phuah dan pawh a dang thluah a ni. English leh Korean in Lemon an ti a, Spanish in Limon emaw Limonero, French in Citron emaw Citronnier, Chinese in Ningmeng, Japanese in Remon, Hindi erawh chuan Neemboo an ti thung. Mizo te hian Assam Lemon/Limbu/Nimbu ti te in a hming kan vuah ve a ni. Assam Lemon hi tropical/sub-tropical thlai anih avangin Mizoram boruak, sik leh sa hi a ngeih em em a, ram lum leh hnawng si, ruahuti tlak tamna hmun ah a thar hlawk duh bik a ni.

### Leilung leh boruak a mamawh dan :

Assam lemon hi eng leiah pawh a chin theih laiin, lei tak chhahna hmun ah a tha duh a, changtual lei, lei me leh hnim tawih tamna hmun a ngeih bik, lei thur leh al tehna 5.5-7.5 pH inkar hi a chinna hmun atan chuan duhthusam a ni. Tin, tropical leh sub-tropical thlai anih avangin ram lum leh hnawng si ruahuti tlak tamna ram a ngeih em em a, tlangsang lam aiin phai boruak lum leh hnawngah a thang duang bik bawk a ni.

### A chin pun dan :

Assam lemon hi leaf-bud cutting te, stem cutting leh air layering te-in a chin pun theih a, Mizoram ah hi chuan air layering leh stem cutting chiah hi kan hman lar a ni.

- Stem Cutting :** Stem cutting hi chin pun dan tha ber leh hman lar ber a ni a, a tang vih phun tiin kan sawi thei ang. Vih phun tur atan chuan a tang (a zar) puichang ngei ni se, pencil tiat vel a lian, 18-20cm (7-8 inches) vel a sei a ni tur a ni. A tang vihphun tur hi a chawrna tur a mit atanga 1cm ah tanchhum a, a hnuai lam chu a remchan dan tawkin a hnah chawrna chang leh chang inkarah tan chum tur a ni. Tin, a tang (a zar) vihphunna tur poly-pot peihsa diamin dah tur – hetiangin:- bawngek, leitha leh balu 1:1:1 in ang vek a chawhpawlhi sa chu poly pot ah thun khah sa vek tur, tichuan, a tang (a zar) tan chum chu a hnah hnun bal lo tawkin cheh chum tur, a zung chawr tir vat turin Root aid/Rut Min damdawi 1gm/1ltr tui paawlhin a bul lam hnawih tur, minute 5(nga) hnu ah a lo hul anga, a mit (a chawrna tur) van lam hawi tiring, poly-pot ah khan a awn deuhin vihphun tawh mai tur a ni. He mi hnu hi chuan sprayer in tui phuh huh tir thin tur a ni.
- Air Layering:** Assam lemon kawlawm dawn hian, lei tak, bawngek leh balu 1:1:1 in zat in chawhpawlhsa neih diam tur, a tang kawlawm tur chu 3 cm vel a hawng paih a, a pil pawh ziahfai vek tur, ziahfai zawk hnuah Root aid/Rut Min 1gm/1ltr tui a hnawih a, lei chawhpawlhi kha kut tum tiat aia te lo polythene emaw buara them in emaw tuam a nghet takin chunglam leh hnuailemah tawn/phuar tlat tur, polythene a tuam chuan tui lut thei turin vih pawp tur a ni.

### A phun dan :

Phunna tur khur hi March-May thla a laih tur a ni a, khur leh khur inkar hi 3 m a inhlata ni tur a ni. Khur thuk zawng leh zau zawng hi 0.5m ve ve a laih a, lei tak leh bawngek chawhpawlhi in vur tur a ni a, chumi hnuah phun chauh tur a ni. Assam lemon hi May-August hi phun hun tha ber chu a ni.

### **Leitha (Manure leh Fertilizer) pek dan tur :**

A hnuiai tarlan ang hi leitha “dose” pek dan tur a ni –

Year	FYM (kilogram)	Urea (gram)	DAP (gram)	MOP (gram)
1	10	100	100	100
2	10	100	100	100
3	10	100	100	100
4	20	100	100	100

Leitha kan tarlan tak dose te khi hmunhni ah then tur a ni a, a dose chanve chu February-March thla ah pek tur. Tin, a dose chanve dang zawng chu October-November ah pek leh tur a ni.

### **A hmun thlawhfai dan tur :**

Assam lemon hmun hi kumtluan in a fai tur a ni a, thlawhfai hlimin a kung bul leia rih vur zel tur a ni. Tin, rih vur hnu ah hnime to tur venna atan a kung bul hi mulching film emaw polythene dum emaw buhpawl hmanga khuh a tha hle bawk.

### **Tui pek dan tur :**

Thal laiin tui pek a tha hle a, tuipek tur neih chuan ni 15 atanga ni 20 danah December-March thla ah pek ngei ngei thin tur a ni. Hei hian a kung a tih hrisel bakah a rah a ti hriselin a rah hlawk bawk a ni.

### **A eichhetu rannung (insect/pests) thenkhat te :**

Assam Lemon eichhetu thenkhat te-

- a) Leaf mining beetle (Sebathe-fulvipennis) hi Assam lemon chawrno laiin a hnah eichhetu a ni.
- b) Leaf miner hi a hnah eichhetu pangang a ni a, a eina hnuhma a lo rang in a hnah ati khawr chhe zo thin.
- c) Aphids hian a hnah no leh a par an eichhe thin.

### **A ven dan leh enkawl dan :**

- a) Assam lemon kungbul tinah Neem cake/Neem kasto/Neem manure phul thin tur a ni. Tin, neem oil a kah thin hian a veng hneh em em bawk a ni.
- b) Rannung in a beih tawh chuan Monocrotophos (2.5g/1ltr) in emaw Dimethoate (1.5ml/1ltr) a kah tur a ni.

### **Natna laka ven leh enkawl dan :**

Assam lemon hi ser family-ah chuan natna leh hri hrai a ngah lova, hei vang tak hian chin hlawhtlin pawh a awlsam bik a ni.

**1) Twig blight** : He natna alo awm hian a zik lam atangin a lo thi thin.

Enkawl dan :

Hetiang a lo awm chuan, natna in a khawih chin kha tanchhum tur, tanna lai ah Bordeaux paste hnawih tur, chumi hnu ah Bordeaux mixture 1% emaw Copper Oxychloride (2.5g/1ltr) in kah tur a ni.

**A rah lawh hun leh a rah theih zat :**

Assam lemon hi kum khatah vawi hniih thal lai February-March leh favang September-October ah a par thin a, thal lai leh favang lai lova par pawh a awm tho bawk. A rah lawh hun hi a puitling chang tha, a hring nalh lai, a eng tlemte a lo awm hunah lawh tur a ni a, June-July leh December-January thla hi a rah seng hun runpui ber chu a ni. A kum thumna atangin kung khatah 40-50 a rah thei a ni.

## **SAPTHEI :**

Khawvel a sapthei awm tanna ram chu Brazil a ni. India ramah chuan kum zabi 20-na hnu lamah chin tan niin, Nilgiri hills, Himachal Pradesh leh hmarchhak state Manipur, Nagaland leh Mizoram-ah te chin a ni.

### **Sapthei chi hrang hrang (Variety) te :**

- i) Purple variety (Nainawk)
- ii) Yellow variety (Eng)
- iii) Hybrid variety (Eng leh senduk thlah pawlh)

### **Leilung :**

- i) Lei dur hang chhah tha, tui luan ral zung zung theihna.
- ii) pH (lei thur zawng tehna) 5.5-7.5
- iii) Lei chhia pawh a ngam, mahse a thar hlawk lo deuh.

### **Sik leh sa :**

- i) Purple variety hi sub-tropical ram, feet 3,000 chunglam feet 6,000 tlengin achin theih.
- ii) Yellow variety leh hybrid hi tropical ram, feet 3,000 hnuai lamah chin tur.
- iii) Ruahtui tlak tamna hmunah a tha duh.
- iv) Temperature 20°C-30°C ah a tha duh ber a, a thar hlawk ber bawk.
- v) Eng (light) a mamawh tam.

### **A chin dan :**

- i) A chi atangin (a tiak).
- ii) A tang tan chum.
- iii) A tang zawm
- iv) Tissue culture

Tun dinhmun ah chuan a tiak phun sown hi kan phak tawk a la ni rih.

### **Chinna tur ram buatsaih dan :**

- i) Khur 2.5m dan ah 1ft a thuk 1.5 ft a zau siam tur.
- ii) Khur hi a theih hram chuan lovah a hmain laih tur.
- iii) Khur chu bawng ek, ar ek, vawk ek etc. leh lei chunglang hang thanin hnawhkhah tur.
- iv) Ek dur neih theih loh pawhin lei chunglang hang thanin vur khah tur.

### **A chi ngai zat :**

- i) Ram tin 1 hmunah a tiak 600 vel a ngai.
- ii) A tiak phun tur hi 1 ft vela sei, chawm/chum tha a ni tur a ni.

### **A chi kui dan :**

- i) A chi tur hi a kung hrisel leh a rah hmin tha atang a lak tur a ni.
- ii) A chi lak chhuah hnuah silfai a pho ro tur.
- iii) January leh February ah kui tur.
- iv) A chi kuina tur lei chu lehphut vek tur.
- v) Leh phut hmain bawng ek, vawk ek etc. pawlh a, leh phut hnan dap tur.

- vi) Leh phut hnuah sapthei chi chu feet chanve dana hmawlha rin khuarah inchi 1 dan zelah dah tur.
- vii) A chi dah hnuah leiin 1 cm vela chhahin vur leh tur. Lei a vur hnu hian di emaw, saiip emaw a chhah lo te a khuh (mulching) tur.
- viii) Nihnih danah tui pek ziah tur.
- ix) A chi hi kar hnih hnuah a tiak tan thei a, saiip a khuh chuan kar khat hnuah saiip chu lak sawn daih tur.
- x) Tui duh ang tawk pek theihna hmunah chauh sapthei kuina hi siam tur a ni.

#### **A tiak phun hun :**

- i) January/February vela kui hi May thla ah a phun tawk vel thin.
- ii) May thla chawhnu lamah ruah tui a tlak that loh chuan June thla chawhma lamah phun tur a ni.
- iii) A tiak chu feet khat aia a sei chuan tan chum tur a ni.

#### **A zamna tur siam dan :**

- i) Thirzai hmanga a zamna tur hi siam a tha ber a, a daih rei ber bawk.
- ii) Thirzai neih loh chuan mau/rua leh thingtuai hmangin a zamna tur hi siam tur a ni.
- iii) A chung ami khi tih theih loh pawhin thingkungah zamtir pawh a theih tho, mahse ni eng tha tawk awm thei turin thawlh thawl vek tur a ni.

#### **Zamtir leh a tang hlawi :**

- i) Sapthei zam theih hmain a zamna tur thirzai kaih zagh vek tur.
- ii) A zam chhoh a, thirzai a han man theih nan a bulah thing/mau/luang etc. ke zungpui tiat vel, a khangin a man ngheh theih tur phun vek tur. Buara hrui pawh a hman theih.
- iii) Sapthei hi a peng/tawi duh em em a, mahse pakhat bak zuah loh tur, a peng tha ber zuah a, a dang zawng chu pah vek tur a ni.
- iv) A peng tha bik i zuah atanga rawn chawr thar (a chang tinah) te pawh pah zel a, a zikpui pakhat chiah zuah tur.
- v) A zikpuiin thirzai a han thlen velah a zik sih/tan chum tur.
- vi) A zik sih chhumna atanga hnuai lamah a rawn chawr.
- vii) A hrang theuh a an zam darh hnuah a peng (a chang atanga chawr) a la awm zel dawn a, chung chuan thirzai dang ava man theihnan buara hrui emaw hmangin thirzai man thei tura hruai zel tur a ni.
- viii) Sapthei hi a zik chawr thar apianga rah chi anih avangin a zik/peng tam thei ang ber tura siam tur a ni. In zamthuah lo bawk se, a in zamthuah na laiah a rah tam theilo.
- ix) Grape anga hlawi nasat a ngai lova, a rah lawh zagh hlimah a tang ro, a hnah upa buk lutuk te hlawi thin tur a ni.

#### **Tui pek dan :**

- i) Fur lain ruah tui tla a tawk mai.
- ii) Thal lai December-April thleng hian ruah tui a tam loh avangin tui pek a ngai thin.
- iii) A rah insiam lai hi a tlangpui thuin February-March thal ro lai anih avangin tui a mamawh zual.
- iv) A mamawh tawk tui/hnawng a awm loh chuan a rahin a tuar a, a kungin a thi phah thei.
- v) Chuvang in tui pek theih dan tur dap hram hram tur a ni.

### **Leitha pek dan :**

- i) Sapthei hi kumtluan in a rah deuh reng avangin leitha pek reng a mamawh.
- ii) A mamawh ang chaw tha ei tur a hmuh loh chuan a rah a tlem a, a lian tha lova a thar hlawk lo.
- iii) Bawng ek, vawk ek, ar ek etc. bakah hnime hnah tawih pek reng tur a ni.

### **Enkawl leh thlawh fai :**

- i) Fai taka thlawh thin tur.
- ii) A thlawhfaina hnimte chu khur siam a, chutah chuan vawm khawm tur emaw mualvang tan zawngin lei luangral tur ven nan dah tur a ni.
- iii) Tui, lei tha leh chaw tha kan pekte a luan ral mai loh nan leh soil conservation atan a bulah halfmoon terrrace siam vek tur a ni, a harsat pawhin mau chang kham tala siam ngei ngei a tha.
- iv) Thlawhfai pahin sapthei zik thangtha lo leh tangkai lo, rah chhuah thei lo turte chu pah zel tur.

### **A rah seng :**

- i) A par atanga thla thumna ah a seng tan theih.
- ii) A rah hmin tha chauh lawh tur a ni.
- iii) Process tur a nih chuan a rah hmin tla char khawm hi a tha ber. A chhan chu a rim a tuiin tui a pai hnem bik.
- iv) A rah dahkhawm nan hian ip hmang lovin em emaw, bawmrang emaw, neih theih chuan plastic crate hman tur a ni. Ip chhunga dah hian a kawr a innawk pilh a, a hmel a mawi lo duh.
- v) A rah hmin tla dang khawm tur hian mual vang tan zawngin a danna siam tur a ni.

### **Thar theih zat :**

- i) Ram tin khat hmuna thar theih zat hi enkawl dan a zirin a danglam thei hle. Chubakah phun tam leh tlemah thui tak a innghat bawk.
- ii) Mizoram a kan chin lar ber purple variety hi a thar hlawk lo ber a, tin khat hmunah a tlangpui thuin 20-40 qtls a thar theih laiin a eng (yellow) chi hi 50-100 qtls lai a thar thei thung.
- iii) Mizoram ah hian tin khat hmunah 30 qtls a thar thei tawh a, 40 qtls tlin thei turin technology thar hmangin tan lak mek a ni.

### **Eichhetu rannung :**

- i) **Fruitfly (*Dacus tryoni*) :** A rah tet/sen laiin a zuk thin a, a puitlin hnuah a sak tulhin bawk a insiam thin a, chubakah a puitlin hmain a tla thin.

#### A ven dan :

- a) A tang ro, eng leh hrisel lote November thla ah hlawi vek tur.
  - b) A chah siam tur (200 ml kurtai, 20 ml systemic insecticide eg. Nuvan) chawhpawlh burah dahin sapthei huanah a khat tawka dah tur.
  - c) Sapthei huanah leh a bul hnaiah fanghma leh bean chin loh tur.
  - d) Malathion 1 ml tui litre khat ah pawlhin kah thin tur.
- ii) **Mite (*Brevipalpus Phoenices*) :** He rannung hi hrik te reuhte te, mita hmuh tham mang loh a ni a, a kung leh hnah a bawm a, a hnah a lo kirin a khawr nasa hle bawk thin a, sapthei rah a ti puitling lovin a kung a ti than thu thin.

A ven dan :

Dicofol 1.5 ml tui litre khata pawlhin emaw wettable sulphur 2 gm tui litre khata pawlhin ni 15 danah vawi 3 kah tur.

- iii) **Red Scale (*Aonidiella aurantii*)** : He rannung hi te sen vit vet, phuhlip nei a ni a, December-February thlaah a kung upa an bei hmasa a, a naupang lamah an pakai leh thin. A nasat chuan a than a thuin a thih phah thin.

A ven dan :

Methyl parathion tui litre khat ah 1.5 ml pawlhin kah tur.

- iv) **Mealy bug (*Planococcus nasicus*)** : He rannung hi a var lam deuh, mawm ban deuh bawk si a ni a, a awmna ngaiah awm deuh rengin a vak sawn ngai vaklo. A zik no, par, hnah ro leh rah karah te a hlawmin an awm thin a, a chang chuan a rah pawh an bawm bawk, nipui chawhnu lam leh favang lamah an tam duh. A kung tuihnang an dawt a, chuvangin a than a thu in a hnah a tla a, rah tha theilo in a kung thihna hial a thlen thin.

A ven dan :

- A nasat lutuk loh chuan heng rannung Pu Vana kawrkilh, khawibel leh rannung dang ten an ei ve thin avangin an veng zo ve mai bawk.
- A nasat chuan white oil leh methidothion 2 ml leh tui litre khat chawhpawlhin kar 2-3 danah kah tur a ni, confidor 0.5 ml tui litre khata pawlhin kah a tha bawk.

**Natna te :**

- i) **Stem swelling ( a kung bawk)**

He natna hi a hluar hle a, a kungah bawk lianpui pui a rawn a, a tirah chuan pawi-awm pawhin a lang lova, mahse a rei hnua a kung chu a ler lam atangin a thi mai thin. He natna awmtir tu hi virus leh fungus inkawp ni a hriat a ni.

A ven dan :

- Sapthei kung khatah zar tam tak zuah loh tur.
- Bawk/vung awmna chu hlawi a, halral tur.
- A zar khawih chetin dim taka tih tur a ni a, hliam awmlo thei tur ang ber a khawih chet tur.
- Systemic insecticide, confidor 0.5 ml tui litre khata pawlhin kah thin tur.

- ii) **Leaf blight (damping off)**

He natna hian sapthei tiak a bei tlangpui a, leiseh chinah a lawng a, tui val ang deuh alo awm thin. Tin, a kung puitung tawh a beih chuan a hnah puitung sa atanga tanin a zikah leh a rah ah a pakai thin. A beihna lai chu a rawng a lo dal a, a uk leh thin. Boruak a hnawn rei a, sik leh sa a duh zawng tak a nih phei chuan a pung chak em em thin a ni.

A ven dan :

- a) Sapthei tiak a beih chuan Ridomil MZ-78 2 gm tui litre khat a pawlhin kah tur, kui hma a kahin a veng bawk.
- b) A kung puitling a beih chuan a chung a pawlh dan tur sawi ang khian Ridomil MZ-78 emaw Dithane M-45 in emaw kah tur.
- c) Sapthei kuina chu tui tling rei theilo tur a siam tur.

**iii) Phytophthora blight (*Phytophthora nicotianae*)**

Sapthei kung leh a tang chawr thar te a lo dum a, a hnah a tla in a kung a vuai a, a thi thin. A rah a beih chuan vutbuak angin durh/lawng a insiam a, a tla thin a ni.

A ven dan :

- a) Tui luan ral zung zung theihna hmunah chauh sapthei chin tur.
- b) Ridomil MZ-78 2 mg tui litre khata pawlhin ni 10 danah kah tur.

**iv) Leaf spot**

Hei hi a hnah val kan tih mai hi a ni a, chi hrang hrang a awm a, he natna hian a hnah a beih tawh chuan a rahin nasa takin a tuar thei a, a kungin a thih phah hial thei bawk.

A ven dan :

- a) A tang hrisello leh natna in a beih te chu hlawi a, halral vek tur.
- b) Copper oxychloride emaw mancozeb-in May atanga September chhungin chawlhkar thum danah kah thin tur a ni a, October-April thla chhungin chawlhkar hnih danah kah bawk tur a ni.

**v) Virus (PWV-N)**

He virus hi passion fruit woodiness virus an ti a, he natna in a beih chu a hnah a engine a chhah bakah a khawr thin. A than a thu in a rah a sawng a, te reuh te leh chhah tak tak, tak awm mang si lo a ni thin a, a hrakh tlak ngai loh. He virus hian rannung chi khat Aphids a pu darh a, a kung hrisel ah te a kai darh thin. A tang hlawina hmanrua atang te pawhin a darh thei bawk. He natna hi thlasik laiin a zual a, khawlum hunah a ziawm leh thin.

A ven dan :

A pu darhtu rannung Aphids ven nan confidor 0.5 ml tui litre khata pawlhin emaw Nuvan 1ml tui litre khata pawlhin kah thin tur.

## **THINGFANGHMA :**

Thingfanghma hi ruahui tamna hmunah a tha duh em em a. Thei hrisel tak anih avangin damdawiah leh chaw tha atana hman a ni nasa hle. India hi thingfanghma thar lamah khawvelah pawh a sang ber a ni a. Kum tin thluklehdingawn thum vel a thar ziah thin a ni. Khawvel a thar tam ve dang ram te chu Brazil, Mexico, Nigeria, Indonesia, China, Peru, Thailand leh Philippines te an ni.

### **Sik leh sa :**

Tuipui atanga meter 1000 bawr velah hian a tha duh em em a. Zan lam vawh zawng 12<sup>0</sup>-14<sup>0</sup> C te hi a ngeih hle bawk a. Vur leh thlina lutuk te leh tui tangkhang te hi a hre em em mai a ni. Balu leitha te hi angeih em em mai a, tin tui pek that a ngai hle bawk a ni.

### **A chi hrang hrangte :**

- Honey Dew,
- Washington,
- Solo sunrise,
- Pusa Delicious,
- Pusa Nanha,
- Hawaiian solo etc.

### **Phun hma a ram buatsaih dan :**

Thingfanghma chinnan hian ram awih pang tui chambang awm theihlohma hmun hi a tha ber a. Heng ram awih pangah te hi chuan vauah thli dang turin thing leh mau chin hi a tha a. A kung hian thli na lutuk te hi a tuar zo lo thei a ni.

### **A phun dan :**

Thingfanghma hi a chi leh tissue culture an tih hmang te a kui tiah thin a ni a. 250-300 gm hi ram hectare khatah hman thin a ni. A chi te hi nursery ah 3 m a thui 1 m a zau leh 10 cm a chhah ah kui tiah theih a ni. Polythene bag (poly pot) ah pawh a kui tiah theih a ni. 1 cm a thukah leh 10 cm inkarakh phun theih a ni a. Compost a chhilh leh tur a ni. Zing lamah tui pek tur a ni a. Thla hniih hnu ah 15-20 cm a sang annih hunah phun sawn thin a ni.

### **A phun hun :**

Thingfanghma te hi (February-March) inkarakh phun thin a ni a, October- November ah pawh an phun thin bawk.

### **A bi inhlat zawng :**

A inkar hi 1.8 x 1.8 m a ni tlangpui. Mahse bi inhnaih deuh pawh in an siam ve tho a, a inkar 1.5 x 1.5 m/ha te hman thin a ni. Hei hian ram khatah kung tam leh zual a chin theih phah a, a ching tu te pawhin an hlawk phah bawk a ni.

### **Phun sawn hun a phun dan tur :**

60 cm bialah khurlaih tur a ni a, Hetah hian phun tur a ni. Ni 15 vel laih zawh hnuah hian dah rih tur a ni. Heng khur te hi lei pangngai leh leitha in pawlha a vur tur a ni. Neem cake leh bone meal te pawlh tur a ni.

**Leitha :**

Thingfanghma te hian leitha an mamawh hnem em em a. Heng a phun dawna leitha pek bakah hian a theih ang anga leitha dang pek belh bawk tur a ni. Hei hian a rah tam lam leh a rah len ah kawng tam tak in awmzia a nei thei a ni.

**Tui pek :**

Tui pek dan tur hi a leilung leh a sik leh sa awm dan mila siam a ni a. Kum hnih an lo tlin chuan kar khat danah pek thin tur a ni a. Tui tlemlna hmunah chuan drip irrigation te hi a tih theih chuan a ngeih hle bawk a ni.

**Hlo thlawh :**

Thingfanghma kan chinna lai hmun hi tha taka thlawh thin tur a ni a. Tin, lei te pawh chawh phuh thin tur a ni.

**Thlai dang chin :**

Thlai dang zung kaih thuk lutuk lo leh thuk deuh pawh chin a pawilo a. Mahse a lo par tan tirk atang hi chuan thil dang engmah chin chhunzawm loh hi a tha ber a ni.

**A kung suat dan tur :**

A phunna hmunah hian a kung pa hi kum 10 vel phun ve thin a ni a. Mahse heng te hi a kung a lo par tan tawh hi chuan suat thin tur a ni. A zung nen lama phawi hi tih dan tlang lawn ber a ni.

**Rannung laka ven dan :**

Khau leh maimawm te chi te hian an ei chhe NASA thei hle mai a, heng a tih chhiatna lai hmun te hi pah hmak tur a ni a. Pah zawh hnu hian prophylactic leh Dimethoate (0.3%) emaw methyl demeton (0.05%) a kah tur a ni.

**Natna dang :**

Natna a tawh ber te chu powdery mildew (*Oidium caricae*), anthracnose (*Colletotrichum gloeosporioides*), a zung ro leh mawih, wettable sulphur (1gm/litre) carbendazim/thiophanate methyl (1 gm/litre) and Kavach/Mancozeb (2 gm/litre) te hmanga enkawl tur a ni.

**A lawh hun :**

A then te chu a lo hmin hian a lo eng deuh thin a, a then te erawh a hring reng mai bawk a. A rah te a lo puitlin hnu ah a rah pawh a hring dang deuh a lo nih hian lawh thin a ni a. Kum 3 atanga kum 4 an dam thei. Hectare khatah hian 75-100 tons a thar theih a ni. Hei hi a variety a zir leh a lei lung a zir in a danglam NASA thei hle a ni.

## **SUNHLU :**

Scientific Hming : *Embelica officinalis* ( syn. *Emblica officinalis*)

Family : Phyllantheceae

Sunhlu hian vitamin C (700mg/ 100 gm) a pai a. Thei hrisel tak leh taksa tan a mamawh tam tak pai thei a ni a, enkawl ngai lutuk lo thei a ni.

Nipui lai a a than loh avang hian enkawl a ti nuam em em a. Kan ram leilung nen hian a in rem em em a ni.

### **Lei enkawl dan :**

- Balu leitha hi a ngeih em em a
- Phun hma in a lei hi leh hmasat phawt atha a
- May-June thla chhung in a khur hi laih tur a ni
- A khur hi meter khat biala laih tur a ni
- Leitha (compost) kg 15 nen a chawhpawlha hman tur a ni
- Ruahsur hnu a lei a lo tla hniam deuh anih chuan lei hi vur belh leh tur a ni
- 90:120:48 of NPK leh sulphur 10 kg leh micro nutrients 10 kg/acre
- 15 kg FYM leh 0.5 kg hi a phun hma in telh tur a ni

### **Sik leh sa :**

- Tropical leh sub-tropicalah te chin theih a ni
- Ruah tam lam 630 mm - 80 mm hi a tha ber
- A kung kum 3 leh a hnuai lam te chu thli lum laka ven tur a ni
- A kung puitling te hi chuan thlasik vawt tak leh khawlum tak pawh an tuar thei a ni

### **A chi hrang hrang te :**

- Banarasi
- Chakaiya
- Francis
- NA-4 (Krishna)
- NA-5 (Kanchan),
- NA-6
- NA-7
- NA-10
- BSR-1
- Anand 1,2,3

### **A phun dan tur :**

- A khur hi 1 sq.mt a zaua laih tur a ni a. May-June ah laih tur a ni.
- A kung leh kung inkar hi 4.5mt x 4.5 mt a ni tur a ni.
- A phun hma in a khur hi leitha leh lei chawhpawlha 15 kg FYM leh 0.5 kg a vur tur a ni.
- Fur laia phun tur a ni.

### **Tui pek dan tur :**

- A kung la puitling lo te chu ni 15 danah tui pek tur a ni
- Nipui laia tui pek hi an ngeih hle bawk
- A kum a zir a tui pek dan tur
- Kum 2 chin ni 10 danah
- Kum 4 chin ni 15 danah

- Kum 4 chin leh a chung lam ni 20 danah

#### **A enkawl dan tur :**

- A zar 4-5 vel tih loh chu thlak tur a ni a, hei hi December thla a tih tur a ni.
- Hnah ro te leh leitha a chang mai thei tur te in a kung bul bawr velah chhilh thin tur a ni.

#### **Rannung laka vendan tur :**

- Endosulfan a chiu tur a ni a. 2 ml hi 1 litres tui emaw Monocrotophos 2ml in tui 1 litre emaw dichlorovos 1.5ml ah tui 1 litre
- Mancozeb 3 gm ah tui 1 litres vawi hnih September thla tir lamah a mawih leh ro vennan blue copper 3 gm 1 litre tui nen kah thin tur a ni

#### **A rah hun :**

- Kum 4-5 inkar ah hian a rah tan thin a
- February thlaah lawh thin a ni
- A kung pui tling hian kg 50-70 a thar thei a ni
- Kung khat hi kum 70 chuang a rah thei a ni
- A kung puitling tha tak hi chuan kum khatah 187-299 kg te a pe chhuak thei a ni

## **THEIHAI :**

Theihai hi India ram ah chuan thei pawimawh ber te zing ami a ni a. A tui mai piahlamah hian vitamin A leh C a pai tha em em a tin a enkawl a hautak lo hle bawk a ni.

## **Sik leh sa :**

Tuipui atang a meter 1400 ah hi chuan a boruak a hnawn lutuk loh hi chuan a chin theih tlangpui a. A par laia vur leh ruahthe a tlak/sur hian a ngeih lo hle a ni. Ruah tui tamna leh nupui ro tak te hi a ngeih a. Thli tamna hmunah chuan phun loh pawh a pawi lo.

## **Lei :**

Lei chi hrang hrangah theihai hi chin theih a ni a. Tlem a lei al deuh hi a ngeih bik in lei that zawng pH 5.5-7.5 ah hian duh thalin a phun theih a ni.

## **A chi hrang hrang te :**

A chihrang hi sang chuang a awm a mahse heng te hi chin nasat te an ni; Alphonso, Bangalora, Banganpalli, Bombay, Bombay Green, Dashehari, Fazli, Fernandin, Himsagar, Kesar, Kishen Bhog, Langra, Mankhurd, Mulgoa, Neelam, Samarbehist, Chausa, Suvarnarekha, Vanaraj and Zardalu.

## **A phun dan tur :**

Khur laih tur a ni a. A khur lai takah hian a tiak te hi phun tur a ni. Fur lai a phun hi a tha duh bik a. A la tet deuh lai chuan a hliah tutur te pawh siam a tha a. Tin, ngil taka a than theih nan do pawh a poi lo.

A inkar zau zawng hi ruahthi tamna hmunah chuan 12m x 12m a hla a phun tur a ni a, Tin, hmun ro deuhah chuan 10m x 10m a hla a phun tur a ni.

## **Tui pek dan tur :**

A la tet lai hi chuan tui hi pek that tur a ni a. A puitling tawhah hi chuan ni 10-15 dan velah pawh pe ila a pawilo. A par hma thla 2-3 inkarah hi chuan tui pek kher hi a ngai tawh lo.

## **Thlai dang chin pawlh :**

Thlai leh thei dang te pawh a bulah hian a chin theih a. An hnah rei lo te chhung awh te pawh hian a chin theih a. Tin, theirah, thingfanghma, kawlhei, theite te pawh a chin ve theih a ni.

## **A rah hun :**

A sik leh sa leh a chi a zir in a rah hun hi a in anglo thei hle a. A then chu a kumnga na a rah tan te an awm laiin a then chuan kum 8-10 na inkar a rah chauh te pawh an awm bawk.

## Topic 13 – Chuktuah huan siam dan

### Objectives :

Creating awareness for the need of household food, nutritional security and improve kitchen gardening

**Duration :** 60 minutes

**Expected outcome :** Participants will learn the importance of kitchen gardening for household nutritional security

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Kitchen Gardening	* What is kitchen gardening? * Importance of kitchen gardening * Selection of crops * Soil preparation * Crop rotation * Different method of kitchen gardening * Harvesting * Post harvest management	Powerpoint presentation, Interactive learning method	The trainer will give lecture on  - Need on household food - Nutritional security - Kitchen gardening -Utilisation of land	LCD projector, Laptop

Kitchen garden chu kan in leh vela tlhai leh hlobet kan chin hi a ni. Hmanlai atang tawh in inbul huan (Chuktuah) hi an siam nasa thei hle a, tlhai pawh a hunbi neiin an ching thin. Thlai chi hrang hrang an chin tlangpui deuh te chu antam te, be te, behlawi te, mai te, hmarcha te leh a dang tam tak chin thin a ni.

Tun laiah chuan heng in bul huan atang a kan thar te hi khaw chhungah te an hrall chhuak ve bawk a ni.

### In bul huan hlawnka te :

- Eitur tlhai hrisel tha leh tharlam kan thar thei
- Thlai lei nana sum tam tak kan hman minlo phuhruk thei
- Kan in ningnawi te chu kan in bul huan a tan lei tha a ni thei
- Kan in bul awl lai te chu tangkai zawkin kan hman thei phah

### Thlai chi thlan dan :

Mixed cropping kan tih mai tlhai a ruala chi hrang hrang chin hi inbul huanah chuan a tha ber a. Kan tlhai chi thlan dan chu hun bi nei ni tur a ni a, tlhai kan chin tur chu chin dun chi a ni tur a ni a, a bawr thei ang ber a chin tur a ni.

## Crop Rotation ( Thlai chin hun bi) :

In bul huan kan siam hian kan thlai chin tur a te chu kan thlak kual thin tur a ni. Thlai thenkhat chuan leitha a hip chak bik thin a, chuvang chuan thlai chu a inang kum zawn a chin hian leitha a ei da thei a ni. Entirnan : thlai par chi tomato te, bawkbawn te leh alu te hi thlai chi dang iskut te, be te leh antam te nen thlak thin tur a ni.

## Pest management (thlai ei chhe tu thunun dan) :

Heng thlai lo eichhe tu lo thunun dan tha ber chu heng kan ti dan thin chi hrang hrang te leh khawl emaw hlohuat emaw a rual a hman hi a ni.

Tunlai thlai eiche tu thunun dan chu “chin hma a ngaihtuah hmasak” a ni, a hnu a beih leh vak ai chuan a hlawk zawk. Thlai kan chin hma hian kan thlai chin tur a chu engin nge tichhe thin tih kan hriat chian hmasak hi a tha hle a ni.

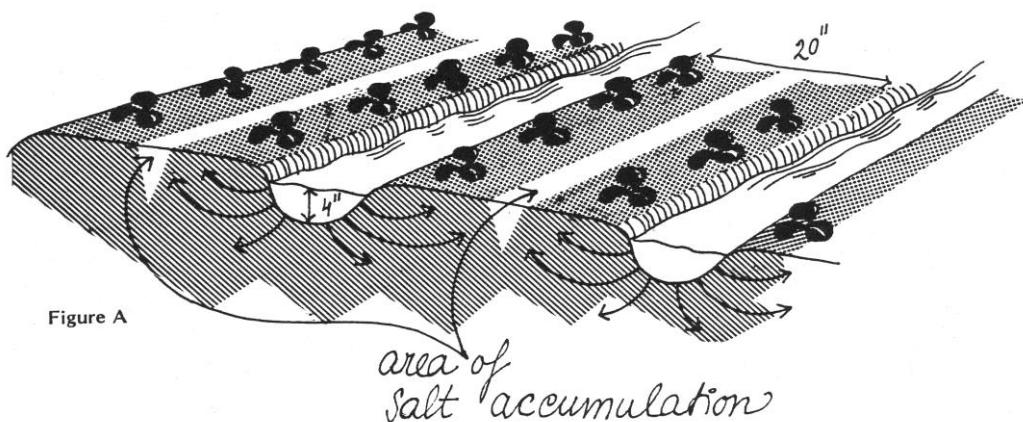
## Pest (Thlai ei che tu) thunun dan tlangpui :

1. **Lei hrisel tha** : Lei hrisel tha hi thlai kan chin hma in kan ngaih pawimawh a tha. Lei tha chuan thlai rannung in lo ti chia pawh ni se a ti dam leh vat thei thin a ni.
2. **Thlai chin dun** : Thlai thenkhat hian rannung huat rim a pek chhuah thei avang hian thlai chin dun thin hi a tha hle a ni. Entir nan purun var thlai kar a chin hian sephung te, maimawm te leh a dang tam tak a hnawt tiau thei a ni.
3. **Crop Rotation** : Thlai chin thlak thin hian rannung thlai ei che tu kha a ti tlem thei a, a chhan chu rannung thenkhat chu nipiuh te an rawn lang a, a ei duh thlai kha a lo awmloh chuan sava in emaw thil dang in emaw a ei zo mai thin a ni.
4. **Mulching** : Mulching han tih hian kan hnime tawih thlai bula kan dah hian thlai tan chaw tha a lo ni a, rannung thenkhat thlai lo veng ve thei tu tan pawh awm hmun a ni thin.
5. **Trap plant** : Thlai thenkhat chu thlai dang ven nan a bulah chin thin a ni a, hei hian thlai dang rannung in a bei tur kha thlai rannung duh chi a bul a a awm chuan a bei ta zawk thin a ni. Chung thlai rannung in a beih chu an phawi a an hal ta mai thin a ni.

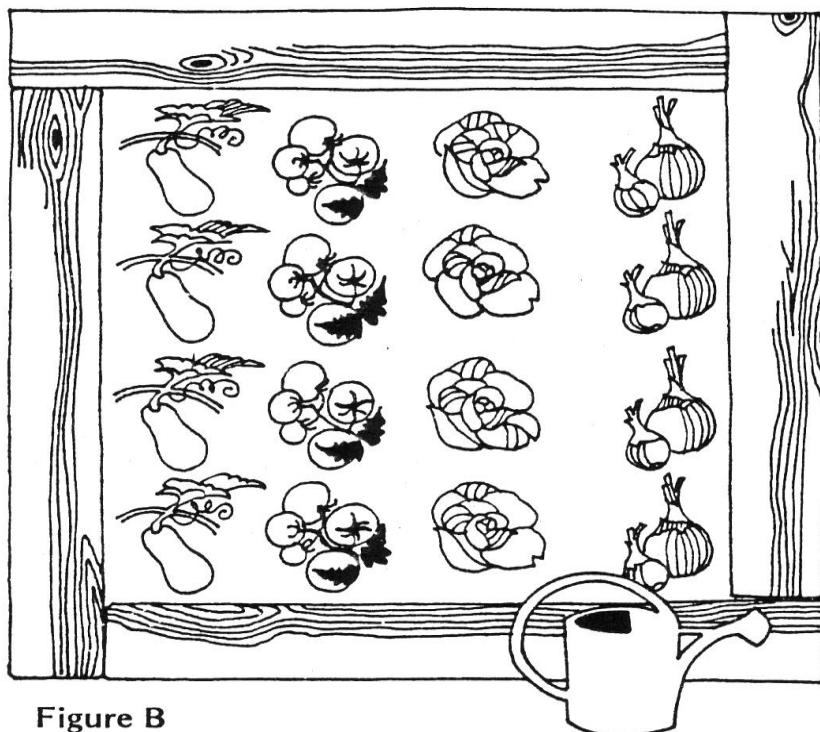
Entirnan : Pangang thenkhat chuan fanghma aiah iskut te an beih duh zawk thin a ni.

## In bul huan siam dan hrang hrang :

1. **Soil bed-technique** : Soil bed technique chu tlem a ram awih deuh hlek ah a siam theih a, lei khuar chu a khat tawk in an siam a hei hian lei al lutuk tur kha a lai khuar ah a tleng thin a ni. Tui chu lei khuar laiah chuan an luan tir thin a ni.



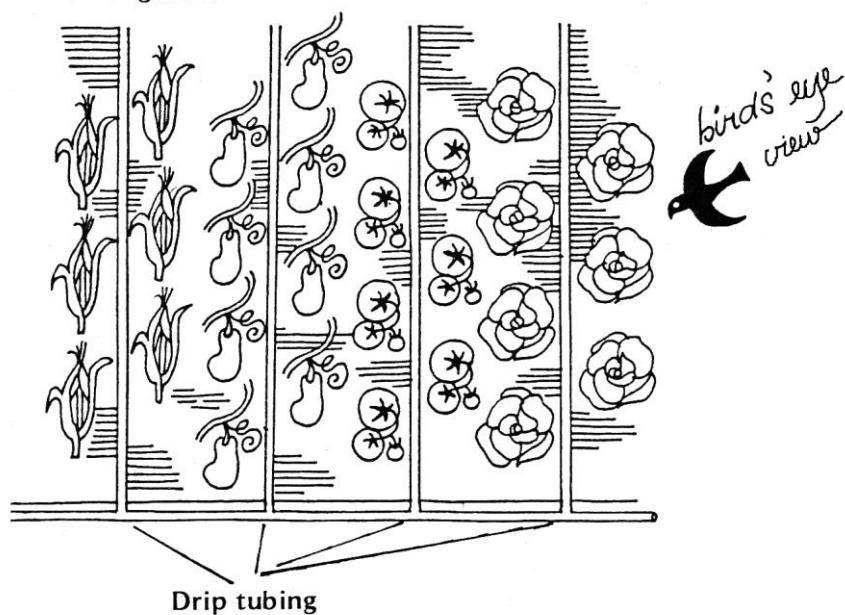
2. **Raised bed-technique** : Raised bed technique chu a sir tawn tawn ah thing emaw thir in emaw an dang kual a, hemi chhungah hian lei chu feet khat velin an chhung ta thin a ni. Hei hian leitha luang ral tur a veng a, chu mai bakah thli in a thlai a ti chhiat tur lakah a veng a ni. Heng hi lei that vaklo na hmun ah siam a tha a, lei tha han vur pawn a luang ral ve mai lo a ni.



**Figure B**

3. **Drip tubing** : Drip tubing ah chhuan tui chu pipe in emaw sprinkle in emaw rual deuh in huan a chuan thlai tui pek nan hman thin a ni. Hei hian thlaiin a mamawh tawk tui a pe tha a, thlai tui mamawh hnem deuh a chuan siam chi a ni.

**Figure C**



## Topic 14 – Sericulture farming

### Objectives :

To impart the knowledge of sericulture practice, value and sales of silk

**Duration :** 60 minutes

**Expected outcome :** Participants will learn the importance of sericulting farming practices

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Sericulture farming	<ul style="list-style-type: none"><li>* Why sericulture farming?</li><li>* Disinfection of appliances</li><li>* Disinfection of rearing house</li><li>* Maintenance of plantation</li><li>* Preventive measure of disease</li><li>* Harvesting of cocoon and transportation technique</li><li>* Pruning of mulberry leaves</li></ul>	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on sericulture farming through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Sericulture hi leilung hna eizawnna (Agro base Industry) awlsam leh daih rei si a ni a. Sericulture in a tum ber chu silk la tharchhuah a ni a. Silk la hi kum sang tel mihringin a pangngai renga kan la hman, tun thlenga a thatna leh duhawmna la chuai lo, a lan thei tur thil dang la hmuh chhuah loh awm chhun a ni. Lal incheina ropui bik buatsaihna hmanrua a ni a, silhpuan ropui leh man to siam chhuak turin a aia tha tur reng reng a la awm lo. Mi hausa tawntaw te pawhin silk aia ropui leh chungnung inbel tur an hre lo a ni. Kum sang tamtak kal liam tawh atang khan silk hian mihring nunah pawimawhna thuk tak a lo nei tawh a ni. Tun thleng hian, mihring ten silhfen a kan neihsa natural (cotton, wool, jute) leh thiamna sangzawk hmanga kan siamchawp synthetic fibre (rayon - viscose, Synthetic - nylon, polyester, etc), te ai hian silk hi a la chungnung ber zel a. La dangte aia dehvel nawm zawk thuah te,a rawng leh a chei danglam mawi awlsammate leh a tlona hrim hrimah te hian ‘Queen of Textiles’ tih a la ni reng a ni. Chuvangin ramchhung leh pawnah a hralthna lamah harsatna a la awm ngai lo a ni. Tin, Silk kan tih hi protein chi khat fibroin leh sericin-in a siamchhuah a ni.

### SERICULTURE :

Sericulture chu silk la thar chhuak tura maimaw pangang khawia cocoon (silk la) siamtir hi a ni a. India hi ram vannei, khawvela maimaw pangang chi nga awmte khawi vek theihna ram a ni. Chung pangang chi ngate chu : Thingtheihmu pangang, Mutih pangang, Bul/Nauthak pangang, Tropical Tasar pangang leh Temperate Tasar (Oak Tasar) pangangte hi a ni. Mizoram ah hian Mulberry silk pangang hi khawi tam ber a ni a. Mutih pangang te, Bul/Nauthak pangang te, Oak Tasar pangangte pawh a khawi theih bawk.

Thingtheihmu pangang (*Bombyx mori*) hi Theihmu hnah (*Morus sps.*) hmanga chawm, in chhunga khawi a ni a. A keu atanga ni 23-30 velah a lo puitling a buhchiumah a lo chang thin. Buhchium a nih chhunga a invenhimna atan bawm (cocoon) a siam thin a. Cocoon a siamna lazai chu silk la hlu tak mai chu a ni a. Chu lazai chu pangang kan khawi chhan ber chu a ni. Silk pangang chi dangte pawh hi chutiang vek chuan duat taka khawia Cocoon siamtir theih vek an ni.

### **India-a silk la siamchhuak thei rannungte :**

Silk Variety	Pangang hming	A chaw
Mulberry (Thingtheihmu)	<i>Bombyx mori</i>	Mulberry (Thingtheihmu) <i>Morus sps.</i>
Tropical Tasar (East & Central India)	<i>Antheraea mylitta</i>	Arjun & Asan <i>Terminalia sps.</i>
Temperate Tasar/ Oak Tasar (Sasaw ei chi)	<i>Antheraea proylei</i>	Oak (Sasua) <i>Quercus sps.</i>
Muga (Bul/ Nauthak pangang)	<i>Antheraea assama</i>	Som & Soalu (Bûl & Nauthakpui) <i>Machilus/Litsea sps.</i>
Eri (Mutih, Pangbal ei)	<i>Samia cynthia ricini</i>	Castor ( <i>Ricinus</i> ), Payam ( <i>Evodia</i> ), Tapioca ( <i>Manihot</i> ) Kesseru ( <i>Heteropanax sps.</i> )

## **SERICULTURE HNATE**

### **THEIHMU CHIN (*MORICULTURE*):**

Theihmu chin hi Moriculture an ti. Mizoramah chuan khawi laiah pawh theihmu hi hlawhtling taka chin theih a ni. Theihmu hi a chi atanga chin pun theih ni mahse, a tang phuna chin a ni ber. May leh June thlaah theihmu tang, kum khat vela upa chu inches 8 vela seia tan chhuma phun tur a ni. A kum leh atangin maimaw pangang khawi nan a hman theih nghal a ni.

### **SILK PANGANG TUI SIAMNA :**

Silk pangang tui siam hi grainages an ti. Silk pangang tui (pangang chi tih a ni bawk) Disease Free Laying (DFL) an tih chu Grainage centre-ah an siam chhuak a. Theihmu huan siamtute hnenah khawi turin an pe chhuak thin.

### **SILK PANGANG KHWI :**

Maimaw pangang khawi hi leilung behchhan eizawnna, industry tenau anga ngaih a ni a. Theihmu hnah hmanga maimaw pangang khawi a ni a. Maimaw pangang chuan Silk puan (maimaw puan) tah chhuak tura kan mamawh Cocoon (raw material) a siam chhuak a ni. Cocoon thar chhuaha hralth hi, kut hna thawktutute tan sum lakluhna tha tak a ni. Zokhaw lam kut hnathawktute tan a remchang lehzual a ni. Silk pangang chi hrang hrangte zingah, Theihmu pangang leh Mutih pangangte hi in chhunga khawi a ni a. Muga pangang leh Tasar pangangte hi pawnah thingkunga khawi a ni.

### **COCOON HRALHNA :**

Maimaw pangang khawitute chuan an cocoon thar chhuah chu a hralthna hmun hnai ber, sorkar-in a siamsakah chuan an hralth thei. Chutah chuan cocoon-te chu a that dan azirin a man

an lo bithliah ang a, maimaw la hlum chhuaktuten an lo lei dawn a ni. Cocoon hi a chhunga buhchium nun lai ngeiin hralth hman tur a ni.

### SILK LA HLUM :

Pangang in bawm a siam ‘**Cocoon**’ chu silk lazai sin tak muk taka inhlum a ni a. Chu chu silk la hlum thiamten uluk takin an hlum chhuak leh thin a ni. Silka la hlumna khawl hi chi thum a awm ber a. Chungte chu: Charka, Cottage basins leh Multi-end basins te a ni. Cocoon tha lo hote chu *charka* hmanga hlum a ni a. Tlema tha deuhte chu *Cottage basins*-ah an hlum chhuak a, a tha zual hote chauh *Multi-end Reeling Basins*-ah an hlum chhuak thin. *CharkaI* hi khawl mawlte hmanlai atanga an lo hman thin chu a ni a, silk lazai quality tha a chhuak thei lo. Cottage basin atang a silk hlum chhuahte hi a tha thawkhat viau nain, quality tha tak chu a chhuak thei lo. Multi-end Reeling khawl atanga hlum chhuah chauh hi Silk lazai tha leh changkanga ngaih a ni.

Silk lazai tha leh changkang ber siamna khawl chu China leh Japan rama an hman thin, Automatic silk reeling machine an tih chu a ni a. India ram pawh, Hyderabad-ah bun a ni ve tawh.

Cocoon atanga lazai sin tak lo chhuak, zai 6 atanga 12 vel belhbawm chu lazai pakhat atana hman a ni ber a. Chutianga hlum chhuah chu *Raw silk* an ti.

### RAW SILK ZAWRHNA :

Cocoon atanga lazai hlum chhuah thiam ho (Reelers) ten an lazai hlum chhuah sate chu Puan tahtute hnenah an hralth leh thin. Silk lazai hralthna hmun lian tak tak, Maimaw pangang khawi nasa ho state-ah chuan a awm a ni. Bazar-a silk laduang an rawn zawhte chu a that leh that loh endik vek hnuah, an lazai that dan azir zelin a man biathliahin an lilam thin a ni. Silk la hralthna bazar-ah chuan la hlamtuten awlsam takin pawisa dawng nghalin an silk late an hralth thin a ni.

### SILK PUAN TAH :

Bazar atanga silk la va leite hi puana tah nghal mai theih a la ni lova. Dandawi hmanga chhum zawi (degummed) hnuah thlur/hrual (twisted) phawt a ngai a. Chumi hnuah puan atan a ban theih chauh a ni. Silk late hi Puantahna khawl mawl te te leh khawl changkang (power loom) hmanga tah theih a ni. A tahna khawl a changkan poh leh silk puan a chhuak mawi mai a ni.

### MAIMAW PANGANG KHAWI DAN :

*Maimaw pangang khawitute tana kaihruaina*

### Thingtheihmu (Mulberry) :

Thingtheihmu (Mulberry) ah hian chi hrang hrang (variety)eng emaw zat a awm a, chung zingah chuan maimaw pangang tan a chaw tha bik leh kan ram leilung ngeih em em- S1635 thingtheihmu chi hi a ni a. Hei hi mithiamen zirbingna (research) an neihna atanga Mizoram tan a an thlan bik a ni. Cocoon quality tha leh hlawk zawk nasa taka thar chhuah theihna anih avangin Maimaw pangang khawia eizawngten phun/chin uar theuh tur a ni.

❖ Thingheihmu (Mulberry) chin dan chu hemi hnu lamah chiang zawka tarlan a ni.

## Rearing House :

- Rearing house hi mihring chenna bul hnaiah sakloh tur, thingtheihmu huan awmna ah ngei sak tur a ni. Hmun thenghaw tha lai leh hmun hrisel thlan a tha
- Rearing house sakna tur chu hmun zawl tha tak a ni tur a ni, kawmchhak lam leibang hnaiah sak loh tur. Lei bang atanga feet 5 vel ala hlaah sak tur. Tuihawk luankawr laih ngei bawk tur a ni.
- Rearing house chu a liang feet 9 aia hniam lo ani tur a ni.
- Sazu luh theihloh na turin a skirting chu tih phui tur a ni.
- Lei laih zawl atanga feet 1 vela sangah rearing house chhuat hi awm thei se duhthusam a ni.
- Rearing house luhna kawngkapui chuan varandah thlawnk feet 4 vel nei ngei se, Tin, tlak deng lam chuan verandah thlawnk chhuak feet 4 vel a nei ngei bawk tur a ni. Hei hian rearing house nisa direct in a emtur a veng a, chubakah rearing house a ti tlo bawk
- Tukverh leh venilation siam tur a ni a, bang thlang lam a tukverh leh venilation kan siamna zawn chiah bang chhak lamah tukverh leh venilation dah tur a ni.
- Kawngkapui kan hawnna zawnah chiah kawmchar lamah pawh kawngkapui dah leh bawk tur a ni.
- Rangva chih anih hmain, rangva hnuiah chiah dap dah phawt tur, hei hian lum lo kal tlang tur nasa takin a veng. Rangva hnuai chiah a dah a nih loh pawhin, ceiling siam ngei tur a ni.
- Chawhnu thlang her tlak deng lamah rearing house sa tan, rearing house atanga feet 20 vela hlaah lamkhuang/theihai phun tur, heihian nisa direct a rearing house a emtur a veng a ni.
- A chung sang laiah boruak chhuahna siam nise.
- Laying 100 vulh nan dung feet 24 leh a vang feet 15 ni thei se duhthusam a ni.

## DOUBLE DISINFECTION (KAH THIANGHLIM) :

Mulberry pangang hlawhtling taka khawi turin, natna laka mawimaw pangangte ven nan pangang khawi hma leh khawi hnuah kah thianghlim (disinfection) hi tih thin ngei ngei tur a ni. Sericulture department a mawimaw pangang khawi hlawhtlinna kawng pawimawh tak pakhat chu pangang khawi hmaa vawi hnih kah thianghlim (double disinfection) tih hi a ni. Pangang khawi puilin hma a, adang khawi leh tur lakleh hi tih loh tur a ni, hei hian a kah thianghlim hun ruahman a tihbuai thin avangin natna lakah kan pangangte an him lo fo thin tih hriattur a ni. Pangang hrisel tha taka khawitur chuan a hunbi taka kah thianghlim ziah tur a ni.

Tin, rearing house leh a chhehvel fai taka enkawl te, rearing house hualvel a tui luan kawr felfai taka siamte leh maimaw pangang khawitu tur te thianghlimna kawngah kan tin vawn uluk angai a ni. Pangang khawih dawnah zuk leh hmuam tih loh te, kut silfaite, rearing house luh dawnna ke tihfaite hi a pawimawh hle a ni.

Chuvang chuan a tih dan tur dik taka double disinfection tih hian awmze thuk tak kan pangang khawiah anei ani tih hriattur a ni. Pangang hlawhtling taka khawi tur chuan ahnuai mi ang hian double disinfection ti ziah thin ang che.

### Double disinfection tih hun tur :

Pangang khawi hma ni 5 ala awmah heng ahnuai ami ang hian tih thin tur a ni.

### *Pangang vulh hma :*

Ni 5 hma : Tihfai, silfai leh hmanruate Nisa-a pho.

Ni 4 hma : Rearing house leh pangang vulhna hmanrua zawng zawng 2% bleaching powder leh 0.3% chinai thi chawh pawlh chu tui nen chawhpawlha kah fai tur.

Ni 3 hma : Rearing house leh pangang vulhna hmanrua zawng zawng Decol/Asthra hmanga kah thianghlim vek tur.

Ni 2 hma : Rearing house pawn leh a vel te kahfai a, kawngka luhna bul vel te kah thianghlim. Tukverh leh ventilation erawh hawn dar tur.

Ni 1 hma : A tuka pangang khawi thei tura lo inrin lawk.

#### ***Pangang vulh hma :***

1. Cocoon thalo lakbang leh rearing house tihfai
2. Rearing house leh a vulhna hmanrua zawng zawngte chu bleaching powder 2% leh chinai hi 0.3% te tui litre 1-a pawlha chumi hmanga kah thianghlim tur chu a ni.

#### **A damdawi hnathawh dan :**

Chinai thi leh bleaching powder-te hian mawimaw panganga natna thlen theitu viral leh fungal natna ang chi zawng zawngte hi a that thei a ni. Chinai thi leh bleaching powder chawhpawlha kan phul hian hnawng a hipin pangang vulhna in ati thianghlim bawk thin a ni.

Decol/Asthra hmanga kan pangang vulhna in kan kah thianghlim hian maimaw pangang ten natna an vei thin tam tak a that thei a ni.

#### ***A damdawi chawhpawlh dan tur :***

1. Chinai thi leh bleaching powder chawhpawlha dan tur (2% bleaching powder leh 0.3% chinai thi chu tui litre khatah) :

Bleaching powder gram 20 a rit chu chinai thi gram 3 a rit nen chawhpawlha a, tui litre 1 ah pawlh leh tur a ni.

*Enirnan : 15 litres*

Bleaching powder:

$$\begin{aligned} 20 \text{ gm} &\times 15 \text{ ltr of water} \\ &= 300 \text{ grams (0.3 kg)} \end{aligned}$$

Chinai thi :

$$\begin{aligned} 3 \text{ gm} &\times 15 \text{ ltr of water} \\ &= 45 \text{ grams (0.045 kg)} \end{aligned}$$

Tui :

$$1 \text{ ltr} \times 15 = 15 \text{ ltrs of water}$$

A chunga mi kan chawhpawlha te hi spayer bura thun dawnin rizai kawr emaw a filter (thlitfim) tur a ni. A nawi te hian a spayer hmawr a hnawh theih avangin a thlitfim hnu chauha hman tur a ni.

2. Chinai thi leh bleaching powder kg1 a rit siam dan (5%) :

A hnuia mi ang zat hi buka, tha taka chawhpawl hnuah hman tur.

Bleaching powder : 0.05 kg

Slaked lime : 0.95 kg

3. Decol/Asthra :

Ashra gram 50 chu tui litre 100 ah pawlh tur.

**Silkworm rearing :**

- Maimaw pangang tui sumo/bus a hawn thin anihin dashboard ah emaw motor chhuat sa ah dah loh tur. A hawnna tur bawm tha tak boruak lut tha si siam a, hei hi hman nawn reng theiha siam a tha.
- Mawimaw pangang tui te farmer ten in an hawn thlen hnuah temperature 25 degree celcius leh humidity 80% awm theihna hmunah an dah thin tur a ni. Hnawng siam tur hian foam pad emaw buara emaw buara ip sukfai emaw tih hnawn te hman thin tur a ni. Tin, pangang tui te an lo dum tantirh in black-boxing hi tih ngei ngei tur a ni a. A keu hun tur ni zingah chuan ni zung chhun theihloh si, ni eng hmu phakah hawn that tur a ni.

	Temperature	Relative humidity
A keu atanga vawi 1 mu	26-28°C	85-90%
Vawi 1 hawh- vawi 2 mu	26-28°C	85-90%
Vawi 2 hawh- vawi 3 mu	24-28°C	80-85%
Vawi 3 hawh- vawi 4 mu	24-25°C	70-75%
Vawi 4 hawh- cocooning	23-24°C	70-75%

• **A tui keu hlim lawk dan (brushing) :**

a) Loose egg brush dan : Maimaw pangang note keu hlim chungah chuan len (net) dah a, zing dar sawm ah theihmu hnah no, a zik atanga a hnah 1 leh hnah 2 na chauh chan sawm sa chu len (net) chungah chuan phul kual a chaw pek tan tur, darkar chanve hnu velah lak sawn tur.

b) Egg sheet brush dan : Maimaw pangang no keu hlim egg sheet a an awm laiin theihmu hnah no, a zik atang a hnah 1 na leh hnah 2 na chauh chan sawm chan sawm sa chu phul kual a chaw pek an tur, chaw pek hnu darkar chanve velah tray dangah dahsawn tur, dahsawn dawn hian egg sheet chu lehlin a a hnung lamah pen kerh kerh tur. Maimaw pangang tla ve theilo te chu ar hmuk a dim taka phiah thlak chauh tur a ni.

• **A chaw pek (feeding) :**

- Silk pangang hi ni 1 ah chaw vawi 4 pek thin tur a ni a, chaw pek inkar rei zawng hi a inang thlap tur a ni. A tet lain chaw pek dawnah an awmna hmun tih zauh nan haidarh thin tur a ni. Chawpek hun tur chu hetiangin :-

Darkar 4 dan zelah: Zing dar 6, zing dar 10, chawhnu dar 2 leh tlai dar 6

- **A ek thenfai (Bed cleaning) :**
  - Maimaw pangang te hi an mut thawh apiangin an ek thenfai thin tur a ni. A vawi 3 mu hawh atang phei chuan a ek hi nitin len (net) hmanga thenfai thin tur a ni. Pangang ek te chu rearing house atanga hla deuhah khur laih emaw dah khawlna siam a, lei tha atana hman theih ani. Pangang mu thawh hlimah Ankush hi phul thin tur a ni. Phul atanga darkar chanve hnuah chaw pek chau tur a ni. Fur khaw hnawn lai chuan zingah chaw pek hmain pangang te chu Ankush emaw chinai thi emaw phul thin tur a ni.
- **Thingtheihmu hnah dah that dan :**
  - Thingtheihmu hnah te hi zing leh tlai ni nemah emaw lawh thin tur a ni a, chhun nisa ah lawh loh tur a ni. Thingtheihmu hnah lawh sa te chu buara huh emaw puan huha tuam thin tur a ni, thingtheihmu hnah lawhsa vum thur a dah loh tur. Fridge ah hnah lawhsa dah loh tur a ni.
- **Maimaw pangang a khawina thlangra a dah dan :**
  - Maimaw pangang te tawt lutuk leh thawl lutuk a dah loh tur, 100 dfls tha taka vulh tur chuan :
    - Plastic tray (3 x 2 sq. feet) hmain 120 vel a ngai
    - Thlangra pangai hmain 150 vel a ngai.
- **Maimaw pangang hmin thlan dan :**
  - Maimaw pangang hmin te chu thlan khawm a, thlangra ah dah lailawk phawt a, zun tir tur a ni. Chumi hnuah chauh plastic mountage ah dahsawn tur a ni.
- **Cocooning :**
  - Plasic mountage (2 x 3 feet) pakhatah hian maimaw pangang 200 atanga 250 vel dah thin tur a ni. Tawt lutuk a dah loh tur a ni. Plastic mountage te chu kan chherchhuan dawn anih chuan blotting paper emaw newspaper emaw akarah phah thin tur a ni.
- **A seng khawm (harvesting) :**
  - A cocoon ni atanga ni 5 na ah chauh cocoon hi seng/khawh thin tur a ni.
- **Cocoon thiar sawn dan tur (ranspor) :**
  - Alu bag awng sir siar emaw bawmrang ah emaw cocoon te chu dah a phurh sawn thin tur a ni. Satha ip/ polythene ah cocoon dah loh tur.
- **Thianghlimna :**
  - Maimaw pangang khawitute chu an invawng uluk thin tur a ni. Thawmhnhaw bal leh rimchhia inbel loh tur a ni. Pangang chaw lawhlai leh khawina in a luh dawnin zuk leh hmuam tih loh tur, kut silfai zawk tur.

#### **Pangang khawi hlawhtlin natna tihtur pawimawh te :**

- Pangang khawina hmanrua midang ta hawh loh tur, pangang khawina hmanrua disinfection loh chu hma loh tur.
- Pangang khawi lain a dang khawi leh tur lakloh tur.
- Maimaw pangang khawi lai hian khawi tute pawh kan invawng uluk tur a ni.
- Rearing house tul lova luh sek loh tur.
- Rearing house luhkaah ke tahna dah a chutah chuan bleaching leh chinai hi chawhpawlh sa ni khat danah phul thin tur.

- Rearing house a kan luh hmain kut silfai ngei tur ani. Ketah naah ke tah tih ziah theih nise.
- Sahbawn emaw 2% bleaching tui chawhpawl a dah a kut zu chiah a chumi hnuah tui pangai a kut silfai ziah tur a ni.
- Pangang te chu ngun taka ena, an thiante rual phalo deuh emaw natna kai rinhlelh te chu lak hran a, 5% bleaching powder siamsa bur chhin neiah pail thin tur ani.
- Ni 3 danah heta dah pangangte chu phum bo emaw halral thin tur a ni.
- Natna kai rinhlelh pangangte kan khawih zawah kan kut te a chung ami anga silfai leh thin tur a ni.
- Ankush powder hi an mut thawh hlim apianga phul thin tur ani bawk, hei hian pangang tin lip hlim vun nem tak te chu natna an kai theih lakah a veng a ni. Tin, vawi 4 mu tho te chu tuk tin chaw pek hmain phul ziah tur a ni.

## **PANGANG NATNA, A EICHHE THEITU RANNUNG LEH A ENKAWL DAN :**

### **Maimaw pangang natna leh a enkawl dan tlangpuite :**

Maimaw pangang te hian hri an kai vei thin a, chung an natna vei thlenu te chu protozoan, virus, bacteria leh fungi te an ni. Heng natna zawng zawngte hi natna an vei hmain alo inven lawk dan a awm a ni. Tun hnai maiah maimaw pangang khawi dan leh thingtheihmu siam dan ah te tihdan thar tha tak tak natna laka inven dan te hmu chhuakin cocoon thar chhuah zat te pawh sang chho zel mahse, maimaw pangang khawi ten natna an vei avanga channa hi India ramah chuan 15-20% anga chhut ala ni tho a ni. A hnuaih hian maimaw pangang natna vei tlanglawn leh theihmu natna tlanglawn te tarlan a ni :

### **Pebrine :**

Pebrine natna hian hun rei tak a awh thin a. Natna dangdai leh phengphehlep nu (mothermoth) atanga inthlahchhawn a ni.

**Natna inlar dan :** Pebrine natna hi engtik hunah pawh alang chhuak thei a, chumi anih avang chuan hunbi nei natna sawi theih a nilo a ni.

**Natna thlentu:** Nosema bombysis, Nosema sp. NIK-2r, NIK-4m leh NIK-3h

### **Natna lanchhuah dan :**

- Pangang than a ti tawp a, chaw an ei thei lo a, an taksa alo vuai a, an nem vek thin a ni.
- Pangang kawchhung a tuihnang paihchhuahna dawt bangah bawl hnai la angin a awm.
- Pangang thi tawh te bacteria natna in a ei chhiat avangin an dum thin a ni.

### **Natna lo thlen dan leh inkaichhawn dan :**

Pangang in natna kai hnah/chawr an ei atang leh pangang tui hrisel lo atang te hian Pebrine natna an kai thei a. Hemi mai bakah hian pangang hrisel lo te, an ek atang te, rannung dangin a bawm atangte, pangang khawina in fai awk lo te, hmanrua leh theihmu hnah hrisel lo pek atang te hian pebrine natna hi an vei thei a ni.

Pebrine natna hi natna nei pangnang nu atanga an hlal te ah a kai chhawn theih mai bakah chaw hianghlim lo leh natna kai pek atangin a kai chhawn theih a ni.

### **Enkawl dan :**

- Pangang tui siamchhuahna kawngah mi thiamte thurawn ngaih pawimawh.
- Pangang khawi laiin, Pebrine natna an vei leh veiloh en thin tur a ni a, a vei an awm anih chuan lakhran nghal tur a ni.

- Pangang khawina in, hmanrua, a chhehvel te leh pangang tui te chu fai taka dah tur a ni.
- Pangang khawi lai leh pangang tui siamchhuah lain thianghlim taka chet a, tihfai thin tur a ni.
- Pangang/cocoon/pangang tui te chu natna in a tihchhiat theihna lakah venhim tur a ni.

### **Grasserie :**

***Natna thlentu : Nuclear Polyhedrosis Virus***

***Natna lanchhuah hun : Kumtluanin he natna hi a hmuu theih a, a bik takin nipui lai leh fur lain a tlanglawn ber a ni.***

### ***Natna lanchhuah dan :***

- Pangang chu a mu hmain a vun a lo tle a, hei hian pangang mu tur a tibuai a ni.
- Pangang natna kai te chu tray chhungah awmze neilovin a vak kual thin a ni.
- Pangang chu alo vung a, an taksa alo eng thin a ni.

### ***Natna kaichhawn dan :***

Pangang in theihmu hnah hrisel lo a ei atang te, pangang natna vei pangang te nen anlo awm ho atang te, taksa atanga tui chhuak atang te, rannung dangin a bawm atang te leh pangang khawina in leh hmanrua fai tawk lo avang ten natna an kai thei a ni.

### ***Enkawl dan :***

- Pangang khawina in leh a velte, a hmanruate leh pangang tui te chu fai taka vawn tur a ni.
- Pangang khawina in leh hmanruate chu bleaching powder 5% a tihfai tur a ni.
- Sik leh sa leh boruak hnawng lam te thunun tur a ni.
- Pangang upa lam tawh te hnah no pek loh tur
- Pangang hmun khatah dah khawm teuh loh tur
- Labex hman tur a ni.

### **Flacherie :**

***Natna thlentu : Infectious Flacherie Virus***

***Natna lanchhuah hun : April-September***

### ***Natna lanchhuah dan :***

- Pangang in chaw an ei duh lo
- Pangang lu leh nghawng bawr a fim
- Pangang thanleh puitlin zelna tur chu an taksa sawngte avangin a tibuai
- Than a ti khaihlak
- Kawthalo avangin Pangang te an thi a, thil tuihnang an luak chhuak thin

### ***Enkawl dan :***

- Bleaching powder 5% in pangang in leh hmanrua te tihfai tur a ni.
- Natna laka pangang venhim nan labex hman tur a ni.
- Sik leh sa leh boruak hnawn dan mamawh ang zelin fel taka vawn tur a ni.

**Black thorax septicaemia :**

**Natna thlen tu :** Bacillus spp.

**Natna lanchhuah hun :** April-July

**Natna lanchhuah dan :**

- Taksa a vung
- Hrawk bawr vel a dum
- Thil tuihnang taksa atangin a chhuak
- Zawi deuhin an che a, chaw an ei thei lo
- An thih veleh an hrawk bawr vel a dum

**Natna kaichhawn dan :**

Taksa hliam atangin.

**Enkawl dan :**

- Pangang khawina in leh a vel vawn fai
- Pangang hliam tur ven
- Pangang hmun khat ah dah tam lutuk loh tur. Tin, an ek pail fai zel tur
- Sik leh sa leh boruak hnawng an mamawh ang pek

**White muscardine**

**Natna thlen tu :** Beauveria bassiana

**Natna lanchhuah hun :** November-April

**Natna lanchhuah dan :**

- Pangang vun a tial a
- Pangangin chaw a ei duh lo a,a chau thin
- Kawthaloo leh luak
- Pangang thi tawh taksa chu an thil hnawng varin a bawm

**Natna kaichhawn dan :**

Taksa pem atangin.

**Enkawl dan :**

- Pangang khawina in leh hmanrua chu bleaching power 5% in kah tur ani
- Pangang khawilai in sik leh sa leh boruak hnawng dan mumal tak a dah tur
- Pangang natna kai te chu an thih hmaiin thleng atanga pail chhuah tur

## **Uzi fly, Exorisa bombycis**

Uzi fly, Exorisa bombycis hi maimaw pangang tan a rannung hlauhawm leh chimawm tak mai an ni a. He rannung chimawm tak avangin Sericulture ah 10-20% in chhiatna a thlen thei a ni.

**Natna thlen hun :** Kumtluanin ah hmuh theih a, a bik takin Jul – Nov ah

**Natna lanchhuah hun :** November-April

**Natna lanchhuah dan :**

- Pangang taksa a rannung tui emaw chhunhnan dum leh rannung chhuahna awm kua a awm chuan Uzi fly in a ei chhia tih a lantir
- Pangang naupang lam deuh a ranung in a tih buai te chuan silk la an pek chhuah hma in an thi a, chu tih rual in cocoon siam mahse cocoon siam chhuah te chu an hman tlak loh a ni.

**An dam chhung hun hman dan :**

Tho lian (Uzi fly) hi vawikhat ah 300 vel a tui a, a tui zinga 2 emaw 1 emaw chu pangang taksaah lutin ni 5-6 chhung hun a hmang a. Chumi hnuah pangang kawchhung atanga lo chuak in pangang khawina in chuatah te, hmun him lamah te awm in buhchium ah a in siam a. Buhchium a a insiam chhung hi ni 10-12 niin an dam chhung hun hi ni 18 atanga ni 24 a ni.

**Enkawl dan :**

- Tho lian in a eichhiat pangang/cocoon/buhchium chu tih ral vat tur a ni
- Pangang khawina chhuat chu khi emaw awng emaw a awm tur a ni lo
- Tho lian in a eichhiat cocoon te a hrana hlum a, dah hran tur a ni
- Pangang khawina in tukverh/kawngkhar leh ventilator ah tho luh theih loh nan net zar tur a ni
- Tho lak a inven nan Uzitrap,Uzicide leh Uzipowder te hmang tur a ni
- Tho buhchium te thah a nih theih nan a eichhe thei tu Nesolynx thymus hmang/chhuah tur a ni.

## **THINGTHEIHMU CHIN DAN LEH ENKAWL DAN:**

**Theihmu huan siam turte tana hriat tur pawimawh te.**

**A hmun leh hma :**

Theihmu chinna atan chuan hmun/ram hmun hniam lam ai chuan kang tha, tui tling loa mumal taka tin paih kang zung zung theihna leh leitha tamna hmun te hi duhthusam ani. Tlang ramah chuan theihmu huan chu awih deuh pawhin 15 degree angle vela awihah pawh siam theih a, leitha kan hman ang ang te tul lova an riral lohna turin mumal taka step ang deuha tin chhawrdawha siam pawh a finthlak hle a ni.

**A phun hun :**

Theihmu hi a tiak phun anih loh leh a tang phun pawhin bul a tan theih a. Ruamah tiak phun nan hun tha ber chu fur ruahrtui tlak hma April leh June thla inkarak niin, tlang pawng mual pawngah phun anih dawn erawh chuan April leh September thla inkarak a tih theih ani. Theihmu tang phunna bul tan tur anih ve thung erawh chuan ruahrtui tlak zawh lam September leh October thla inkar velah a nung tha duh bik a ni.

**Leilung buatsaih dan :**

Theihmu siamna tur hmun chu 30-45 cm a thuk a laih phut vek anih hnuah a lei a phut that lehzual nan tum hnih atanga tum thum vel nasa lutuk lova laih nawn leh tur a ni. Thingkung dang lo awm tawh te chu a zungte fai tako paih leh hnime te chu a fai thei ang bera pawh a, paih bo vek tur a ni. A lei al lam te chu duhthusam chuan teh hmasak ni thei se, a tul dan azirin chinai te pawh hman theih a ni. Ruah tui ringa enkawl tur anih chuan bawngke leitha hman ngei theih nise, hei hi 10 Mt per hectare a hman tur a ni.

**Thingtheimu huan siam dan :**

**Mulberry variety :**

- Ruamah- S1365, S1, K2, S36
- Tlangah- S1635, S1, BC259 & Tr10

**Khur zau zawng leh thuk zawng :**

- 90cm X 90cm kawng chen vela sanga awmna turah.
- 180cm X 180cm kawng chen aia sanga awmna turah.
- Khur len zawng – 35cm a dung X 35cm a vang zawng X 35cm a thuk zawng.
- Khur tinah bawn ek leitha 3kg theuh lei nena uluk taka pawlha hman tur a ni.
- Fanghmir laka ven nan 5gm. Titafen chu pit tinah hman bawk tur a ni.

**Theihmu phun dan :**

- Theihmu huan siam bul tan nan hian theihmu tiak emaw theihmu tang pawh a hman theih ve ve a ni.
- Ruamah chuan theihmu tiak te hi September-October thla chhunga phunin an nung tha duh bik a, tlang pawngah erawh chuan April-September thla thleng a phun theih thung ani. Theihmu tiak emaw a tang pawh nise, tlang pawngah chuan July-August thla chhung chuan ruahrtui tamlai leh boruak lum vanglai anih avangin phun miahloh tur a ni.
- Theihmu tang hum (3) zel chu khur khatah phunin 15 cm tala an inkar inhlat theihin tang tinah a chawr pakhat tal lei pawnlanga awmin phun tur a ni.
- Lei tin a hnawnna a hlauh loh nan hnah ro emaw, di emaw hnime emaw tin a khur bul vel chu khuh tur a ni.

- Phun anih hnu lawkah hian tui pek nghal nise.

### **Phun hun: April-June & September-October**

#### **Thingtheihmu variety leh a thar hlawk dan :**

- Ruamah- S1365, S1, K2, S36
- Tlangah- S1635, S1, BC259 & Tr10

Variety	Yield/Kg/ac/yr.	Yield per Mt/tha/yr.	Dfls utilization/ac/yr.
S1	6470	16	-
K2	6470	18	-
S1635	7200	20	850
S36	7200	18	-
BC259	6470	18	-
r10	6470	18	-

#### **Hlawi/Suat hunbi :**

- Hlawi natna hun tha : November-December & June-July
- Theihmu kung kawng chen vela sang hlawi dan tur: November-December chhunga tih anih chuan a bul atanga 50-60cm a sangah hlawi tur a ni a, June-July thla chhunga hlawi anih ve thung chuan 30-36 cm vela sangah tihtur.
- Theihmu kung kawng aia sang anihin : November-December thla chhunga hlawi anih chuan a bul atanga 120-150cm velah hlawi tur anih laiin June thla chhunga tih anih erawh chuan 120-130cm ah hlawi tur ani ve thung ang.

#### **Leitha enkawl dan :**

- Hlawi atanga chhiar a ni 20-na chhungin theihmu phunna leiah chuan Nitrogen 150 kg, Phosphorous 50 kg leh Potassium 50 kg te phul tur a ni a, hei hi bawngek leitha 10 Mt zawlin ram hectare 1 zelah kum khat chhungin hman chhunzawm bawk tur a ni.
- Changpat leitha emaw bawngek leitha emaw = Ram hectare khat zelah kum khat chhungin 10 Mt hman ngei ngei tur a ni. (FYM: 10 Mt/tha/yr)
  - a) Nitrofert: Ram hectare khat zelah kum khat chhungin 10 kg hmang mai lovin tum thum hmanah a siam theih a ni.
  - b) Phosphofert: 40 kg/tha a ni a, hei ve thung hi chu ram hectare khat zelah 40 kg tum khatah hman zawh vek tur a ni a, amaherawhchu kumtin hman angai lova, kum 4 dana hman a tawk viau a ni.
- Nitrogen, Phosphorous leh Potassium (NPK) te chu tlem zawka hman anih dawn chuan 75:20:50 kg/tha/yr tin hman tur a ni a, hei hi Nitrofert emaw phosphofert kan hman atanga ni 15 na hnu lamah chauh hman tur a ni.
- PGR: Seriboost chu hlawi atanga ni 15 leh 30 hnuah (750ml PGR+300 ltr tui/ha/crop) a hman theih a ni.

## Ruahtui ringa siam theihmu huan enkawl dan :

Cocoon tha thar tur chuan pangang chaw atana kan hman theihmu hnah kan neih that leh tamah thui tak a innghat a. Hetiang hnah tha leh tam thar thei tur chuan mithiam tena an duan hunbi leh enkawl dan hrang hrang an sawi leh ziahte chu kan zawm hram hram a ngai a ni. Chung hunbi leh tihtur te chu a hnuia table ah hian chiang taka tarlan a ni.

Sl. No.	Tihtur pawimawhe	Hunbi
1.	Hlawi tum khatna (1 <sup>st</sup> pruning)	October-November
2.	Thlawhfai tum khatna (1 <sup>st</sup> weeding) leh leitha pek @10 Mt/hectare	Hlawi atanga kar hnih chhungin
3.	Leitha pek tum khatna (1 <sup>st</sup> dose)	Hlawi atanga kar thum chhungin
4.	Thlawhfai tum hnihna (2 <sup>nd</sup> weeding)	January-February
5.	Hnahlak tum khatna (1s leaf harvest)	March-April
6.	Thlawhfai tum thumna (3 <sup>rd</sup> weeding)	Hnah lak tum khatna atanga kar khat chhungin
7.	Hnahlak tum hnihna (2 <sup>nd</sup> leaf harvest)	May-June
8.	Hlawi tum khatna (1 <sup>st</sup> pruning)	June
9.	Leitha pek tum hnihna (2 <sup>nd</sup> dose) leh thlawhfai tum li(4) na(4 <sup>th</sup> weeding)	Hlawi atanga kar hnih chhungin
10.	Hnahlak tum thumna (3 <sup>rd</sup> leaf harvest)	August
11.	Thlawhfai tum ngana (5 <sup>th</sup> weeding)	Hnah lak tum khatna atanga kar khat chhungin
12.	Hnahlak tum lina (4 <sup>th</sup> leaf harvest)	October-November

## Lei hnawnna hum dan :

Be lam chi engpawh chu theihmu karah tihnun ve nise, heng kungte hi fur ruahtui tlak tawp hmain a zung chawpa phawi thin tur a ni a, hetia kan phawi hnu hian paihral mai lovin leitha atan a hman theih turin theihmu kung bulah te chuan chap mai thin tur a ni. Hei hian lei tha a siam mai bakah thlasik chhungin lei hnawnna a siam thei dawn a ni.

## Leitha hman dan :

Bawngek leitha leh chemical leitha te hi an tha em em a, bawngek leitha bik hian lei a siam tha in, lei in tui a khawl theihna te a tihpun bakah leihnuia awmchi rannungte inthlahpun nan lei tha te chu an tana seilenna tha a siamsak thin a ni. Chutih rualchuan chemical leitha te ve thung chuan theihmu kung thanna leh hriselna kawngah mawh a phur nasa ve em em thung a, heng leitha te hi theihmu kung bulah khur chhete emaw lain phul tur a ni a, a rang thei ang berin leia chhilh hnan an ni thin a ni. Chemical leitha Nitrogen, Phosphorous leh Potassium (NPK) te hi hman tur zat tam lam chu a kung len dan azirin a danglam ve a ni.

## **Hetiangin :**

### **1. Theihmu kung phun tirkum khatna (1<sup>st</sup> year plantation)**

- NPK chu 50:25:25ha/ year/ year tin phun atanga thla hnih danah tum hnih hman tur a ni.

### **2. Phun atang kum hninhna (2<sup>nd</sup> year plantation)**

- Hlawi atanga chhiar a kar khat chhungin bawngek leitha chu 10 Mt/tha/year in lei nen uluk taka chawhpawlha hman tur a ni.
- Chemical fertilizer NPK chu 150:75:75/tha/ year/year tin tum hnih hman tur a ni.
- Hlawi atanga kar thumna velah NPK chu hmennawn leh a ni anga, chumi zawahh chuan a tum hninhna (2<sup>nd</sup> dose) chu hnahlak tum hninhna zawahh
- Nitrogen hlangin hman leh tur a ni.

## **Theihmu hnahnak :**

Theihmu hnahnak te hi theihmu pangang vulh natna neih leh enkawl anni a, hemi anih avang hian hnahlak pawh hi kan pangang vulh dan hunbi mil zelin kan la thin a, pangang vulh hunbi pawh hi a vulhna hmun sik leh sa inher dan danglam ang zela hman niin, hmun tinah a inang vek kher lo a, a tlangpuin hnahlak tum khana hi chu thal laiin theihmu kung bul te a hlawi anih hnua a lo chawr hmasa te chu lak thin a ni a, hemi hnu hian hnalaak tum hninhna leh thumna te chu nupi lai leh fur laia lak niin a tum li na erawh favang laia lak ani thin a ni. Phai ramah chuan theihmu hnahnak hi kum khat chhungin tum nga te an lak hman lain tlang ramah erawh tum thum kan la hman awrh a, hei hian kum khataha 18-22 Mt thar ang kan ni.

## **Theihmu huana hnim thunun dan :**

Hnim te hi an hnawksak tin theihmu huanah hian an than a lo tha ve phian zel mai a, a chhan ni a lang chu theihmu huan leitha te hi an lo ngeih ve em em mai a lo ni. Hei hian huan leitha te kha lo ei da ve in theihmu hnahnak thar tur za zela hmun sawmnga lai mai chu a thar theihlo hial phah thin ani. Chutah theihmu thichhe theitu rannungte awmpuk an ni lehzel a, hnim sam/thlawnfai natna hun leh tha sen pawh hi namai lo tak a lo nih phah fo reng ani. Heng theihmu kara hnim hnawksak em em zingah chuan Borreria attenuata, Imperata cylindrical, Ageratum conyzoids, Axonopus compressus, cypreus brevifolia, paspalum conjugatum te hi a lar zual te an ni.

## **Thingtheihmu tlai dang nen :**

Kan thingtheihmu huanah te chuan theihmu chauh lo pawh a hun mil zelin tlai dang chi hrang hrangte an phun/chin tel ve theih tih hi hriat a tha a, tlai dangte hian ni, tui leh leitha hmang tein rah tha tak kan pangang chawhmunah ngei khan an lo chhuah ve thei ani. Hei hi hre reng chungin hlawk thei ang berin kan theihmu huan kan enkawl thin tur a ni.

## **MULBERRY NATNA LEH A ENKAWL DAN :**

### **Thingtheihmu eichhe theitu rannung leh a enkawl dan :**

Thingtheihmu kung tana hlauhawm rannung tamtak an awm a, rannung azirin an hlauhawm dan pawh a inang lo thei bawk. A then te chu kum khata vawi khat rawn inlar an awm laiin a then chu generation tin a hmuh theihin an awm bawk. Heng theihmu tan a hlauhawm rannung thenkhat te hian theihmu hnahnak an eiral a, tin, theihmu kung than zelna tur an dal bawk a, thenkhat erawh a zik no ah awmhmuun an khuar ve bawk a. Hei hian a rawn chawr no tur te chu ti thuan awpin hnahnak thar chhuah a tih tlem phah thei a ni.

### **Leaf spot :**

*A natna thlentu hming* : Fungus chikhat a hming chu Cercospora moricola Cook.

*A natna lanchhuah dan* : Leaf spot natna thingtheihmu hnalah alo awm chuan hriau hmawr a chhun kuak hlek hlek angin a hnalah chu alo pawp fir fer a chumi hnuah a kua te chu lo zau tin alo ro ang. A awmna hmunah chuan a hnalah te lo eng vekin alo tla kawlh thei thin a ni.

*A natna lanchhuah hun* : Kum tluanin a awm thei a, mahse a tam zual lai chu ruahui tlak lai leh thlasik laiin a tam duh.

### ***A enkawl dan:***

- Bit lutuk tin phun loh tur
- A hnalah chang tawh leh natna tin a bawm te chu lakkawm a halral tur
- Bavistin 0.1% (carbendezim 50WP) gram 2 zel tui ltr 1 a pawlhin theihmu hnalah ah leaf spot hmuah chuan kah tur. A tul dan azirin ni 10 danah kah nawn leh tur.
- Damdawi kah atanga ni 7 hnuah pangang khawi nan a hman leh theih.

### **Powder Milldew :**

*A natna thlenu hming* : Fungus chikhat Phyllosticta corylea (Pers) Kars tin he natna hi a thlen a ni. September atanga lo lang tanin, a kum leh March thla thleng pawh a awh thin.

*A natna lanchhuah dan* : A vut buak var thet thet theihmu hnalah hmalamah lo lang tanin ahnahn pumin alo bawm thin. A tam hnuah chuan theihmu hnalah chu eng buang deuh emaw rawng dum deuhin emaw a lo awm thin. A hnalah te chu ro anga langin alo tla mai thin.

Thlasik lai (Oct-Nov) vel hi a tam lai a ni thin.

### ***A enkawl dan :***

Theihmu hnalah chu heng damdawi hmang tea kah theih ani, chungte chu 0.1% Carbenzim 50 WP (Bavistin), 0.2% Karathane (Dinocap) and 0.2% wet-table sulphur (Sulfex). Pruning tih atanga ni 30 hnuah fungicides a lo inven lawk na turin kah tur ani. Damdawi kah lai hian a hnalah hnualilam pawh kah thuak thuak tur a ni.

Damdawi kah atanga ni 7 atanga ni 10 hnuah te a hman theih ani.

### **Leaf rust :**

*A natna thlenu hming* : Fungus chikhat Cerotellium fici (Cast) Arth leh Aecidium mori Barclay ten leaf rust natna hi an thlen thin.

*A natna lanchhuah dan* : Dum thet thet leh a bial a sen kual thet thet theihmu hnalah tawn tawnah alo awm a, tichuan a hnalah te lo engin an lo tla kawlh ta mai thin.

*A tam hunlai* : Thlasik laiin (Oct-Nov)

### ***A enkawl dan :***

- Tawt taka theihmu kung phun loh tur.
- Tum khatah kan theihmu kung te prune tur.
- Theihmu hnalah natna tin a tlak buak te chu lak khawm a, hal ral thin tur .

- 0.2% copper ox –chloride 50 WP (Blitox) gram 4 chu tui litre khatah pawlh tur emaw 0.02% tridiamefon 25WP (Bleton)gram 8 chu tui sawmah pawlhin a natna lo lan chhuah an hlimah kah tur a ni .A ul dan a zirin kah atanga ni 10 ah kah nawn leh tur ani .
- Kah atanga ni 15 hnuah pangang khawi nan theihmu hnah te cu a hman theih.

### **Bacterial leaf spot :**

He natna hi India ram hmarchhak lamah a hluar bik hle. June thlaah lo lang tanin October thla thleng te a awh thin. July atang a September thla thleng hi atam zual lai a ni thin.

*A natna thlentu :* Xanthomonas campestris pv.mori Maji te al.

*A natna lanchhuah dan :* Theihmu hnah hnuailam te chu hmun tam takah te tak te te tin tui pai angin a lo puar chhuak a,chumi hnuah a hnah te chu eng buang deuh tin alo awm thin.

- Theihmu hnahah te kua lo awmin, theihmu hnah no te chu alo tin vial kual thin.
- A nasat hnu chuan a hnah te lo engin anlo tla kawlh thin.

*A tam hun lai :* July –September

*Save period :* Chemical spray hnu ni 10 ah hnah a hman theih .

### ***A enkawl dan :***

- 0.01% plantomcin/Pusamcin gram kha chu tui litre khatah pruning tih atanga ni 20-25 kah tur, fur laiin.
- Disrict khat khaw thum ah zel he natna lo lan chhuah hun te ngun taka zirchian a, a tam hun lai leh a natna lo lan chhuah hun lai te record fel taka neih tur.
- Khaw pakhatah zel, farmer pathum hnen atangin data lak khawm tur.
- Tin khat huam chhhung vela zau ah data hi lakhawm tur.
- Theihmu varieties /kum/spacing/pruning /kan thlawhfai hun etc. te a tin ang tur a ni.
- Natna lanchhuah dan zirchianna chu kar khat dan zelah tih tur.
- A hnah no a natna rawn lan chhuah dan zirchianna chu theihmu kung 5 zelah nise, theihmu kung 4 chu theihmu huan sir kil theuh atangin, tichuan a 5 na chu huan laili ami tak nise.
- Natna lo lanchhuah dan record chu theihmu zar 3 atang theuh a lak tur ani.
- Theihmu zar khatah, theihmu hnah hrisel leh natna vei engzat nge awm tih entur ani. Theihmu hnah pakhat chu natna kai tam dan a zirin thensawm leh ani, hetiangin:

0=Hnah hrisel

1=1-5% theihmu hnah natna tin a bawmin

2=6-10% theihmu hnah natna tin a bawmin

3=11-25%theihmu hnah natna tin a bawmin

4=26-50% theihmu hnah natna tin a bawmin

5=51-a aia tam theihmu hnah natna tin a bawmin

- Infection percentage or percent Incidence (P.I) leh Percent Disease Index (P.D.I) te chu a hnuia mi ang hian chhutchhuah theih ani.

**1. Infecion percentage or percentage incidence(P.I)**

Theihmu hnahnatna kai zat

$$PI = \frac{\text{Theihmu hnahnatna kai zat}}{\text{Theihmu hnahnendik zat}} \times 100$$

**2. Percentage disease index (P.D.I)**

Theihmu hnahnatna vei awmzat belkhawm

$$P.D.I = \frac{\text{Theihmu hnahnendik zat}}{\text{Max. grade (i.te, 5)}} \times 100$$

Theihmu hnahnendik zat X Max. grade (i.te, 5)

*Example: Percentage disease incidence and percentage disease index chhut dan :*

Theihmu kung zat	Theihmu ang zat	Theihmu hnahnawmzat	Theihmu hnahnatna ina bawm dan azira then sawm					PI/PDI
			1	2	3	4	5	
1.	1	16	3	1	2	0	1	
	2	17	2	2	1	1	0	40.43/17.87
	3	14	4	1	0	1	0	
		47	9	4	3	2	1	
			9x1	4x2	4x3	4x2	1x5	
			9	8	12	8	5	

19                    1900

$$P.I = \frac{19}{1900} \times 100 = 40.43\%$$

47                    47

9+8+12+8+5

$$P.D.I = \frac{9+8+12+8+5}{47} \times 100$$

47 x 5

42                    4200

$$= \frac{42}{4200} \times 100 = 17.87$$

47x5                    235

## **Khaw chin awmdan data record :**

Nitina khaw awmdan chu hetianga chhinchhiah tur -

- Maximum and minimum temperature (degree celcius)
- Maximum and minimum relative humidity (%)
- Ruah sur (mm.)
- Ni en chhung
- Thli thawt chak dan

## **Weaher Correlation methodology :**

- Natna lanchhuah hun chu temperature/ relative humidit/rain das/rainfall/sunshine hours/wind velocit/leaf wetness period of the previous week nen enmil tur
- Temperature san lai ber leh hniam lai ber te chu natna lo lan chhuah hun nen a tin kungkaih dan zirchian tur.
- Simple and multiple correlation and regression analisis hmanga khaw awmdan leh natna lo lanchhuah dan te zirchian hnuah, a inven dan tur duan chhuah tur a ni.

Tin, a chunga kan sawi bakah khian thingtheihmu natna enkawlna atana damdawi tha tak Mancozeb (Dithane M-45) chungchang hi han sawi ta bawk ila. He damdawi hi powder (a dip) a awm a ni a. A powder hi lei phul atana hman theih a ni. Tin, tui nen a chawhpawlhin hman theih a ni bawk. A tui a hman dawn chuan spraer-a kah tur a ni. Hetiang powder hi a tuia siam hian a mawngah an lakkhawm thin avangin kah dawnah pawlh hmasak zel tur a ni.

### **A hmanna te :**

1. *Wig blight:* Theihmu chu a hnah tlang alo dum kual a, a rei deuh hnuah a pumin alo dum chhuak a, kang ang maiin a awm a, a tla kawlh zui mai thin. Tin, a kungah rawng dummin pem hmuamhma ang deuh, a tung zawngin alo awm a, a keh a, a zar a ro thin. A hnah chawr tantir te pawh a lo rawp ral mai thin.

Hetiang natna veite chu Mancozeb 0.2% a a hnahte kah tur a ni a; tin, a nasat viau chuan abul vel lei 0.5% in kah tur.

2. *Bacterial blight:* Theihmu hnah hnuai lamah tui huh ang in a lo val thluah a, a nasat chuan hnah a khawr a, a rawng dum lam deuhin alo thlak thin. A kungah rawng dummin pem hmuamhma ser ang deuha sawi zawngin a awm thluah bawk thin.

Chutiang vei theihmu chu kawr phawia hal fai tur a ni. Tin, a lei pawh nisa em ro tir vek tur, 0.2% Mancozeb-a a kung leh hnah te kahin a control theih.

3. *Root rot (Zung tawih):* Theihmu zung natna a ni a, kumtluanin theihmu in a vei thei a. A kung chu chhan hriat lohvin a lo vuai a, a hnah a la kawlh a, a thi zui thin. Heianga theihmu kung alo awm chuan a zung lamah natna (root rot) a vei ani tlangpui.

Theihmu tang phun hunlaiin he natna ven nan hian a khurah Dithane M-45 (Mancozeb) hi 5gm-10gm vel phul tur a ni. Tin, theihmu kung phun tawh sain he natna a vei chuan a kung bul vela lei cho chhuakin Dithane M-45 (Mancozeb) hi 5gm-10gm vel phul kuala tui pek tur a ni. A bul lei cho chhuah hi damdawi phul nan hian inches 5-6 vela thuka laih tur a ni. Tin, theihmu kui chawrsa phun sawn dawnin he natna ven nan hian 0.2% a kahin a veng thei bawk.

4. *Stem canker:* Theihmu kung natna ani a, a rawng hring, a hnua dum zuih telh telhin a pilah a rawn keh chhuak thin.

5. *Collar rot:* Theihmu tang phuna a lei chin bak chiah ah rawng buang dum deuh alo awm a, a rawp thin.
6. *Cutting rot:* A tangah rawng buang, a hnua dum zui a awm a, a pil a tawih a, a inhik bawk thin.
7. *Die back:* Theihmu hnah a zik atangin a lo dum thla a, a vuai a, a thi zui thin.

A chunga natna hrang hrangte ven nan hian theihmu tang chu phun hmain 0.1% Dithane M-45 (Mancozeb) ah darkar chanve chiah tur a ni. 0.1% siam tur chuan tui litre 1 ah damdawi powder 1 gram telh tur a ni.

#### **DITHANE M-45 (MANCOZEB) TUI PAWLH DAN :**

- 0.1% Mancozeb litre khat siam tur chuan tui litre 1 ah he damdawi hi 1 gm telh tur a ni. Tui 2 litre hnihil chuan 2.5 gm telh tur a ni a, tui litre 1 zel a tam belhin damdawi hi 1.5 gm zelin tih tam belh tur a ni.
- 0.2% Mancozeb litre khat siam tur chuan tui litre 1 leh Mancozeb damdawi hi 2.5 gm pawlh tur a ni. Tui litre 2 ah chuan damdawi 5 gm telh tur a ni a, 3 litre tui ah 8 gm telh tur a ni a, a bak chu tui 1 litre a tam a belh zelin damdawi 2.5 gm a tihibelh zel tur a ni.
- 0.5% Mancozeb litre khat siam tur chuan tui litre 1 ah damdawi 6.5 gm telh tur a ni a, litre 2 ah 13 gm telh tur. Tui 3 litre ah 20 gm telh tur a ni.

Tui litre 5-ah : 33 gm Mancozeb

Tui litre 10-ah : 66.5 gm Mancozeb

Tui litre 16-ah : 106.5 gm Mancozeb

Tui litre 20-ah : 133 gm Mancozeb

#### **Damdawi hman laia hriat tur te :**

- Damdawi te hi ni 2 dainh lai (zing/lai) ah kah tur ani a, chhun ni sat laia kah loh tur a ni.
- Damdawi te hi tur hlauhawm tak anih avangin naupang ban phakah dah loh tur.
- Damdawi chu tha taka chhin phuiin dah thin tur a ni.
- Kut lawnga khawih loh tur ani a. tin, kah lain hnhar leh ka vela a luh loh nan tuam tur a ni. Mita a lut tur pawh ven tur a ni.

## **THEIHMU EI CHHETU RANNUNG LEH A ENKAWL DAN :**

Thingtheihmu kung tana hlauhawm rannung tamtak an awm a. rannung azirin an hlauhawm dan pawh a inang lo thei bawk. A then te chu kum khata vawi khat rawn inlar an awm lain, a then chu generaion tina hmuh heihin an awm bawk. Heng theihmu tan a hlauhawm rannung thenkhat te hian theihmu hnah an ei ral a, tin, theihmu kung than zelna tur an a dal bawk a, thenkhat erawh a zik no ah awmhmun an khuar ve bawk a. Hei hian a rawn chawrno tur te chu ti huanawpin hnah thar chhuah a tih tlem phah thei a ni.

### **Mealy bug (*Maconellicoccus hirsutus*):**

*A bawh buai hunlai* : April-June

*A hnathawh dan* : Meal bug note chuan theihmu hnah te chu Zukin a chawrno tur a ti khawtlai a, hnah a ti chhah bawk a. Hnah a bawh lai chu alo hring duk a, a hnah chawrno tur chu tichhah in a tikir bawk a. Hetiang natna a thlen hi ‘tukra’ tiin an sawi a ni.

*A him chin a ngaih* : Hnah no pakhat zela sawm an awmin.

### ***Enkawl dan:***

- Rannungin a ei chhiat hnah chu sahhlak a hal ral tur a ni.
- A zik rawn chawr leh ni 20 chhungin 0.2% Rogor a spray/kah tur ani.
- Rannung eichhe theitu tur Pullus Bourdillioni Kapoor chu @ 600 pairs/acre a chhuah tur a ni.

### **White fly (*Dialeuropora Decempuncta*):**

*A tam hunlai* : August-November

*A hnathawh dan* : White fly no leh puitlingte chuan thing hnai chu an zuk a, hei hian hnah eng siamin a tikir bawk a. Theihmu hnalah white fly in thil tuihnang tichhuakin theihmu hnah ah inting a lo insiam a, hnah tan chhiatna a thlen a ni.

*A him chin a ngaih*: Hnah no pakhat zela sawm an awmin.

### ***Enkawl dan :***

- Theihmu huan a hnim tur a ni lo.
- Theihmu huanah rannung hlauhawm man nan polythene (sarang) (1.5x1 metre) tel ban (sticky oil) a zutin tun tur a ni.
- White fly eiral thei tur rannung chhuah zawhah 0.2% Monocrotophos emaw 0.1% Dichlorovos a spra tur a ni.
- White fly ven nan Coelophora unicolor hman tur a ni.

### **Thrips (*Pseudodendrothrips mori Niwa*)**

*A tam hunlai* : May leh August atanga November

*A hnahawh dan* : Thrips in a eichhiat theihmu kung chuan a hnawnna (moisture) a hlauh a, a hnah a eng bawk a. Hnah chu lawng (boat shape) anga awmin a tlak tir thei a ni.

*A him chin a ngaih*: Hnah no pakhat zela sawmhnih an awmin.

***Enkawl dan :***

- Hnim lakah kan veng tur a ni.
- Thrips manna atan polthene sheet (1.5 m x 1 m) 40 atanga 50 vel chu dah tur a ni.
- 0.1-0.2 % Dimethoate spra tur a ni.
- Micraspis discolor chhuah tur a ni.

## Topic 15 – Sangha khawi dan

### Objectives :

To impart the knowledge of productive fish farming

**Duration :** 60 minutes

**Expected outcome :** Participants will learn the importance of fish farming

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Fish Farming	* Why fish farming? * Site selection * Transportation of fish seed * Feeding * Pond management during monsoon * Harvesting of fish	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on sericulture farming through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

### Sangha khawi hi engnge ni?

Sangha khawi chu hmun bik neia sangha te dakhawm a, an chhuah mai theih lohna tura dilah emaw khungkhawm a, an than len zel nana chaw nen chawmzui zel te, inthlahpun tirte leh mumal nei taka kan seng te hi a ni.

### Engvangin nge sangha kan khawi ang?

- Sangha hi sa tui tak mai leh mihringte tana chaw tha tak, chakna pai hnem tak a ni.
- Sangha ei tam mite chu an hrisel in an thluak pawh a chak zawkin mithiamte chuan an chhut.
- Sangha hi sa dang kan ei te aiin kan taksa ah thatna tam tak a thlen zawk.
- British chaw lam zir mite chuan kar tina sangha tharlam ei hi lung tan a tha tih an hmuchhuak bawk.
- Sangha hi natna tam tak tan damdawi tha tak a ni, nu naupan lai tan ei tam a pawimawh.
- Ram zau zawng in ang rau rau ah sangha khawi hi buh leh thlai dang chin aiin a let tam takin a hlawk zawk a ni.
- Sangha khawitu chuanan chhungkaw tan eitur hrisel a thar mai bakah eisen loh a thar chuan sum tam tak hail uh nan a hmang thei.

### Dil hmun thlan dan :

- Dil siamna hmun atan chuan tlema awihtlan deuh emaw, lei laih hautak lutuk lohna lai nise, tui paih pawh a awlsam deuhin dil siam pawh a hautak lo deuh bawk a ni.
- Hmun hniam lutuk, tuilianin a chim phakna hmun thlan loh nise.
- Ni eng thatna hmun, dil tui pawh ni zungin a chhun theihna hmun thlan nise.
- A enkawl tuin awlsam taka kan enkawl theihna hmun thlan thiam a tha bawk.

### **Sangha dil siam dawna hna indawtte :**

- A ram enfiah hmasak phawt tur.
- Kan dil a tui chim chin tur kan tih chu chhinchhiah phawt tur.
- A khuahna bang san zawng tur te pawh hisap vek tur a ni. A tul dan a zirin lei laikhuar tur.
- Tui paihchhuahna tha taka buatsaih tur.
- Tui lakluhna tur tha tawk tak siam.
- A khuahna tlangpui rinawm taka siam.
- Dil mawng leh dil khuahna tlangpui t etui puttlang thei lova char phui/bel phui leh siam mam.
- Tui lak luh.

### **Dil chi hrang hrang leh a thuk zawng :**

<b>Sl. No.</b>	<b>Dil hming</b>	<b>Hmanna</b>	<b>Dil thuk zawng</b>
1	Nursery Pond	Sangha note keu hlim dahna tur	0.75-1.00 m
2	Rearing Pond	Sangha note ni 15 vela upa vela upate dahna tur	1.00 – 1.50 m
3	Stocking Pond	Sangha te zungchal chen annih atanga an puitlin thlenga khawina tur	2.00 – 2.50 m

### **Tuikhuah a dil siam :**

Mizoram a kan sangha dil tam ber hi chu luite khuah a ni ber, hetiang a tuikhuah hi ramzawl laikhuar aia a senso a tlem zawk avangin kan hmang uar hle a, that pawh a tha khat hle reng a ni. Amaherawhchu tuikhuahna tlangpui sah a tam avangin tuikhuah chhia a tam a, a siam dan hi fimkhur hle a ngai a ni.

- a) Sangha sil siamna hmun tur teh fel a, tui chim tur chin zawng zawng leh tui chim phak atanga hlam 5 chu thing leh mau, hnimeh leh hrui zam zawng zawng, an zungte nen lam tihfai vek tur.
- b) Tukhuah tur chu feet 4 a zau, feet 3 a thukin laikhuar a, tuiput tur veng turin lei ban, tlak lei emaw hlum lei emaw muk taka chhu belin hnawh khah tur.
- c) He lei ban (Clay Core) hi tuikhuahna tlangpui tur chim chin tur thlengin chhunzawm chhoh zel tur.
- d) Dil sah kang na tur pipe phum nghal tur. (1 Hectare a zau dilah pipe 6-8 inches a lian a tawk).
- e) Tuikhuahna lei chhun pawn chu chhung lam leh pawn lamah a awn chhuak tur a ni, a awndan (slope) chu chhunglamah lei a zirin 3:1 emaw 2:1 ni se, pawn lamah erawh chuan lei a zirin 2:1 emaw 1:5:1 ni se (3:1 awmzia chu a phei zawng a feet or metre 3 zelah feet or metre 1 a sang zel tihna a ni).
- f) Lei ban tha apiangah tuikhuahna bang hi a tung thei a, lei ban lo leh tiau lei angah chuan tuikhuahna bang hia awn dan a zal zawk tur a ni.
- g) Sangha dil mawng hi a rual thei ang ber tuikhuah lain siam nghal tur a ni.
- h) Sangha dil atanga tui luan chhuahna “Outlet Channel” tha tak kan siam tur a ni, sangha te an chhuah theih lohna net a tha taka khuh tur, fur lai leh ruah tui tam lain dila tui tam lutu tur a luangchhuak thei tur a ni.

### **Sangha note khawi atana tha hriat theih dan :**

- Tui eng angah pawh an khawi theih tur a ni.
- An thang chak hle tur a ni.
- Sangha dang ten en chaw an in chihbuai tur a ni lo (Hemi awmzia chu an chaw zawn dan habit a inang tur a ni lo).
- An chaw ei thin pangngai (natural food) bakah kan chaw pek thin (artificial food) an ei ngei tur a ni.
- A chi mamawh zat hmuh theih ngei tur a ni.
- Bazar a man tha tawka hrallh theih ngei a ni tur a ni.
- Sangha chi hrang hrang dil khata khawi pawlh atana tha te chu a hnuai ami te hi anni a, mithiamte rawn chungin a thliar hran theih :
  - a) Catla
  - b) Rohu
  - c) Mrigal
  - d) Silver Carp
  - e) Grass Carp
  - f) Common Carp

### **Sangha eng chaw nge kan pek ang :**

- Chaw tha tam tak protein leh carbohydrate lam a paihnem tur a ni.
- Sangha te ei duh zawng tak leh an ei theih chi ni se.
- A man to lutuk lo leh senso tam lo ni se.
- Kan sangha khawi chhung zawnga awlsam taka hmuh mai theih, lei mai theih ni se.
- Hnim hnah lehthlai hnah te.
- Rannung lam chi tlumpi leh changpat lam chi te.
- Favai leh buhkem lam chi.
- Wheat vai.
- Vaimim sawr fu.
- Hriak nei thlai herna fu, Eg. Mustard oil cake
- Fu tui sawr.
- Chaw ei bang nawi.
- Sa sah nawi them.
- Vawk ek leh ar ek etc.

### **Sangha chaw pek chungchange hriat tur :**

- Sangha te an tet lai chuan chaw pek zin leh zual tur.
- Chaw kan pek reng rengin sangha buk rih zawng aia za a 3 (3% of body weight) aia tam pek tur a ni lo.
- Tui a vawh lai (thlasik) chuan chaw pek zin lutuk loh tur, ni 2/3 dana pek a pawi lo.
- Sangha te chaw pek hun bi diik taka pek a tha. Zinglam boruak daih lai dar 7:00 am velah leh tlailam dar 5:00 pm vel a pek a tha.

- Sangha an lo thanlen zelin chaw pek tih tam ve zel tur a ni.
- Sangha chaw pekzat tur chiah hi chhutthiam a har a, ngun taka thlithlai a, chaw ei bang nawi a tam viau chuan pek tlem mai tur.
- Vawikhatah an eizawh awm tawk pek a tha, an ei bangnawi a tam chuan diltui an ti bawlhhawh thin.
- Chaw pek laia tha taka an ei loh emaw an che a zawi emaw boruak hip a tuo chunglanga an rawn lan fo chuan dilah tui thar khawhluh tir thuai tur a ni. Leitha pek pawh hun enngemaw chen chawlh a, chaw pek pawh chawlhsan rih tur a ni.

**Sangha seng leh hrall chungchanga hriat tur pawimawh :**

**Complete harvesting :** Dil tui sahkang veka sangha man emaw sahkang vek kher lova sangha awm zawng zawng man fai vek hi a ni.

- Sangha man hun chu boruak a daih lai zing lam hma deuh taka tan tur a ni.
- Dil tui a lo kam viau hnuah pawh a tul takah lo chuan dilchhung luh reng loh tur.
- Sangha man sa te chu fai tak a silhnu ah daihlim leh hmun vawt laiah dahkhawm a, balhla hnah emaw a remchan anga khuh tur a ni.
- Sangha man te an thih mai lohva, dil kam vela an in perh vak vak hian an taksa ah hliam/pilh a awm duh hle a. Hei hian sangha a tichhe hma em em thin. Sangha hliam tur vennan hian sangha man te silfai hnu ah vur tui vawt taka chiah ila, an thi mai thin.

**Partial harvesting :** Dila sangha awmte vawikhat a man fai vek lova, a puitling hralltham tawh chauh te man chhuah hi a ni.

- Sangha than dan a in ang vek lova, a lian leh puitling tawh te chu man a, hrall zel mai tur.
- Sangha kan hrall chhuah tak ang chiah sangha chi kha dilah dah luh leh mai tur.
- Sangha lian deuh tawh chu lena hrut a thla 3 thla 4 danah manchhuah a, sangha chi dah leh nghal hi a tha hle.
- Sangha hrall hlawk hun lai a hrallna hriat a pawimawh.
- Sangha man/tuikhuah sah dawnin ni 2-3 chhung chu sangha chaw pek chawlhsan ngei ngei tur a ni.

## **Topic 16 – Ni hmasa lama zir thlirletna**

### **Objectives :**

Knowing the trainees understanding from the previous day training

**Duration :** 15 minutes

**Expected outcome :** Participants will learn scope of improvement from previous day learning

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Recap of previous day	* Gap analysis * Learning from previous day * Scope for improvement	Group discussion	Small group of 5 members each will be formed where the trainees will discuss the entire previous day topic with his/her partner. Quick recap will be done by representative of each group	Chart paper, Marker

## **Topic 17 – Vawk leh ar vulh dan documentary film thlir ho**

### **Objectives :**

To motivate the participants through best practice of successful farmer

**Duration :** 30 minutes

**Expected outcome :** Participants will learn the best practice done by successful farmer

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Documentary Film	Video clips on : * Pig farming * Poultry farming	Audio Visual Aids	Documentary film showing the success story of livestock farmer will be shown to the participants	LCD projector, Laptop

## Topic 18 – Ar vulh dan

### Objectives :

To enrich the knowledge and skills of the participants on Poultry farming

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness on the scientific method of poultry farming

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Poultry farming	* Why poultry farming? * Record keeping *Procurement *Management : Housing, Feeding, Health, Disease * Vaccination schedule * Feed conversion ratio	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on poultry farming through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Khawvel thiamna a thang chho zel angin mihringte hian hriselna atan chaw tha kan mamawh zia alang chho zel a. Arsa leh artui atanga kan taksa mamawh phuhruk thei tur leh kan economy siam tha tur hian tanlak nasat a ngaihzia kan hrechhuak tan niin alang. Hetiang a lo nih takah chuan ar vulh lam kan uar chho zel a, eizawn nan a rintlak mai bakah kan nitin mamawh phuhruk thei khawp anihna hi kan hre thar ta niin a hriat ta hle mai. Kan ram (India ram) a bikin Agriculture hmalaknaah chuan ar vulh hi a thang chak ber pawl a ni ta a. Artui ah ringawt pawh khawvel tharchuah atangin 4% kan tharchhuak thei a, chutiang bawkin Arsa 2% hi India in kan tharchhuak bawk a ni (as per 2006). Kan tharchhuah hi tam kan ti hle nachung hian Nutritional Advisory Committee, Government of India in a recommend-ah chuan artui 180 nos. leh arsa 111 kg lai mi pakhatin kumkhat chhunga eitura a tih a ni a. Hetiang pawh hian tuna kan ram dinhmunah chuan kumkhatah mi pakhatin artui 45 nos. leh arsa 1.76 kg ei ang vel chauhva chhut ala ni chauh mai a. Hengte avang pawh hian kan la intodelh lohzia alang chiang hle a, tan kan lak viau a ngai tih a chiang hle awm e. A pawimawhna leh eizawn nan a kan hman a tul tak avang hian ar vulh dan tlangpui kan hmeliarit thar leh zual a tul ta hle mai.

Ar kan vulh anih chuan tih tak takna tello chuan kan hlawhtling dawn chuanglo tih hriat hmasak a tha hle ang. Heng Record vawnthat, ar in sak, ar note thlan, hriselna chungchang (Vaccine pek, rulhuthlo pek, faina leh hriselna etc.), management, chaw pek leh evaluation te hi kan rilruah a riak reng tur a ni.

Ar hi chi hrang hrang a awm a, mizoten kan vulh tlanglawn chu broiler leh layer te hi a ni awm e. Broiler chu ar kar 8-10 a upa, 1.5-2 kg vel a rit, tihrawl nem tak, a sa ei atana vulh hi a ni a. Layer erawh chu a sa ei atan leh a tui thei tur a kan vulh te hi a ni.

## **Engvangin nge ar kan vulh ang?**

- Arsa ah hian taksa tana chaw tha protein, minerals leh vitamins chi hrang hrang a awm.
- Arsa hi mihring tan balanced diet (chaw tha in buk tawk) a ni.
- Ar te hi rei tak vulh a ngai lo a, hun rei lote ah ei an tling thin.
- Chhungkaw eizawnna sum bel pawimawh tak pakhat a ni.
- Chhungkaw sum lakluh engemaw zat a lo phuhru ve thei.
- Artui hi mihring zawng zawngin kan mamawh a ni, a hralthna ah buaina a awm lo.
- Ar ek hi lei tha tak a ni a, thlai ten an ngeih hle.

## **Ar vulh a that bikna te :**

- Bul tan nan sum sen a tlem.
- Kar 8-10 chhung bak vulh an ngai lo.
- Hmun neih that chuan broiler leh layer tum khatah a vulh teuh theih.
- Broiler hian an chaw ei te an taksa than nan an hmang chak bik a, an chaw mamawh a tlem.
- Ar vulhna atana sum sente a hmuh let zung zung theih.
- Sa dang aiin arsa hi mi nawlpui ei theih a ni.

## **Ar in hmun thlan chungchang :**

- Hmun rualrem, nikang tha leh thengthaw thlan thiam a tha.
- Midangte tana hnawksak leh rimchhe thei hmunah sak loh tur.
- Tui thiaghlim leh electric tha tak awmna hmun a ni tur a ni.
- Ar chaw leina leh leh artui hrall awlsamna hmun a ni tur a ni.
- Ar in zauh belh zelna hmun thlan theih a tha.

## **Ar vulh dan :**

1) **Deep Litter System** : Ar in chhuat chungah favai, phuai leh thildang chhah tak dah a ni a, ar tan khawsak a nuamin ar ek pawh a hip ral zung zung thei.

2) **Cage System** : Ar leng tawkin bawm siamsak a ni a. Chutah chuan chaw leh tui pekna remchang siamsak niin ar tui lai tan pawh awmhmuna tui mai theihin buatsaih a ni.

3) **Traditional System** : Mizo ar vulh pangngai a vulh hi hmunhma leh ar vulh a zirin a tha tho. Amaherawhchu ar vulh ho tana him, rukru leh sik leh sa laka hreawm lo ni thei se, natna laka an him damna hmun tur ngaihtuah a tha.

## **Ar in chhuat mamawh dan :**

Ar upat dan a zir leh an len leh tet azirin ar pakhat tana hmun zau zaswng a inang lova, ar pakhat zel hmun duh zau zawng chu a hnuai ami ang hi a ni.

<b>Ar upat lam (Kar)</b>	<b>Ar pumte chi (Sq. ft.)</b>	<b>Pumraw lian chi (Sq. ft.)</b>
Kar 0 – 8	0.7	0.7
Kar 9 – 12	0.95	0.95
Kar 13 – 20	1.9	2.35
Kar 21 chunglam	2.5-3	3-4

### **Ar note dahna tur buatsaih lawk dan :**

- Ar note chu ar in a thlen hma ngeiin Brooder House (Awplumna) lo peihfel vek tur.
- Ar in pumpui chu tihthianghlimna (disinfectant) hmanga tih thianghlim lawk tur a ni. Eg. Formalin ½ Litre in 50 litre of water emaw Fumigation (20 KMnO<sub>4</sub> leh 40 ml Formalin) hmanga tih thianghlim ni thei se.
- Ar note lak hma kar 1 (khat) chhung tal chu thianghlim taka enkawl chunga lo dah lawk theih hram a tha.
- Hmanrua tul angte chu ar note dah hma in a awmhmun turah a lo awm tawh tur a ni.
- Ar note dahna tur in chu darkar 24 chhung tal an mamawh tur temperature (lumna) anga lo ruahman lawk thin tur a ni.
- Ar in a lo thianghlim theih nan footdip (ke chiahna) siam ngei tur a ni. (KMnO<sub>4</sub> 1 gm in 100 ml water)

### **Ar note awplum dan (Brooding) :**

Ar note awplum hunchhung hi ar note thihna thlen tam ber lai hun (critical period) anih vangin uluk leh zual a pawimawh hle.

### **AR NOTE AWPLUM NANA TEMPERATURE MAMAWH DAN**

Kar 1 -	95°F (35°C)
Kar 2 -	90 °F (32°C)
Kar 3 -	85°F (29 °C)
Kar 4 -	80 °F (26 °C)
Kar 5 -	75 °F (23 °C)
Kar 6 -	70 °F (20 °C)
Kar 7 -	65 °F (17 °C)
Kar 8 -	65 °F (17 °C)

### **Ar note awplum (Brooding) hun chhunga hriattur :**

- Brooder house (Ar note awplumna in) chu a lum dan tur ang takin a lum tur a ni.
- Ar note kan dah luh pah hian ngun leh zuala enfiah zel tur a ni. Chaklohna, pianusalna te leh thildang ten alo tlakbuak theih avangin.
- Ar note dahna chhuat phah chu a tir ni 4-5 chhung lehkhapuan/chanchinbu hlui a phah thuah ngei nise.
- Ar note chu an tui in turah glucose pawlh a tha, a tam luat avanga mawng berh erawh a awm hma hle.
- A tir darkar 24 chhung vaimim hlang dip, mineral leh vitamin pawlh pek thin tur a ni.
- Lehkhapuan/chanchinbu hlui chungah “brooder” chu hun nita sela, tichuan chick guard a kualkhung leh in ar note chu dah nise.

- Brooding chhung hian tui leh chaw pekna atan a lian aiah a te dah tam a tha zawk.

Entir nan :- Ar note 100 tan tui leh chaw pekna pathum (3) ve ve zel ni thei se.

#### **Ar note awplum hun chhung :**

A tlangpuiin Broiler tan chuan kar 4 bak a ngai lem lova, chutih lai chuan Layer note tan chuan kar 6 chhung tal ni thei se a tha ber. Sik leh sa a zirin leh pawn boruak lumdan azir pawhin a tihdanglam theih bawk a ni.

#### **Ar thanglai enkawl dan :**

Ar note kar 8 a upa annih atanga kar 18 na vel emaw tui an thlauh tan hun thleng hi grower/pullet (Thanglai) an ni a. Heng grower an rawn nih chhohah hian an chenna tur hmun (Grower house) mamawh a lo lian / zau tan ta bawk a. Hetiangin – Chhuat zau zawng 900 cm<sup>2</sup> (3 sq.ft), chawpekna feet 2, tuipekna 2.5 cm vel ruahman tur a ni. Heng ar awplumna (brooder house) atanga dah sawn hnu ah hian eng (light) zan hniih khat tal chu inchhung ti eng tura pek zel hi duhthusam a ni. Hemi hnuah hi chuan zanah pawh eng hi pek tawh loh a pawi lem lo. Tichuan an chaw ei tur pawh Grower Mash (Ar thanglai chaw) pek chhoh tura ruahman an lo ni ta a, amaherawhchu vawi leh khatah ar thanglai chaw hi pek that loh a tha, Ar note chaw (chick mash) nen ni li chhung vel tal pek pawlh hrih tur a ni. Chumi hnuah Grower Mash hi pek chauh tur a ni. He ar thanglai chaw ah hian protein leh energy level tih hniam alo nih tawh avangin ar thau lutuk tur a veng a ni.

#### **Ar tui lai enkawl dan :**

Kar 18 an lo nih hian emaw ar chu a lo tui tan hian an chibawm (ovary) in hna a thawh tur ang a lo thawk tan ta a, chumi a lo nih tak avang chuan arpui tuilai hian engemaw danglamna, awm pangngaia awmlohma (stress) nasa tak a lo awm thin a, dimdawi taka enkawl an ngai zual, natna vei an lo awlsam phah bawk a, hei vang hian damdawi (antibiotic), vitamins leh calcium te pek uar deuh a tha. Hetia kar 18 atanga ar chu a lo tui tan hian layer mash (ar tui lai chaw) pek tan tawh tur a ni. Kar 20 a upa annih atangin emaw 20% egg production an neih atangin light (eng) darkar 16 chhung pek belh tur a ni. (Chhuat zau zawng 100 sq ft. ah 40 watt bulb pakhat ft 6-7 vela sang a khai tur). He eng pek belh avang hian artui tharchhuah a tipung thei a ni. Layer (artui lai) hian chaw 110 gm/bird/day leh tui 220 ml/bird/day eiral ang lo nise kum khat ah layer pakhat in chaw 40 kg leh tui 80 litter vel a ei in, a in ral ang a chhut theih a ni.

#### **Ar chaw leh a pek dan tlangpui :**

Ar chaw hian kan ar vulh than chhoh dan leh a hlawk dan a hril thui hle mai a. Ar chaw ah hian an mamawh heng – protein, energy, vitamin, mineral te tha tawk leh in buk tawk tak (Balanced Ration) a awm theuh tur a ni a. Ar len leh tet, a chi, upat dan ang zelin chaw siam hran an ni thin. Ar chaw kan lei dawn pawhin fimkhur taka a quality thlir chunga kan lei a pawimawh hle. Tunlaiah chuan company hrang hrang in ar chaw siamsa lei mai theihin dawrah an dah ta fur mai. Heng ar chaw dawrah hian ar chaw “Mash” (a dip chi) leh hlawm te tak te te “Pellets” an siam lei tur pawh a awm ve ta zel a, a quality ah danglamna a awm lem lo. Ar chaw tha leh pek dan a zirin Feed Conversion Ratio (FCR) a khawih danglam thei tih hriat reng a pawimawh hle a ni. Kan hlawhtlinna tur tehfung tha tak a ni tlat si a. Ar chaw a kan senso hi a tam thin em avangin kan duhtui a ngai reng a, 70-75% vel hi a chaw mana kan hmanral a ngai hial thin.

### **Ar chaw hi hlawm hnih a then a ni a :**

- (a) Energy Sources - e.g. Vaimim, Wheat vai, Favai, Jowar, Barley, Oat
- (b) Protein Sources - e.g. Thlai lam (Mustard Oil Cake, Groundnut Cake, Soyabean) leh  
Sa lam chi (Fish Meal / Meat Meal)

### **Ar chaw chi hrang hrang te :**

1. Broiler ration -      Starter ration (Ni 1 - Kar 5)  
Finisher ration (Kar 5 - hrall hun thleng)
2. Layer ration -      Chick Mash (Ni 1 - Kar 6)  
Grower Mash (Kar 6 - Kar 20)  
Layer Mash (Kar 20 atangin)

\**Thlai hring pek tam a tha a, tin an tui lai hian calcium pek that a pawimawh*

### **Ar in tui a mamawh zat :**

<b>Upat zawng (Kar)</b>	<b>Tui mamawh zat (ml)</b>
<b>1</b>	<b>30</b>
<b>2</b>	<b>60</b>
<b>3</b>	<b>95</b>
<b>4</b>	<b>135</b>
<b>5</b>	<b>175</b>
<b>6</b>	<b>215</b>
<b>7</b>	<b>255</b>
<b>8</b>	<b>290</b>

### **Ar natna lan chhuahdan tlangpui :**

- Rihna tlahniam
- Kawthalo
- Zeng
- Ke vung
- Che sawn tha thei lo
- Hmul pawr chip chep
- Mit leh hnar bawr vel tui chip chep
- Thawhah
- Thak
- Hmul tlakawlh

## Ar damlo enkawl dan tlangpui :

- Ar dam lo ten midang an kai ve loh nan hmun dangah sawn vat tur.
- Virus vanga ar hi a damlo anih chuan enkawlna vak a awm lo, a natna rawn lanchhuah dan anga enkawl mai tur.
- Bacteria vanga natna lo awm anih chuan antibiotic ni 5-7 tal pek ngei tur.
- Rulhut lam anih chuan rulhut hlo pek tur a ni a, ni 21 hnuah pek leh ngei ngei tur, hei hian rulhut a pai zawng zawng a that kim thei a ni.
- Tlakchham an neih avanga damlo annih chuan mithiam te rawn chunga damdawi pek tur.
- Ar kawthaloh ah chuan tetracycline powder hi thirfiante chanve tui litre khatah chawhpawlha nitin ni 5-7 chhung pek tur. Ar len leh tet a zir in a dose a in ang lo thei.
- Ar dam lo in chu a fauin a thianghlim tur a ni.
- Ar in chu ni sa hmu thei a dah ni se
- Ran dam lo enkawl chungchangah mithiam te rawn zel tur.

### Hri danna pek dan (Vaccination Schedule)

Sl. No.	Natna hming	Vaccine chi hrangte	Pek hun tur	Pek dan tur	A ven chhung
1	Ar pul hri (New Castle Disease / Ranikhet Disease)	Live virus F.D vaccine (Mild strain)	Ni 1- Ni 7	Far 1, mit leh hnarah	Thla 2-4
2	Ar pul hri (New Castle Disease / Ranikhet Disease)	Live virus F.D vaccine (Virulent strain)	Kar 6 chunglam chin tan, kar 6-8 ah a ni ber	0.5 ml S/C or I/M	Kum 1
3	Ar hmai huh (Fowl Pox)	Fowl Pox vaccine (Live strain)	Kar 2 a upa ah	Feather follicle method or wing web method	Thla 2-3
4	Ar hmai huh (Fowl Pox)	Fowl Pox vaccine (Freeze Dried) Kar 6-8	Kar 6-8	Feather follicle method or wing web method	Kum 1
5	Marek's Disease	Herpes virus vaccine	Ni 1 na ah	S/C	Dam chhung

## **FEED CONVERSION RATIO (FCR) :**

Ar chaw kan pek leh a thandan inmil lai tak hi kan chhinchhiah a pawimawh em em a. A chaw pe teuh siin a than theih tawh si loh chuan ar chaw man in min eilet thei a, chuvangin ar vulhtuten kan ar vulhte a chaw pek mila a than duh lai ber hi ar hralh hun a ni tih kan hriat a pawimawh.

$$\text{i.e. F.C.R.} = \frac{\text{Total amount of feed consumed}}{\text{Total body weight gain}}$$

Total body weight gain

Kar 6-na a value 2.00 aia tlem hi a tha.

## **AR TE NATNA LAKA AN HIM THEIHNAN HRIAT TUR THENKHAT TE :**

Ar hian ran dang aiin natna an kai hmain an thihpui awlsam bik emaw tih tur ani. Tin, tunlai Ar tui tam chi Layer leh Broiler te phei chu natna hrik lakah an duapkai zual a, chuvangin ‘Inven hi enkawl aiin a tha zawk’ tih hi kan ngaih pawimawh leh zual a tha awm e.

Ar natna avangin kawng hnihil hlohn a awm thin a. A pakhatna ah chuan ar a lo thihih ar thi man, an ei ral leh senso zawng zawng hloh vek a ni. A pahnihnaah chuan, ar an damloh a, a lo than that deuhin leh a enkawlna damdawi leh senso thlawn ta te a awm leh a. Hlawk duh a Ar vulh kan nih miau avangin natna tlentu leh natna tlentir theitu kan hriat pawh a ngai a ni.

Natna awmtir theitu te (Predisposing factors) te chu a tlangpuiin chaw that tawk loh vangte, chaw pek dan felhlel te, boruak tha leh thianghlim hmuh that loh vangte, ar in leh a vel tawp avangte, ar in chhunga ar dah tawt lutuk vangte leh sik leh sa khaw awmdan uchuak avangte a ni ber.

Ar in hi natna hrik chi hrang hrang laka a him theih nan disinfection a khat tawk a tih fo hi a pawimawh hle. Ar in pakhat a awm ho dah ruak vek a tih a tha a, Ar rualkhat hralh zawh veleh, a rual dang dah luh leh hma in disinfection tih thin tur a ni. Chutianga disinfection kan tih dawn chuan heng ahnuia kan sawi te hi zawm hram tum tur a ni.

- 1) Ar in pumpui chu tha taka tihfai tur a ni a, a tul chuan chem a ziah fai leh tui a silfai a tha, balkhawn lai awmlo tur a tih fai a tha ber.
- 2) Ar chaw pekna, tui bawm leh tui pekna lak chhuah hmasak vek tur a ni.
- 3) Vaivut nawi leh ar chaw nawi bua te hi natna tawm buk anih thin avangin, phiah fai vek tur a ni.
- 4) Disinfection kan tih hma nthum velah ar in chhuat a phuai leh ar ek khawnte paih fai hmasak tur a ni.
- 5) Ar in chhung skirting bang chu sahbawn leh tui a silfai ni thei se a tha.
- 6) Ar in chhuat chu formalin litre chanve leh tui litre 50 chawhpawlh a chiah tur a ni.
- 7) Ar in leh a chhunga hman chi bungrua te tihfai vek anih hnuin, disinfectant tuiril chi a chiah tur a ni. Chumi hnuah formalin hu a kah emaw Potassium Permanganate leh Formalin 2:3 ratio a ur tur a ni. A tawp berah chuan damdawi Aerosol, Kohrsolin-Th hnang a kah leh tur a ni.
- 8) Ar in chhuat phuai (litter) hi kan hmang nawn dawn anih chuan damdawi hmang a ur vek phawt tur a ni bawk.
- 9) Ar in leh a chhung damdawi hmang a ur chhung, darkar 12 vel chhung chu ar in khar phui vek tur a ni.

Ar kan vulh te hrisel leh hlawk zawk a kan vulh theih nan uluk taka hmalak hi kan mawhphurhna a ni a. Chuti anih loh chuan sum tam tak seng a hmalakna kha engmah lovah achan theih a ni. Chumi a kan hriattur thenkhhat lo sawi leh ila.

- 1) Ar note hrisel leh pian tha, mawng berhlo leh hul tha chauh vulh tur a lak tur a ni. Ar note thar lak dawnin ar in chu kar hniih tal dah awl tur a ni a, ni hniih chhung chu ar in chhungah tumah luh tir loh tur ani a, darkar 24 chhung lo tih en a, lo tih lum lawk tur a ni.
- 2) Ar te natna laka an him theih nan a hun takah hridanna (vaccine) pek thin tur a ni. Vaccine pawh siamtu rintlakte siam chauh hman tur a ni. Vaccine thi (expire) chu hman miah loh tur. Vaccine hmanzawh loh chu pah bo mai lovin uluk taka dah bo tur a ni.
- 3) Ar in leh chaw pekna leh tui pekna hmanruate uluk taka tih thianghlim thin tur a ni.
- 4) Ar chaw quality tha leh tui thianghlim chauh pek thin tur. Chaw leh tui pek dawnin pekna hmanruate tihfai hmasak phawt tur a ni.
- 5) Ar damlo an awm leh awm loh uluk takin en thin tur a ni. Ar damlo an awm chuan dah hravat a, vety doctor te entir a, an tih anga enkawl nghal vat a, a dam veleh tih ralvat tur. Tin, ar thi a awm chuan lakchhuah vat a, a theih chuan engvanga thi nge tih leh a enkawlna dan tur te a hriat theih nan postmortem tir a tha. Ar thi a awm in pah bo mai lovin phum bo / halral tur a ni.
- 6) Ar in chhungah ar enkawl tu nilo midang luhtir mai mai loh tur. Ar in luh dawn kawngka bulah damdawi (disinfectant) tui, ke chiahna tur dah tur a ni. A theih phei chuan apron leh boot in bel tur nei ila a tha.
- 7) Ar in chhung chu a hulin a ro tha tur a ni. Ar in chuatphah (litter) te a ro tha tur a ni. Ar in chhung ah sava leh sazu te an lut thei tur a ni lo.
- 8) Ar in chhungah boruak thianghlim luhnna leh chhuahna tha tawk leh eng hmuh theihna tur tha siam tur a ni.
- 9) Ar ek leh ar chaw tui chhe pahna mumal tak siam tur a ni. Ar ek pahna hmun chu tho tawm khawmna leh inhlah punna anih loh nan chhawla khuh reng tur a ni.
- 10) Ar natna hri alen chuan ar in chhung, chhuatphah (litter) phuai leh hmanrua te damdawi hmanga tihthianghlim tur a ni. Ar in bang, pindan bang leh chhuat pawh chinai tui a hnawih var thin a tha. Ar in leh a vel hulhliap te, artui dakhawmna leh chhuarte pawh disinfectant a kah fo tur a ni.
- 11) Ar in chu ar dang dahluh leh hma in damdawi disinfectant hmanga tihthianghlim thin tur a ni.
- 12) Ar enkawlna ah ar thi zat, hralh zat, damdawi leh hridanna pek dan te, sum hmanral zat leh lakluh zat leh thil dangte chhinchhiah thlap thin tur a ni. Tin, damdawi pek dawn in mahni duhdan a pe mai lovin, mithiam zawk rawn hreh lovin, an tih anga pek thin hi a tha ber fo.
- 13) Ar hian natna an kai chhawn zel theih thin avangin ar damlo dahna tur bik (Isolation Shed) a hrangin ar hrisel ho awmna atanga hnai lutuk lovh siam tur a ni. Tin, ar enkawltu in ar hrisel leh ar damlo a enkawl kawp tur a ni lo.

## Topic 19 – Vawk vulh dan

### Objectives :

To improve the knowledge and skills of the participants on Pig farming

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness on the scientific method of pig farming

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Pig farming	* Why pig farming? * Record keeping * Procurement * Management : Housing, Feeding, Health, Disease, Sow and Piglet * Vaccination schedule * Feed conversion ratio * Artificial Insemination	PowerPoint presentation, Interactive learning method	The trainer will deliver lecture on pig farming through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Mizo te hi kan pi leh pute hunlai atang daih tawh a vawk vulh tawh kan ni a. Amaherawhchu eizawnna atana hmang leh hlawkpu chu mi tlem te an ni. Tunlaiah thiamna te lo thang zelin, vawk vulh hlawk dante mithiam hnen atangin kan hre thar zel a. Kan Self Help Group member tam berte pawh vawk vulh a eizawng an ni awm e. Chuvangin vawk vulh dan awmze nei a kan kalpui a ngai a, tunlai thiamna hmanga kan vawk vulhte kan enkawl hi a pawimawh em em a ni.

### Engvangin nge vawk kan vulh ang?

- Vawk hi ran inthlahpung chak tak an ni a, vawkpui pakhatin tum khatah note (8-12) a nei thei.
- Mizo te sa duh ber pakhat anih avangin vawksa hralthna lamah harsatna a la awm hril lo.
- Chhungkaw chaw ei bang nawi paih mai ngai lo a ei zo tu annih avangin vawk chaw a senso a ti tlem.
- An chaw ei mila an than duh avangin sum khawlna awlsam tak a ni.
- Vawksa ah hian paih tur a tlem a, a vulhtu tan a hlawk.
- Vawksa ah hian mihring tana chaw tha protein tam tak a awm.
- Vawk vulh enkawl nan nileng tha sen a ngai lo.
- Broiler ar tih lohah chuan vawk hi ei tling hma ber a ni.

### Record keeping chungchang :

- Vawk vulh a eizawngtu ten record felfai taka vawn thin tur.
- Vawk note lak ni atanga a talh ni tlengin diary ah felfai taka chhinchhiah thlap tur.
- Vawk chaw, damdawi leh vaccine a senso zawng zawng felfai taka vawn anihin vawk vulh atanga kan hlawkdan a chhutchhuah theih.
- Vawkpui vulhin vawk pawl ni leh no neih ni, lak hran ni te fel taka chhinchhiah tur.

### **Vawk vulh tur thlan dan :**

- Vawk vulh tur chu thlahtu atanga vawk chi tha, thangduang an ni tur a ni.
- Vawk talh tur chi chu a pian tha, chum tha leh ruakhau deuh thlan tur.
- Vawkpui tur chu thlahtu atanga no neih ngah, hnute hmur 12 aia tlem nei thlan loh tur, a pui atanga hnute ngah, no hrin harsat lo, no lak hran hnua hur leh thuai thin a ni tur a ni.
- Vawk chi thlah tur chi chu a hmel en a pa riau, a kum phu tawka lian tha leh pian tha thlan tur.
- Thisen zawmpui hnaih lutuk thlan loh tur, piansualna a tam duh.
- Vawk note chi tha chi hi Selesih A.H & Vety Farm atangan a lak theih.

### **Vawk in sakna hmun thlan dan :**

- Vawkin sakna hmun chu hmun rual rem, ni eng hmu tha a ni tur a ni.
- Thli natna hmun a ni tur a ni lo.
- Vawk zun leh ek te rimchhe lo a luanral theihna hmun a ni tur a ni.
- Vawkin sakna chu kawngpui atanga hla lutuk lo, chakkhai lakna rem a ni tur a ni.
- Tui thianghlim hnianghnar taka neih na hmun a ni tur a ni.
- Electric supply tha tak a awm tur a ni.
- Thenawm khawveng tana rimchhia hriat phak loh na hmuna sak tur.
- Vawk chaw atana tha thlai chin theihna hmun awm thei se a tha.

### **Vawk in tha tangkaina leh pawimawhna te :**

- Khawlum lutuk leh vawt lutuk laka an him theih nan.
- Vawk an in thlah pun hnem theih nan.
- Vawk thi an tlem theih nan.
- Hri leng laka an him theih nan.
- Rulhut laka an him theih nan.

### **Vawk in chhuat zau zawng mamawh dan te :**

<b>Vawk chi</b>	<b>Vawk pakhat in hmun a duh zat (Sq.m)</b>	<b>A tlatna tura hmun a mamawh zat (Sq.m)</b>
Vawkpai chi thlahtu	6.27-7.5	8.8-12.0
Vawk rai lai	7.5-9.0	8.8-12.0
Vawkpui rai lo	1.8-2.7	1.4-1.8
Vawk talh rual	0.96-1.8	8.8-12.0

### **Vawk chaw pek dan :**

Vawk chaw tha pek hi vawk vulh chungchang a thil pawimawh em em mai a ni a, a chhan chu vawk kan talh hnu a kan hlawk leh hlawk loh kan tehna ber chu a chaw kan leina/thasen atanga hlep kan neih leh neih loh a kan chhut thin vang a ni. Vawk te hi an than chak ang bawk in chaw an mamawh pawh a tam hle a, vawk no te1.4 kg a rit hi thla 18 hnu ah chuan 163 kg a ni daih tawh thei. Hemi awmzia chu thla 18 hnu ah chuan a rihna kha a let 120 chuangin a lo tam tawh tihna a ni.

Vawkte hi engkim ei thei an ni a, a saptawng chuan omnivorous animal kan ti thei awm e. Hnim hnah te pawh an ei thei vek a, mahse bawngte angin pumpui 4 an neih ve loh avangin hnim hnah ringawt ei chu a tha ber lo. An hmui leh ha to dan mak danglam tak mai chuan lei ami leh a chaw pekna kuang a eitur te chu an ei ve zung zung thei a, mihring in a kan ei ang thin zawng zawng hi chu an ei ve thei vek bawk, chuvang chuan kan chaw ei bangnawi pawh paih mai mai lo in kan hman tangkai theih phah a ni.

Vawk te hi an upat ang zelin an chaw mamawh pawh a in ang lo ve zel a, vawk a lo upat telh telh in protein, mineral leh vitamin a taksain a mamawh pawh a lo tlem ve hret hret a. Vawk note apiang ah chaw tha bik a mamawh hi a sang a, a chhan chu a taksa in relbawl dan te a la famkim tawk loh vang a ni.

### **Vawk chaw pek dan hrang hrangte :**

1) **Vawk note chaw tha bik (Creep Feeding)** : Ram changkang leh farm puitling ah chuan he pre-starter ration/creep feeding hi vawk note in kg 2 a tlin hun emaw ni 7-10 vel a upa anih in an pe tan thin. Hetiang ang vawk chaw hi vawk note lak hran rual an nih thlengin a pek theih, anih loh pawhin vawk note kg 6.5 to 8.5 chin an pe thei bawk. He pre-starter ration hi a tui tel lo (dry) a ni a, hetiang ang chaw hi vawk note in a lo ei chuan a tui in a tihal a, vawkpui hnute tui a hnek tamtir phah thei bawk, Hetiang ang chaw ah hian 20% vel hi protein a ni a, heng bakah hian minerals leh vitamin chi dang dang a awm bawk, tin, vawk note ei duh chi a ni ngei bawk tur a ni.

#### **Creep mixture (Dr S.K. Ranjhan)**

Vaimim (Ground yellow maize)	40 kg
Bawngnute (Skimmed milk)	10 kg
Oil cake (Groundnut cake)	10 kg
Til cake	10 kg
Wheat bran	10 kg
Kurtai (Molasses)	10 kg
Sangha dip (Fish meal)	6 kg
Brewars yeast	2 kg
Mineral mixture	2 kg
Add. Vitamin (A, B2, D3)	10 gm
<b>TOTAL</b>	<b>100.00 kg</b>

2) **Vawk note chaw** : Hetiang ang ration hi chu vawk note lak hran atanga kg 20 an tlin thleng a pek theih a ni. He chaw hi pre-starter ration nen a in ang deuh reng a, a danglam na chu pre-starter ration a skim milk powder aiah hian fish meal/meat meal telh mai tur a ni. Farm thenkhat skim milk powder tlawm na hmun ah chuan pre-starter ration pawh a pek chhunzawm theih tho bawk.

3) **Vawk thanglai chaw** : Vawk te chu kg 20 an lo tlin hnu ah grower ration a pek tan theih a, vawk te pawh an lo thanlen ang zelin an pumpui te pawh a lo insiam puitling ve zel a, an taksa ralveng khawl te pawh a lo insiam danglam ve zel bawk. Farm thenkhat a vawk vulhtu thenkhat te chuan starter leh grower ration te hi an pek pawlh thin tho. Heng grower ration ah hian chaw tha protein 16% lai a awm thin.

Ingredients	10 Quintals (kg)
Chi (Common Salt)	5
GNC	50
Vaimim (Maize)	460
Mineral mixture	20
Mustard oil cake	95
Wheat bran	130
Rice polish	180
Sa dip (Meat meal)	60

4) **Vawk puitling chaw** : He ration ve thung hi chu vawk kg 35 chin chunglam ah an pe thin. He chaw ah hian protein leh energy level hi a tlem bik a, vawk than nan a chaw tha pawimawh zawng zawng chu a pai vek. He ration hi vawk talh rual an nih thleng a pek chhunzawm theih a ni.

Ingredients	10 Quintals (kg)
Chi (Common Salt)	5
GNC	60
Vaimim (Maize)	400
Mineral mixture	20
Mustard oil cake	75
Wheat bran	200
Rice polish	190
Sa dip (Meat meal)	50

5) **Vawk railai chaw** : Vawkpui rai lai chuan chaw tha proteins, vitamins leh minerals in balance tawk a mamawh hle a, a chhan chu a no pai zawng zawng te chaw tha a pek tel a ngaih vang a ni. Tin, vawkpui in no a hrin hnaih tawh lampang ah hian a no paite an than belh thin avang hian chaw a mamawh na a tam zual.

### A pek dan :

A rai tan tirk : 2-2.5 kg  
 A rai lai : 1.5 kg  
 A no neih hma kar 3/4 : 2.5 kg

Heng a chung a kan sawi ang hi farm puitling a an pek dan a ni a, amaherawh chu a chaw kan pek tam avanga vawkpui in a thau phah vak chuan a chaw khi pek tlem mai tur a ni, vawkpui chu thau lutuk lo cher lutuk lo a chaw pek tur a ni.

Vaimim (Maize)	50%
GNC	20%
Kurtai (Molasses)	5%
Wheat bran	18%
Sangha dip (Fish meal)	5%
Mineral mixture	1.5%
Chi (Salt)	0.5%

- 6) **Vawk no neih dawn hnaih chaw** : Vawkpui no neih hma leh neih hnu ah hian a chaw pek hi tih tam tur a ni a, tin chu bakah a no neih hma deuh in a hnute tui tam nan calshakti, biobloom etc. te pawh pek tel tur, hetiang ang a kan tih chuan a hnudetui insiam na ah a tanpui. Tin, vawkpui no neih laiin tui thianglim tam tawk a in tur a awm reng bawk tur a ni.
- 7) **Vawk pui note hruai lai chaw** : Vawkpui hnute chawm lai nei in a rai lai aiin chaw a mamawh hnem zawk, a chhan chu a hnute tui vawk note ten an hnek ve vang a ni. Vawkin note a chawm tam leh tam loh a zirin a chaw mamawh pawh a danglam thei bawk.

### Vawk in nitin tui a mamawh zat

Vawk rual (Classes)	Tui mamawh zat ( litre)
<b>Thang lai</b>	
Kar 8-12	3.5
Kar 13-18	6.0
Kar 19-24	7.5
Kar 25 chin chunglam	8.0
<b>A la/Rai lai</b>	
A pai hun chhung chawhma lam	10-15
A pai hun chhung chawhma lam	16-20

No chawm lai	
No 5-7 hruai lai	20-25
No 8-10 hruai lai	22-27
No 11-14 hruai lai	28-35
<b>A pa/Chithlahtu</b>	20-25

### Chaw pek dan hrang hrang te :

1) **Rationing System** : He system hi chi hrang 3 ah then hran leh theih a ni.

- a) **Ad lib feeding (Hnianghnar tak a pek)** : Hemi awmzia chu vawk chaw duh ang tawk a tam pek tih na a ni, vawk than nan chuan tha viau mahse kawng tam takah that loh na a awm ve tho, a chhan chu vawk chaw nawi (waste) a tam duh bak ah vawkin a duh lai lai a ei a, a mamawh thenkhat chaw a tel tho si te a ei tel loh phah thei bawk.
- b) **Restricted feeding (An mamawh tawk pek)** : Hemi awmzia chu vawkin a mamawh ang zat chiah chiah tlem te te a pek tih na a ni, Ni khatah vawk chu chaw vawi 2/3 lai pawh a pek theih. *Ad lib* a chaw pek ai chuan an than a tha lo deuh zawk a, mahse an chaw pek ang zawng zawng a ei zawk zel avangin vawk tan a chaw tha awm ang kha vawkin a dawngkim vek thung. A sa pawh a tha zawk a thau leh ti a inpawlh mawi bik hle.
- c) **Appetite feeding (Chaw hniang hnhar taka pek leh a changa tlemte pek)** : Hetiang method hi chu a chung a kan sawi tak pahnih te in kawp hi a ni, vawk chu minute 15-20 chhung vel a eitur a duh ang tawk a tam chaw pek tur a ni a, hemi hun chhung a chaw a ei ban chuan a lehpek ah chaw kha an pe tlem mai thin, amaherawh chu vawkin minute 20 hma a chaw zawng zawng a ei zawk vek chuan a lehpek ah chaw tam zawk pek belh mai tur a ni.

2) **Vawk chaw chi hrang hrang te :**

- a) **Dry foods (A hul)** : Hemi awmzia chu vawk chaw ah khan tui tel lo a ro tihna a ni, hetiang ang chi chaw hi *ad lib*/restricted feeding in a pek theih. Tin, chaw kha cube angin an pe thin bawk. Hetiang ang a chaw pek chuan chaw bang nawi a tlem bik a mahse chaw man a to deuh thung.
- b) **Wet foods (A hnawng)** : Hemi awmzia chu vawk chaw kha tui nen a pawlh(mix) tihna a ni, hetiang ang a vawk chaw pek chuan a chaw khu lutuk tur te a tlem bik a, tin vawkin hnhar lam a harsatna (respiratory problem) a nei tlem bik bawk.

Heng a chung a kan sawi ang chaw chi hniih pek hian vawk than duh dan ah te, a sa chungchang ah leh sa hmelhmang ah effect a nei em em lo tih research atanga hmuhchhuah a ni.

3) **Vawk chaw pek dan hrang hrang te :**

- a) **Vawk chaw kuang a pek (Trough feeding)** : Hetiang ang chi ah hi chuan vawk chaw tuiril lampang chi te pawh a pek theih. Amaherawh chu a rual a vawk tam tak chaw kan pek dawn chuan vawkin lian tha, vawkin rualkhai tak a chaw an chan theih na tur hmun thawl a pawimawh hle.

- b) **Chhuat a pek (Floor feeding)** : Hetiang ang chi ah hi chuan vawkin chhuat ah khan a chaw kha pek mai theih a ni, vawk kg 30 aia rit atana ruahman a ni tlangpui. He method hi vawkchaw kuang siam mai remchan lohna hmun ah an hmang thin.
- c) **Self feeders** : Hetiang ang method ah hi chuan vawk kuang pakhat ah vawk pakhat chauh chaw pek zel ang a ni.

Vawk vulh hian a chaw hi sum senna pui ber a ni a, a hautak avangin ngaihtuah ngun a ngai hle a ni. Tun a kan vulh ang a  $\frac{1}{2}$  lek vulhtu tan chuan chaw chum sak a tun a kan pek dan hi a la tha thei mai a, Farm din a, vawk tam tham vulh tur chuan chum sen a nil ova, a chaw siamsa pek mai a tul a, senso tihtlem nan thlai leh hnah nem dang pek theih tur a awm nual a, chung te chu :

- 1) Pangbal – 40% thleng pek theih a ni
- 2) Kawlbahra – 45% thleng pek theih a ni
- 3) Dawl/Bal – 30% thleng pek theih a ni
- 4) Changel – 20% thleng pek theih a ni
- 5) Thlai dang – 50% thleng pek theih a ni
- 6) Chaw nawi – 50% thleng pek theih a ni

Vawk chaw hi zing leh tlaia hunbi nei tak a pek hi a tha hle, pek zat tur erawh chu an len leh rih zawng a zirin tihdanglam tir a ni. Hetiangin :

Vawk upat zawng (Thla)	Vawk rih zawng	Ni 1 a pek zat tur
Thla 2-3	15-27 kg	1 kg
Thla 3-4	27-40 kg	1.25 kg
Thla 4-5	40-50 kg	1.50 kg
Thla 5-6	50-60 kg	2.00 kg
Thla 6 chin leh a chunglam	60 kg	2.50 kg

#### **Vawknu hur hriat dan leh pawl tir hun :**

Vawk nu hur pawl tir hun tha chu kum khat vela upa anih hun emaw 80-90 kg a rit a lo nihin a ni. A lo hur laia pawltir loh emaw pawltir a rai lo anih chuan ni 21 hnuah a rawn hur nawn leh tlangpui thin. Vawk hur hriat theihdan tlangpui te chu :

- An serh a lo vung sen hlar in
- An serh atangin tuihnang fim a lo chhuahin
- An hram chhen a, an awm hle hle thei lo
- Vawk dang nena an awmin an bawh thin
- An hnungzang a kuta nemin kalsan lovin an ding reng thin
- Nidang aiin chaw an ei tlem thin
- An mawng lam khawihin an mei an kan a, an dawh hle hle thin bawk.

Vawk hur reilam : Ni 2-3 (Vawk la chu ni 1 chauh)

Vawk hur zin zawng : Ni 21 (ni 19-23)

A pa pawl tir hun :

- A pui : A ni hnihil
- A la : A ni khatni

A nu hur hmasak ber hun : Thla 6-8

Vawkpa chi thlah theih tan hun : Thla 8-12 (average)

Vawk rai hun chhung : Ni 114

### Vawkpui hur hriat/landan

A lan dan	A hur tan tur	Pawl tir hun	A hur reh tawh
Pawl tir hun tak	A hnungzang mawng hnaih lamah kutphah a han nem a la duh lo	A hnungzang mawng hnaih lam a kutphah a hna nem in a dawh hle hle	A hnungzang mawng hnaih lam a nam in a dawh duh lo
A serh lan dan	A serh a sen vung hlar a, bawlhhlawh tlem a chhuak	A serh chu a sandal ta deuh a, a vung pawh a nep in bawlhhlawh fim ban deuh a awm	A serh chu a sendal hle tawh a, a vung leh bawlhhlawh chhuak pawh tih tham a awm tawh lo
A nungchang a lan dan	A awm hle hle thei lo a, a phawklekin vawk dang a bawh a, an bawh ve erawh chuan a ngaithei lo, a zung zing hle	A zia a zawi tawhin, midang bawh a duh a, a beng a tun a, a pa a zawng ruai tawh a, a pa bulah phei chuan a hnungzang a ti kul thin	A awmdan a pngngai tawh
A hun chhung	Ni hnihil	Ni khat	Ni khat
Pawl tir	Pawl tir rihloh tur	Pawl tir hun dik a ni	Pawl tir a hun tawh lo

### Vawkpui rai lai enkawl dan :

Vawk hi an rai lain uluk tako enkawl a ngai a ni. An rai laia enkawl that hian a no that leh that lohah te, vawk note chak leh chak lovah te kawng ro a su hle a ni. A rai laia hriattur pawimawh zual te chu -

- 1) A rai laiin a in chhuat tihngchin loh tur, anmahni pawh sawn kual sek loh tur.
- 2) Vitamins leh minerals te pek thin tur.
- 3) A rai tan atanga ni 60 thleng chaw tha 3-4 kg pek tur a ni a, ni 110 atanga no neih inkarah 2 kg bakah hninhnah te pek tel a tha.
- 4) No an neih hma ni 10-14 a la awmin rulhut hlo pek a tha.

- 5) No an neih hma ni 5-7 velah a note awmna tur a that tawkleh tawk loh enfel vek tur a ni. A pui chawkuang vel pawh hruck fai vek tur, tin a note hrufaina tur pawnchhe fai pawh inrin fel vek tur a ni.
- 6) A rai chhungin chul emaw hiah fo a tha.

### **Vawkpui no neih laia enkawl dan :**

Vawkpui hian a tlangpui thuin ni 110-114 vel no an pai a. Ni 110-na atang chuan no nei thei dinhmunah an ding reng tawh a ni. No an neih hun dawnah ngun leh zuala enkawl tur a ni a, vawkpui no vei hriat theih dan tlangpui te

- 1) An awm hle hle thei lo va, chaw an ei tha duh lo.
- 2) Bu an sual a, an zung zing em m a, bawlhhlawh pawh a lo chhuak thin.
- 3) An hnute a tang a, a put thin bawk. An hnute a lo put anih chuan, a put atanga darkar 12 chhungin an nei tlangpui thin.

Vawk no neih hun chhung hi a hunchhung chiah sawi theih loh mah se darkar 3-4 chhung vel a ni tlangpui. Chu aia rei emaw rei lo emaw pawh a ni thei. A note a lo lawr chhuah tawh chuan kut sil faiin a san zawnga lo pawh pui a tha. A neih zawh leh zawh loh hi hriat a har thin a, a khat tawh viau anih chuan chhul thuahna mum thum thun tur a ni. Darkar 12 hnuah mum thum bawk thun leh tur a ni. Vawkpuiin no a la nei zo lo anih pawhin a lo chhuak leh tur a tanpui zawk a ni. No neih chungchanga harsatna awm anih chuan mithiam te rawn vat tur a ni.

### **Vawk note piang hlim enkawl dan :**

- a) **Lai hrui tan :** Vawk note a lo pianin a lai hrui hi 2-3 cm vel a sei zuahin hrui thianghlim a tawn thin tur a ni, darkar ruk vel chhungin a lai hrui thisen awm 5-10 ml vel chu a note lamah a lut vek a, vawk note tan a thisen a hlut em avangin fimkhur tak a sawngbawl tur. Lai hrui tawn khahnha lai chu dettol emaw iodine tui hnawih thin tur.
- b) **Hruk fai :** Vawk note piang hmasa apiang chu puanchhe thianghlim a hrufai zel tur, a hnar leh ka a thawkna lam tibuai thei a awm lohnan enfiah vek tur. A thawthei lo ho chu rang taka a letlinga khaia an darah zawi te te a ben tur a ni. Tin, an hnar leh ka ah te hammin an lo thaw chhuak leh thei thin bawk.
- c) **Up lum :** Vawk note hian a pui aiin lum an mamawh nasa zawk a, chuvangin thilasik lai phei chuan an awmna bawmah electric bulb khai sak ngei ngei tur, vawt an tih chuan an in bawh khawm a, a lum tawk chauh anih erawh chuan tlamuang takin hmun hrang hrangah an mu dar dar thin. Vawk note bawm chu a rovin a hul tha tur a ni.
- d) **Hnute tui hmasa :** Vawk note pianghlim tan chuan a pui hnute tui hmasa bak a tha a awm lo a, he hnute tui hmasa ah hian natna tinreng do let theihna leh vawk than len zelna tura chaw tha leh chakna tinreng a awm tel bawk a ni.
- e) **A ha tan :** Vawk note pianghlim hian ha hriam tak tak 8 a nei a, hei hi tan anih loh chuan vawkpui hnute hmur an seh pilh a, a pan thei a ni. Chuvangin a ha hni khawih lo tawka tan tur a ni. Nail cutter hmangin a tan theih a, a tanna tur renga siam pawh a awm ve bawk.
- f) **A til lak :** Vawk te til lak hi a pian ni a lak a awlsamin na an tuar lo bera ngaih a ni. Amaherawh chu thianghlim taka tih a ngai a, thui a ngai lo va, a dam awl em em bawk.
- g) **Iron injection :** Vawkpui hnuteah hian vawk note mamawh tawk iron a awm loh avangin iron injection hi pek ngei tur a ni. A pian atanga ni 3-na leh ni13-ah te pek a tha.

## **Vawk dam lo hriat dan :**

- A landan, chetzia leh awmdan a danglam
- Vawk dang lak atangin an in la hrang a, an mu tlat a, an harhvang lo
- Chaw ei a tui lo
- An taksa a pangngai aia a lo lum emaw vawh emaw in
- Khuh emaw thawrang/muang, an puma an thawk vak vak in
- Na nei ni awm taka ni dang ang lova an hram vak vak in
- Kawthalo, ek khal, ek a thisen awm emaw an zun that theih lovin
- An serh emaw thisen a thilvar/hnang a kaiin
- An vun a hrisel lo a, an hmul a tla vak thei bawk

## **A pul hri laka venna (Vaccination) :**

Thla 2-3 ah vaccine pek tur a ni. Vawkte pakhat tan 1 ml zelin an tihrawl ah chiu tur. Thla 10-12 dan zelah pek nawn tur a ni. Vawk rai laite, vawkte thla hniih hnuailam leh vawk dam lo te chu vaccine pek loh tur a ni. A tul angin veterinary doctor leh mithiam te rawn zel tur a ni.

## **Vawk hri danna pek dan :**

Sl. No.	Natna hming	Schedule	
		Primary vaccination pek hun	Regular vaccination
1	Swine fever (Vawk pul hri)	Kar 6-8 ah	Kum tin pek tur
2	Foot and Mouth Disease (Ke leh ka na hri)	Kar 4-8 ah	Thla 6 danah
3	Haemorrhagic Septicaemia	Thla 3 ah	Thla 6 danah
4	Swine erysipelas	Kar 10 ah Booster : Chiu hmasak ber atanga kar 3 hnuah	Kum tin
5	Brucellosis	Thla 2 ah	Chiu nawn a ngai tawh lo
6	Swine influenza	A tul dan a zirin pek tur	

## **Vawk kah rai (Artificial Insemination) :**

Vawkpa chi hmanraw hmanga doctor ten an lak chhuah chu, a nu chi bawm atanga a nu chi lo chhuak nena intawng tura hmanraw hmanga a nu chhul chhunga va thun luh hi a ni. Mizoramah hian vawk kahrai atangin thla tin vawk note 700 aia tlem lo an piang a ni. Vawk kahrai hi Mizoramah 70% a hlawhtling a, kan ram tan a tangkai em em a ni.

Vawk kap rai tur hian a hun dik taka kah a tul a, a hun dik hriat theih dan chu hetiang hi a ni :

- 1) A hur atanga ni thum tuk emaw tlai lamah emaw
- 2) A bawlhhawh chhuah hnu ah

- 3) A zahmawh chhung a sen vanglai takin
- 4) A zahmawh pawng thur lo vuai leh hnu ah
- 5) A chunga chuan pawha a dawh vung vung duh hunin
- 6) A zahmawh khawiha a mei a kan emaw a beng a tun ar hunah

**Vawk kahrai thatna te :**

- 1) Ran chi tha thehdarh zelna a ni, vawkpa chi tha vawi khat lak chhuah hian vawkpui sawmli (40) vel lai a kahrai theih a ni.
- 2) Natna inkaichhawn theih lakah a him. Vawkpa a chi kahraina atana hman tur te chu ngun taka enkawl bik an ni a, natna bakah hrivenna (vaccine) te pawh a hun takah pek thin an ni.
- 3) Vawkpa chi hi awlsam taka ken kual theih a ni.
- 4) Vawkpa chi tha leh tha lo khawl hmanga enfel hmasak vek anih avangin chi tha lo hman a ni ngai lo
- 5) A pa pawltir avanga chetsualna – ke liak, ruh pelh, kawng awp leh inhliam theihna lakah a him.

**Vawk kahrai thatlohnna te :**

- 1) A chi lakchhuah atanga a sawngbawl danah te, dahthat laite leh kap rai tute fimkhur tawk loh avangin vawkpa chi thi a awm thein a hman palh theih.
- 2) A chi lakna vawkpa in natna inthlahchhawn theih an lo vei palh chuan theh darh tu awlsam tak a ni.
- 3) A chi kaptu mithiam tak mamawh a ni a, thiam ve lo tan tihve ngawt a rem lo.
- 4) Vawkpa chi hi 16-17°C ah ni 4-5 chhung chauh a vawn that theih.
- 5) Vawk kahrai dawn hian vawk vulhtu ten an vawk hur tan, hur hun leh hur that leh that loh hriatchian lohin vawkpui kahrai a hlawhtling tha duh lo.

## Topic 20 – Bawng vulh dan

### Objectives :

To improve the knowledge and skills of the participants on dairy farming

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness on the scientific method of dairy farming

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Dairy farming	* Why Dairy farming? * Record keeping * Procurement *Management: Housing, Feeding, Health, Disease, Fodder, Lactating and Pregnant cow * Vaccination schedule * Feed conversion ratio * Milk hygiene * Artificial Insemination	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on dairy farming through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Mihring tan a chaw tha em em mai chu bawngnute hi ani. Kan ram hi kan ram naupang tak leh harsa tak mahni a thawh chhuah em em nei lo ram kan ni a, chaw ei tur hrisel tha hi a kan nei lo em em a ni. Chuvang chuan bawngnute hi kan thar chhuah ve thei kan tan a hrisel em em a ni.

Kan ram mipuite eizawnna tam ber chu lo neih a ni a, amaherawhchu kan ram leilungin a zir loh vang te leh chhan hrang hrang avangte in lo neih hi a hlawk em em lova, eizawnna kawng kan zawn a lo ngai a, chung zingah chuan ran vulh hi kawng dang awm chhun a ni. Ran vulh zing ah chuan bawng vulh hi eizawnna tling leh hlawk tak a ni thei a ni.

### Engvangin nge bawng hi kan vulh ang?

- Bawng vulh hi eizawnna tling leh hlawk tak a ni thei.
- Bawngnute hi mihringte tana chaw hrisel tak a ni.
- Bawng ek hi thlai tan a lei tha tak a ni.
- Bawng hnute tui sawr lai chu nitin atana sum hmuhna tha tak a ni.
- Bawng sa hi mihringte tana chaw tha tak a ni.
- Bawng yun hi thil chi hrang hrang siam na atan a tha tak a ni.

### Bawng vulh tur thlan dan :

- Bawng hmel chu itawm leh nu riau tur a ni.
- Mitmeng fiah leh fai tak, hnar lian leh hmui sei rat tur a ni.

- A hnungzang chu ngil tak leh a mawng lam a mei in vuah na (rump) chu hlai darh tur a ni. A ke pali chu te chu a taksa ah chuan nghet tak leh rual khai taka in hlat in a in vuah tur a ni.
- A ke hma lam pahnih chu a ngil tur a ni a, a hnung lam ke te chu in hlat deuh hlek a awm tur a ni, chu chu hnute bu lian tak neih theih na tur a ni.
- A hnute bu chu a a lian in a taksa atanga uai fual lutuk lo tur a ni. A hnutebu chu in ang tlang tak in hmun li ah a in then tur a ni. A hnute bu chuan thisen zam tha tak a nei tur a ni a, a vun chu nem tak ani bawk tur a ni.
- Bawng vulh tu rintlang tak atanga lei thin tur.

#### **Bawng in sak dan tur :**

- Bawng in sak na tur chu ni hmu tha leh ro tui tling awm loh na an sak tur a ni. Lei atanga kang in sak thin tur a ni.
- A in chu chhim leh hmar hawi zawng a sak hian ni a dang tha duh bik a ni.
- A in chung chu 3-4 meter a sang a ni tur a ni.
- Bawng in chu boruak thianghlim tak a dawn theih nan a in chu sak tur a ni.
- A in chhuat chu tlem a awn deuh in sak tur ani, hei hian a zun leh ek te chu tih fai a ti awlsam dawn a ni.

Farm ah hian record neih that hi a pawimawh em em a, an bawng vulh hrisel nan leh hlawk nan a pawimawh ani. Farm record hrang hrang kan zawm ve theih te chu :

#### **Farm Register :**

Date	Bawngpui		A pa	A no		A la	Total	Bawnghnute sawr chhuah		Bawng lei belh		Bawng hrallh	
Hnute sawr lai	Hnute sawr loh		A nu	A p a			Zing	Tlai	No.	Kawi hmun atangi n nge	No .	Engvanga/ engtia hrallh nge	

#### **Bawng hur leh pawl tir register :**

Bawng no.	A hur ni	A hur hun	Pawl tir hun/ni	No neih ni tur	No neih ni tur

#### **Bawnghnute register, Thla :**

Bawng no/hming	No neih ni	Ni		Ni		Ni		Ni	
		Zing	Tlai	Zing	Tlai	Zing	Tlai	Zing	Tlai

**Vaccination register :**

Date	Bawng no.	Vaccine hming	Vaccine pek ni	Pek leh hun tur

**Bawng no neih register :**

Bawng no.	No neih ni tur	No neih ni	A pa	No number	A nu/ A pa	A rih zawng	Breed	Remarks

**Bawng chaw register, thla :**

Date	Bawng no.	Concentrate (kg)	Hnim hring	Thil dang pek a awm chuan

**Bawng pakhat in a hmun a mamawh zau zawng :**

Bawng	Hmun (square meter)
A note	1
A la	2
Bawngpui	3.5
Bawng pa	4

**Bawng hur hun :**

- Bawng nu chu thla 15-18 ah a lo puitling thin a ni.
- A lo puitlin atang chuan ni 21 dan ah a hur thin a ni.
- Bawngpui hi uluk taka enkawl chuan no an neih atanga ni 45-60 in kar ah an hur leh thei a ni.

**Bawng hur hriat dan :**

- Bawng hur hun chhung hi ni 18-24 in kar a ni thin a. Bawng alo hur chuan a hnuaia tar lan ang hian an awm thin a ni.
- Awm hle hle thei lovin a bu vak vak thin a, chaw pawh a ei tha duh lo bawk.
- A hnute tui chu a tlem that thin bawk.
- A serh chu alo sen deuh ang a, a lo vung deuh bawk ang. Hnang tlem chhuak in ni dang aiin a huh deuh bik thin bawk a ni.
- A bul a bawng dang te pawh in a hmim thin a, bawng dang te pawh bawh a tum ur ur thin.
- Bawh in ring ni awm takin a ding deuh arh thin.

### **Bawng pawl tir hun :**

- Bawng chu zing a a hur chuan tlaiah pawl tir tur
- Bawng chu tlai a a hur chuan zingah pawl tir tur

### **Bawng rai leh railoh hriat dan :**

- Bawng pawl tir hun chu chhinchhiah tur a ni
- A pawl tir atanga ni 21 hnu ah a hur leh hur loh en tur a ni.
- A hur lo anih chuan a pawl atanga thla 2-3 vel ah a rai leh rai loh en tur a ni.
- Bawng rai lo chu a hur leh velah pawl tir leh mai tur a ni.
- Bawngpui chu vawi thum pawl tir hnu ah pawh a la rai lo anih chuan veterinary doctor hnenah en tir tur a ni.
- Bawng in no an pai hun chhung hi ni 280-285 chhung a ni.

### **Bawng chaw pek dan tur :**

- Bawngpui hnute 2.5 ltr sawr theih chin ah concentrate 1.5 kg, Green fodder (hnah hrung) 10 kg, Paddy straw/hay (hnah ro) 1.5 pek thin tur a ni.
- Bawngpui hnute 2.5 ltrs ai a tam sawr theih chuan litre 2.5 a tamna zelah 1kg concentrate pek zel tur. Hnim hrung a tam chuan 30 kg thleng pawh a pek tur a ni.
- Concentrate hi pek hma in tih huh tur a ni.

### **Bawngpui enkawl dan :**

#### Bawngpui rai lai

- Bawngpui rai lai chu no a neih dawn hnaih ah concentrate 1 kg zel pek belh tur a ni.
- Chaw ek ti nem thei tur wheat vai, kurtai ek chhia leh linseed oil cake chu no a neih hma ni 3-5 chhung pek tur a ni.
- Milk fever laka ven nan damdawi (Mineral mixture) pek tel bawk tur a ni.
- No a neih hma kar hnih velah chuan a no neihna hmun tur ah chuan dah hran ni se a tha. No neihna hmun tur chu a hul in a thianghlim tur a ni.
- Bawng rai lai chu tui lum in a hnute silfai sak pah a khawih sak fo tur a ni.
- Duh tawk a in theih turin tui chop reng bawk tur a ni.

#### No a neih lai enkawl dan

- A hnute hmar atangin hnute hmasa rawng eng lam deuh paw deuh phit phet sawr chhuah theihin a awm thin.
- A serh a lo vung anga a pangai ai in a let 2-6 velin a lian thei.
- A awm hle hle thei lo anga, a dul chu a ke in a thei chhen thin bawk.
- A serh a tangin bawlhlawh hnang a chhuak thin.
- A tul hun a tanpui theih turin lo in rin tur a ni, no a neih that pangai chuan bawngpui chu tihiuai loh tur a ni.
- Bawngpui chuan darkar 4-6 vel hnuah pawh no a neih theih loh chuan doctor koh vat tur a ni.

### **No neih hnu a enkawl dan :**

- A chhul hi no a neih zawh hnu darkar 4-5 chhungin a tla tur ani a, darkar 12 vel ah pawh ala tla lo a nih chuan chhul tang an ti thin.
- No a neih zawh hnu chuan a serh leh mei leh mawng vel te chu tui lum leh tuisen/dettol in pawh a sil fai tur a ni.

- A chhul tla chu paih bo ngal vat tur a ni, bawngin alo ei chuan chaw a ei that duh loh bak ah hnute tui pawh a neih tlem phah thin a ni.
- A hnute tui hmasa (colostrum) chu darkar 12 chhungin pek tur a ni.
- No a nei zawk hlim hian chaw pek tam vak loh tur a ni, ni hninhna vela tang hian chaw chu pek tam ve tial tial tur a ni a, ni 14-na tang chuan a mamawh tawk a tam ei tir a theih tawh a ni.

**Bawng no piang hlim enkawl dan :**

- Bawng note pianghlim chu puan thianglim leh ro tha a tih fai tur a ni.
- A ka leh hnar velah chu thil hnang a awm leh awm loh en a tihfai tur a ni.
- A thei chuan a ke hnung lam chu chawi kan tur a ni, hei hian a ka leh hnar leh a chuap a tui awm chu a ti chhuak dawn a ni.
- A lai hrui chu tan tur a ni a, a pum atanga 2-3 inches vel a tan tur ani, chuan a lai hrui tanna hmawr chu iodine tui ah chiah tur a ni.
- Bawng no chu a pian atanga darkar 12 chhung in a pui hnute a hne ngei ngei tur a ni.

**Bawng no enkawl dan :**

- Bawng hnute ni khatah vawi 2 pek tur a ni.
- Bucket ah pawh a pek thei a mahse bucket chu fai taka enkawl tur.
- Kar khat a tlin hunah concentrate leh hnime hnah ei zirtir tur a ni.
- Bawng note chu a nu a nih chuan thla 3-8 in karah brucellosis (S19) vaccine pek tur a ni.
- Thla 3-4 inkar vel ah hnute nghei tir tur a ni.

**Bawngchnute sawr dan :**

- Bawngchnute chu vawi 2-3 nitin sawr thin tur
- A hun bi thlap thlap a sawr tur
- Minute 8 vel chhung chawl lova sawr thin tur
- Bawngchnute chu a sawr tu ngai in a sawr hi a tha bik a ni
- Hmun fai leh thianghlim taka sawr thin tur
- Bawngchnute chu sawr hma in a hnute bu leh hmur te chu fai takin antiseptic solution/tuilum a sil faiin hruk ro leh thin tur
- Bawngchnute sawr tu chuan natna inkaichhawn theih chi a vei tur a ni lova, a tuk pawh bawngchnute a sawr hma in fai takin a sil tur a ni
- Bawng damlo an awm chuan a hnuhnung berah sawr thin tur a ni.

## BAWNG NATNA HRI LAKA VENNA

### (VACCINATION SCHEDULE)

<b>Natna hming</b>	<b>Vaccine hming</b>	<b>Pek hun/bawng upat zawng</b>	<b>Dose (ml)</b>	<b>Ven hun chhung</b>	<b>Pek leh hun</b>
Ke leh ka na hri (F.M.D.)	1. IVRI Polyvalent cell cultur vaccine	Thla 4 chunglam	5-10 s/c	Thla 6	Thla 6 dan zelah
	2. FMDV (Hoeschst)	Thla 4 chunglam	5-10 s/c	Thla 6	Thla 6 dan zelah
	3. FMDV (BAIF)	Thla 4 chunglam	5-10 s/c	Thla 6	Thla 6 dan zelah
	4. Raksha (Indian Immunologic als)	Thla 4 chunglam	5-10 s/c	Thla 6	Ni 22 naah chiu nawn, chumi hnuah thla 6 danah
Brucellosis	<i>Brucella abortus</i> <td>Thla 4-8</td> <td>5 s/c</td> <td>No Vawi hniih neih thleng</td> <td></td>	Thla 4-8	5 s/c	No Vawi hniih neih thleng	
Anthrax	Anthrax spore vaccine	Thla 4 chunglam	1 s/c	Kum khat	
Black Quarter (BQ)	BQ vaccine (polyvalent)	Thla 4 chunglam	5-10 s/c	Kum khat	
Haemorrhagic Septicaemia (H.S.)	H.S. oil adjuvant vaccine	Thla 6 chunglam	2-3 i/m	Kum khat	
	M.S. broth vaccine	Thla 6 chunglam	5-10 s/c	Thla 6	
H.S. and BQ	H.S. and B.Q. combined Vaccine (BAIF)	Thla 6 chunglam	4 s/c	Kum 1	
Rinderpest	1. Freeze dried goat tissue vaccine (GTV)	Thla 6 chunglam (Zo bawng)	1 s/c	Thla 14	
	2. Tissue culture vaccine	Tha 6 chunglam (bawnglian)	1 s/c	Kum 3	

## **BAWNG NATNA LAR ZUAL TE :**

### **1. Milk fever :**

- Calcium tlakchham vang
  - No a neih hnaih dawn leh a neih atanga darkar 48 vel chhungin an vei tlangpui
  - No neih vawi 3-7 ah a common
  - Bawngpui kum 6-10 an vei duh bik
  - Hlawm 3 a then
- i) Za chung leh khur der der, kehnung lam a khawng, an tlu, khawsik awm lo
- ii) A bawk tlat, a lu nak nem lam a hawi, taksa a vawt tial tial, mit naute zau, marphu chau, hmui hul
- iii) Sir zawngin a mu thlawp, chau, marphu rang leh chau, darkar 12 hnu ah a thi

**Damdawi:** Calcium borogluconate, vitamin B inj.

### **2) Bawng note kawthalo (calf scours) :**

A thlentu : Bacteria chi khat *Escherichia coli* (*E. coli*), khawlum lutuk emaw vawt lutuk, hnute pek puar lutuk, Vit. A tlakchham

**Damdawi :** Kawthalo damdawi: neblon powder, antibiotics

### **3) Pum puar (Bloat) :**

Hnimhnah chawr no eivak, chhang phut hnim tel lova ei tamin, chaw hmuar

Enkawl dan :

- Trocar & canula hmangin a nak nem lai (nakruh hnuhnung ber hnungha) ah vih pawh tur, gas lak chhuah vek tur a ni.
- Lavaging tih tur, a pumpui zai hawn a, a pumpui chhung ami a chaw pai chu lakchhuah a, bawng hrisel pumpui ami dah luh tur.

Damdawi : Bloatonil susp. Bloatosil susp. etc.

### **4) Foot and Mouth Disease (Ke leh ka na hri) :**

A thlen tu: Virus – Picorna virus

- Darkar 12 -14 hnuah a langchhuak
- Khawsik, ka chhung durh leh ke durh
- Thih phah lo mahse tharchhuah a tlahniam

Enkawl dan : Dahhran nghal, a in leh a velte tuisena silfai, antibiotics, neem hnah tui/tuisen a ke na lai sil

A venna: vaccine.

## **5) Brucellosis :**

- Bacteria chikhat *Brucella abortus* in a thlen
- Mihring pawhin kan kai thei

Kaichhawn dan : Chhul atanga bawlhhlawh chhuak, hlam tla atangin, hnute tui thianghlim lo, no chhiat atangin

A lan chhuah dan :

- Nopai thla 5 emaw a aia upa
- No chhiat
- Chhul tang
- No sawngnawi
- Hnute tui tlem
- Hriselna pangai ah chuan nghawng em em a nei lo
- Ruhchuktuah bawk

Enkawlna : Antibiotics inj

## **6) Hnute bu vung (Mastitis)**

A thlen tu : Natna hrik bacteria in a thlen, hnute sawr dik lo, hnute hmur kua zim lutuk, hnute hnek laia hlam, bawng upa lamah, hnute tamah

A lan chhuah dan :

Hnutebu vung, khawsik, hnai niawm tak sawr chhuah tur a awm. A nasa tawhah chuan hnutebu a sak tul thin.

Enkawl dan : Antibiotics hnute hmura thun chi leh injection, tui lum a deh, swellnil ointment

Ven dan : Hnute sawr dawnin kut silfai tur, tihhliam loh, hnute hnuhnung bera sawr

## **ARTIFICIAL INSEMINATION (BAWNG KAH RAI) :**

### **A thatna te:**

- Bawng chi tha thehdarh zelna a ni.
- Natna inkaichhawn theih lakah a him.
- Kan bawng chanchin kan hrechiang thei.
- A ken vel zung zung theih.
- Bawng chi tha rei tak chhung kan hmang tangkai thei a ni.
- A pa chi tha leh tha lo a hriat zung zung theih.
- Bawng pa vulh kher a ngai lo.

### **A that lohna awm theite :**

- Bawng pa chi chhiat theihna hun tam tak a awm.
- Chi kap thiam tak a ngai.
- A chi kap tu in a chhul vel a hliam thei.
- A chi dahthatna hmanrua neih reng a ngai.
- Bawng kah rai hi hmun tin ah a tih theih vek loh.

## Topic 21 – Kel vulh dan

### Objectives :

To improve the knowledge and skills of the participants on goat farming

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness on the scientific method of goat farming

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Training on Goat farming	* Why Goat farming? * Record keeping * Procurement *Management : Housing, Feeding, Health, Disease, Pregnant goat and kid * Vaccination schedule	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on goat farming through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Kel hi ran tangkai tak mi retheite bawng an tih hial a ni a. A hnute, a sa leh a vun te hi hman tangkai theih vek a ni. India ram hmun dangah phei chuan an vulh nasa em em a, sawrkar lam pawhin kelh vulh a bultan duh te tan tanpui na tam tak a sem chhuak mek bawk. Ran tla chi annih avangin a tlatna hmun tur ram tha neih erawh a ngai thung.

### Engvangin nge kel kan vulh ang?

- Kel vulh hi a hautak lo in sum hmuu let leh a rang.
- An taksa a len loh avangin in sak a hautak lo.
- Mihring nel tak annih avangin enkawl an nuam.
- Ran inthlahpung chak tak anni a, kum khat an tlinin an inthlah tan thei.
- Eizawnna dang nei te tan pawh hautak lutuk lova sum lakluh belh na atan a hman theih.
- Beram leh bawng te aiin hnime hring chi hrang hrang an ei theih a tam zawk.
- An tlatna hmun hnime hring ti tha tu pawimawh tak an ni thei.
- A sa ei chungchangah sakhaw serh leh sang a tibuai ve lem lo.
- Kelsa ah hian mihring hriselna atana chaw tha tam tak a awm.
- Kel hnute hi bawng hnute aiin paitawih a awlsam zawk.
- Thinglang mi rethei zawk te tan eizawnna a siam sak.

### Kel vulh dan chi hrang hrang te :

#### 1) Extensive system :

- Kel te chu chhun lamah ram awl zau takah tlat tir an ni a, zanah erawh chuan an inah an awm thin.
- Ruah tui tla tlemna ram leh hnime hring awmna rama an vulh dan ber a ni.

#### 2) Semi-intensive system :

- Kel te chu ram a an tlat bakah kelin ah an chaw tur pek an ni bawk.
- Hetiang anga kel vulh hi a enkawl tu tan a awlsamin a hlawk em em a ni.

**3) Intensive system :**

- Kel te chu rama tattir lovin a inah khung char char thin an ni.
- A chaw pawh a inah pek vek annih avangin a hautak hle.
- Kel tlatna hmunawm lohna hmun a an vulhdan ber a ni.

**Intensive system hi chi hnihil a thenhtran theih a :**

**a) Deep litter system :**

- Kelin chhuat phuai 6 cm vela chhah dah thin a ni.
- A inchhuat hi a rimchhiat lohnan a khat tawka lehkual zeuh zeuh tur.
- A chhuat a phuai hman te hi kar hnihil dana thlak thin tur. Kel pakhat hian hmun 15 sq. ft a zau a mamawh.
- Kel vulhte rannungin an seh loh nan ven uluk hle tur.

**b) Raised Platform system :**

- Thingphel chhuat lei atanga ft 3-4 vela sang a kel vulh.
- Hetiang anga kel vulh hian rannung seh lakah kel te an him bik.

**Kel in sak dan tur :**

- Kel in hi hmun ro tha, thengthaw nuam leh kanga sak tur a ni.
- Ni keng tha leh boruak tha luh theihna laiah sak tur a ni.
- Chhak leh thlang zawnga kel in sak hian boruak a dawng tha bik.
- Kel pahnih tan a dung ft 5, a vang ft 2.5, a chung san lam ft 6 a sak tur a ni.
- A no te awmna tur hi a pui in si rial a sak tur.
- A pui leh no dah dun tur anih chuan ft 7 bial hi kelpui leh no tan tawk a ngaih a ni.
- Kel in chhuat awn deuh leh awng hi a zun leh ek luan zung zung nan a tangkai.
- A chung atan chuan rangva a hman theih.
- Kel in ah a rualin tam tak dah loh tur.
- Kel ho tawmhul na tur leh tui tam tawk pek thin a tha.
- Kel zun leh ek te felfai taka then thianghlim thin tur.

**Kel in chhuat zauzawng mamawh dan :**

<b>Kel upat lam</b>	<b>Chhuat zauzawng (sq. ft)</b>
Thla 0-3	0.5-1.0
Thla 3-6	1.0-2.5
Thla 6-12	2.5-3.5
Kel pa puitling	5
Kel nu puitling	6.5

**Kel intlah pung tura vulh dan :**

Hlawn taka kel vulh tur chuan kum hnihil chhunga no vawi thum tal nei chi ni se duhthusam a ni.

- Kel chi tha chi vulh hian a hlawn leh hlawn loh chungchangah kawngro a su hle.
- Kel piantha leh hrisel te hi an thlah kal zel a tha duh bik.
- Kel thangduang te chu chi thlah tur a hman tur a ni.
- Kel nu te kum khat an tlinin no an pai tan thei.
- Kel no neih hnu thla thum hnua pawltir lehin kum hnihil chhung in note tum 3 a nei hman.

- Kel nu sawmhnih panga tan kel pa pakhat hi tawk tura ngaih a ni.
- Kel hi thla 14 atanga 18 annih velin an hur tan.
- Kel nu hi ni 18-21 danah an hur tlangpui, a hur rei zawng hi darkar 24-72 vel a ni.
- Kel pa ve thung chuan kum hniih annih in chi an thlah thei.
- Kel nu hur hriatdan – An be chhen a,an mei an ti che nasa, an serh a lo lianin a sen lar, a serh atanga bawlhhawh chhuah vangin a mawng bawr a berh chap, nidang aiin chaw a ei tlem, a khat tawkin a zung reng, kel dang a bawh thin.
- Kel nu hur tan atanga darkar 12-18 a pawl tir hian a raitheihna chance a tha.
- Kel pui rai hun chhung hi ni 145-150 a ni.

### **Kel chaw pek dan :**

Kel te hian chhuat a chaw pek hi an ei duh lo a, hnime hring a kung ami an ei tlangpui. Chaw eizat in ang rengah bawng aiin kelin hnute tui a pe chhuak tam zawk. Kel hian hnime hring an hmuh that chuan a hrampain tui an mamawh lutuk lova, tui luang lai te an liak ve lep lep thin. Nitin darkar 8 atanga darkar 9 vel tlattir tur a ni a, chumi hnu ah khalh haw a, an in a chi leh kel chaw tur atana siam wheat vai, vaimim hersawm leh chhawhchhi oil cake te pek thin tur.

<b>Kel upat lam</b>	<b>A chaw</b>	<b>Nitina chaw pek tur zat</b>
A pian atanga ni 3 chin	Colostrum (Kelpui hnute tui tha bik)	A tam thei ang ber
Ni 3 – Kar 3	A pui hnute, Tui leh chi	450 ml A tam thei ang ber
Kar 3 – Thla 4	A pui hnute A note chaw Tui, chi leh hnime hring	450 ml Nitin 450 gm A tam thei ang ber
Thla 4 chin chunglam	Concentrate mixture	15-16% Crude Protein @ 450 gm
A rai lai	Concentrate mixture Tui, chi leh hnime hring	15% Crude Protein @ 400-500 gm A tam thei ang ber
Kelpui no chawm lai	Concentrate mixture Tui, chi leh hnime hring	15% Crude Protein @ 400-500 gm A tam thei ang ber
Kelpa	Hnim hring Concentrate mixture	Nitin 400 gm Chi thlah hun season ah

### **A chaw pekna :**

A chaw bang nawi, zun leh ek hi kel vulh na a thil buaithlak tak a ni a, A chaw kuang kil li nei hi concentrate mixture leh chaw dang pek nan a tangkai.

### **A tui pek na :**

Tui pekna kuang hi thianghlim taka vawn tur a nia, bawlhhawh leh tho in an bawm theih loh tur a vawn thianghlim a tha.

## **Kel hur hun leh no an pai dan tlangpui :**

Kel hi thla 14 atanga 18 an nih velin an hur tan a, no an pai tan thei. A pa ve thung chuan kum 2 an nih in chi an thlah thei. An no pai chhung hi ni 145-150 vel a ni, tum khatah no 2 an nei deuh ber a, kum khatah no vawi 2 an nei tlangpui a, kum 12 vel an dam thei. A pa chuan kum 8 atanga kum 10 vel thleng chi a thlah thei.

## **Talh thei hun :**

Kel note chu an pian hlimah a pui hnute tui haw hmasa kha hnektir ngei ngei tur a ni a, chawlkar 2 a upa an nihin hnim hring an pet tan ve mai a ni. A chi thlah tur tih loh chu kar 2 atanga kar 4 vela upa (thla 3 an tlin hmain) a til lak tur a ni. Hei hian a ti thang duhin an sa pawh a tui bik a ni. Hetianga enkawl chuan kum khat velah talh an tling thei a ni. Mizorama kel te hi chu a puitling pawh 10 kg vel chauh an nih lain kel chi tha chi chu 50-70 kg vel an ni thei. Tin, hnute tui hi 1-2 litre sawr theih anih lain a chi tha chi chu 2-3 litre te pawh a sawr theih a ni.

## **Kel natna leh a enkawl dan :**

- 1) **Foot and Mouth Disease (FMD)** : Bawng ang bawkin FMD (a ke leh ka na hri) hi an vei thei a, an ke te na in an ka a na bawk a, chaw an ei tha duh lo thin. Tin, an khua a sik a, chaw an thlah avangin an chau hle thin bawk. A venna a chiu hi a enkawl dan tha ber chu a ni a, an lo vei tawh chuan a pan lai a damdawi diak hnawih leh tui sena sil thin tur a ni. Antibiotics a chiu emaw ei tur emaw pek tur a ni.
- 2) **Kel phar** : Kel phar hi vun natna, vun chhunga natna hrik te (mange/mites) vanga awm a ni. A vei chuan an vun a thak nasa thei hle a, a pan hial thin. Tin, an thak avang hian chaw an ei tha thei lova, an cherin natna dangin a tlakbuak duh hle a ni. Vun hnawih chi leh a ei/chiu chi antibiotics pek tur a ni.
- 3) **Contagious Caprine Pleuro Pneumonia (CCPP)** : A hming ang hian awmna (pneumonia) natna a ni, antibiotics a enkawl tur a ni a, hmun hnawng leh hmun thawleng hi an haw hle bawk a, kelin sakah fimkhur hle tur a ni.
- 4) **Contagious Ecthyma** : He natna hi pox virus vanga awm a ni a, an chaw eina lamah an hmui vel an tih pem hian an hmui a lo pan thin a ni. Hnim ro hriam lam deuh an ei hian an hmui a lo pem a, an kai awlsam hle a ni. A pan laia damdawi diak (ointment) hnawih leh ei/chiu tur antibiotics pek chi a ni. Tin, an hmui pemah te natna an kai hmain enkawl vat thin tur a ni.

Kel natna pumpelh tur hian a in hul leh phui tha, a chhuat kang ngei a pawimawh hle, chuvangin uluk taka a in sak thin tur a ni. Tin, an tlatna hmunah te saphihrik an kai thin a, thenfaisak thin tur a ni.

**Hri danna pek dan (Vaccination Schedule)**

<b>Sl. No.</b>	<b>Natna hming</b>	<b>Pekna lai (Route)</b>	<b>Pek hun</b>	<b>A ven hun chhung</b>
1	Haemorrhagic Septicaemia	I/M (Dose 1)	June/July	Kum 1
2	Enterotoxaemia	S/C (1 <sup>st</sup> dose, Ni 10 hnuah 2 <sup>nd</sup> dose)	Kel note : Thla 3 ah Kelpui : No neih hma thla 1 awmin	Thla 6
3	Clostridial infection	S/C (Dose 1)	June/July	Kum 1
4	Black Quarter	S/C (1 <sup>st</sup> dose, Ni 14 hnuah 2 <sup>nd</sup> dose)	June/July	Kum 1
5	Anthrax	S/C (Dose 1)	June/July	Kum 1
6	Foot & Mouth Disease (FMD)	S/C (Dose 1)	October/November leh April/May	Thla 6
7	Rinderpest	S/C (Dose 1)	June/July	Kum 5
8	Lungworm	Orally (1 <sup>st</sup> dose, Ni 10 hnuah 2 <sup>nd</sup> dose)	-	Kum 1

## **Topic 22 – Mahila Kisan Sashaktikaran Pariyojana (MKSP)**

### **Objectives :**

Understanding the vision, concept and objectives of MKSP

**Duration :** 30 minutes

**Expected outcome :** Participants will develop understanding and awareness on vision and objectives of MKSP

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
MKSP	<ul style="list-style-type: none"> <li>* Background</li> <li>* Objective</li> <li>* Vision</li> <li>* Non-negotiable for MKSP proposal</li> <li>* NTFP</li> <li>* Linkage with SHG's</li> <li>* Impact of MKSP : Economic, Social, Environmental</li> </ul>	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on MKSP through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Ei leh bara intodelh turin sawrkar laipui chuan nasa takin hma a la mek a, hemi kawngah hian thingtlang lama kut hnathawkutu hmeichhia te hi thawhlawk pawl tak an ni awm e. India ram pum pui thlir pawhin agriculture lama thawhhlawk ber pawl chu hmeichhia te an ni a. Hei hi Ministry of Rural Development Department pawhin ngai pawimawhin kut hnathawk tute tan project tha tak Mahila Kisan Sashaktikaran Pariyojana (MKSP) hi a lo duang chhuak ta a ni.

India ram Finance Minister (FM) in he scheme “Mahila Kisan Sashaktikaran Pariyojana” (MKSP) hi union budget 2010-11 khan hmeichhiate tihhmasawnnan Ministry of Rural development (MoRD) hnuaiia peng pakhat Aajeevika (National Rural Livelihood Mission) enkawl tur in a ti a ni.

### **A thil tum te :**

- 1) Ei leh bar zawnna kawngah thingtlang hmeichhia te a tam thei ang ber tel tir.
- 2) Kut hnathawk tuten eizawnna ngelng het an neih theih dan kawng zawn sak.
- 3) Lo neih leh ran vulh lamah kut hnathawkutu hmeichhiate an thiamna leh theihna tih changtlung sak.
- 4) Buh leh thlai thar kawngah chhungkua leh khawtlang intodelh tir.
- 5) Kut hnathawkutu hmeichhia ten sawrkar leh hmundang atanga hamthatna an neih theih dan kawng kawhhmu.
- 6) Kut hnathawkutu hmeichhia te an finna leh theihna tihpun sak.
- 7) Department hrang hrang hnuaiia scheme awm te kut hnathawkutu hmeichhia te tan a hman tangkai.

## **Eizawnna chungchanga MKSP thupui :**

MKSP hian a tirah chuan agriculture lama eizawnna lam a huap a, amaherawhchu hun a lo kal zel a, agriculture bakah Non Timber Forest Produce (NTFP) lam hi a huam tel ta ni. Tin, hei bakah hian ranvulh lama eizawng te pawh a huam tel bawk. Hetiang hian kawng hrang hrangin mi rethei ten eizawnna ngelng het an neih theih dan tur hi a thupui ber a lo ni ta a ni.

### **A rahchhuah beiseite :**

- 1) Thinglang lama kut hnathawh lama eizawngtu hmeichhiate sum lak luh a lo tam.
- 2) Buh leh thlai thar kawngah te leh Non Timber Forest Produce (NTFP) ah chhungkua leh khawtlangin hma a lo sawn.
- 3) Hmasawn zelna avangin kut hnathawk tute huan leh ram a lo zau zel.
- 4) Kut hnathawk tu hmeichhiate thiamna leh theihna a lo pung.
- 5) Kut hnathawk tu hmeichhiate sum lakluh leh che vel a lo tam.
- 6) Ei leh bar zawnna kawnga hmeichhia ten harsatna an tawh thin a lo tlahniam.
- 7) An thlai thar chhuah hralthna kawngah hmasawnna a awm.
- 8) Ram leilung leh leitha hman chungchangah a hma aiin thiamna an nei nasa zawk.
- 9) Hmasawn zel duh hmeichhia an lo tam avangin an khuain hma a lo sawn.
- 10) Eizawnna lama khawtlang tana mi tangkai tur Community Resource Person (CRP) an lo pung.

### **Sum chungchang :**

MKSP atan hian state hrang hrangten lo neih leh ran vulh lama hmasawnna a lo awm theih nan National Mission Management Unit (NMMU) ah Annual Action Plan leh Budget proposal an thehlut thei a. Budget pawm anih hnu ah ministry lamin sum an rawn pe chhuak thin a ni. Sum hi central leh state sawrkar in tum sem tur a ni a. North East state tan chuan 90:10 a ni.

### **Ruahmannan rei zawng :**

MKSP hnuia project hi kum thum chhung atana ruahman a ni.

### **MKSP project hnuia thiltih ngei ngei tur thenkhat te :**

#### **a) Sustainable Agriculture :**

- Man tlawm zawka Nutrient Pest Management/Integrated Pest Management/Integrated Nutrient Management kalpui.
- Lo neih leh ranvulhna lama harsatna awm thei te tih hniam.
- Lei chunglang han na vawnhim.
- Tui leh lei chunglang luangral tur venhim.
- Thilnung peng hrang hrang tangkaina hman uar zel.
- Ram leilunga awmsa hriatna leh thiamna hman tangkai.
- Sum hnar enkawl dan thiam.
- A ram mipui te mila an mamawh khawl hman tangkai.
- Sik leh sa lo danglam zel mil a eizawnna kalpui.
- Chhungkua leh khawtlang ei leh bara intodelh tur a hmalak.
- Hmeichhia te tan a hna ninawm leh hahthlak tiem.
- Huan lo ram nei lo leh nei zim te tan a hmalak dan tur ngaihtuah.

**b) Non Timber Forest Produce (NTFP) :**

- Ramhnuai/ngaw atanga thingzai lam ni lo thil tharchhuah tih changtlun leh nu ho tana eizawnna siam sak.
- Khawtlang mipuite sum lakluh a lo pun theih nan ngaw/ramhnuai atanga thil thar chhuah hlawk dan zawk hrilhriat.
- An thil tharchhuah te hlawk zawk a hrallh dan ngaihtuah.
- An thil tharchhuah hralhna hmun zawn sak.

**MKSP leh SHG inzawmna :**

MKSP project hnuiah hian SHG member lo neih leh ran vulh lama eizawng te chu an tel thei vek a. SHG member hrang hrangte chu an lo chakzual theih nan Producers Group ah in tlunkhawm a ni. He group hian an thil tharchhuah te kalpui dan tur a ruahman thin ang.

**MKSP in a nghawng tur te :**

**A) Inrenchem na lamah :**

- 1) MKSP tum ber pakhat chu chhungkaw sum lakluh tihpun hi a ni. SHG member chhungkaw hrang hrangte sum lakluh chu za a sawmnga (50%) laia a pun a beisei a. Hemi ti hlawhtling tur chuan man man leh hlawkzawk a an thil tharchhuah hrallh hi a ni.
- 2) MKSP chuan chemical tel lo chi leitha leh rannung thahna hlo hmanga vantlangin eizawnna a kalpui mek chu chawisan a tum a. Chemical telna ei tel avanga harsatna tam tak thleng thin tihnniam a tum bawk. Mihring hriselna vawnhim zel a ngai pawimawh.
- 3) Khaw hrang hrangah eizawnna lama mi tangkai tur Community Resource Person (CRP) tam tak an awm ang a. Heng mite hi an hriatna leh thiamna a lo pun theihnan training hrang hrang pek an ni ang. Heng CRP te hian vantlang eizawnna kawngah nasa takin hma an la ang. MKSP hnuiah hian Agriculture CRP, Livestock CRP leh Para Professional te awm tura ruahman a ni.

**B) Vantlang/Khawsak hona lamah :**

- 1) Agriculture lama hmeichhia te hamthatna tur ruahmanntha tak siam a ni a, chumi atan chuan sum tam tak pawh senral a ni. MKSP hnuia Producers group din chuan eizawnna lama harsatna awm te sutkian dan tur a ngaihtuah thin ang.
- 2) MKSP hian agriculture lama hmeichhia te eizawnna a ngai pawimawh hle. Hamthatna an hmuh theih nan ruahmanntha tak a siam.
- 3) MKSP hian retheihna ata dinchhuah dan kawng a thupui hle mai a. Ram tin chanve hmun nei ten kum khat chhungan Rs 20000-50000 tal an lakluh a beisei.
- 4) Kut hnathawktu hmeichhia ten hna ninawm leh hahthlak an tih te ti bo turin hmanraw hman awlsam zawk te ruahman sak tum a ni.
- 5) Buh leh thlai thar kawngah hmasawnna a lo awm theihnan chuktuah huan siam te, thlai chi dahthatna siam leh tualchhunga thlai leh theirah tha chi chawisan zel a tum.

**C) Chhehvel leh chettlatna hmun lamah :**

MKSP hian thingtlang mite tihhmasawn nan an eizawnna kalpui mek chawisan leh chhawmdawl a tum a, hemi kawngah hian ramngaw tichereu lo leh sik leh sa tichhe lo zawng a eizawnna kalpui a tum.

## Topic 23 – Integrated Farming System (IFS)

### Objectives :

To impart the knowledge of Integrated Farming System and generate income through farm and off farm activity and maximum utilisation of all resources available

**Duration :** 45 minutes

**Expected outcome :** Participants will develop understanding and awareness on Integrated Farming System for maximum utilisation of all resources available

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Integrated farming system	<ul style="list-style-type: none"><li>* What is integrated farming system?</li><li>* Benefit of integrated farming system</li><li>* Integration of livestock with crops</li><li>* Integration of fish farming with pig/dairy farming</li><li>* Construction and management of fish pond</li><li>* Selection of fingerlings</li><li>* Construction of pig sty</li></ul>	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on Integrated farming system through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

### Integrated Farming System awmzia :

Sangha leh ran dang vulh kawp hi thil hautak tak ni si lo, hlawk tak a ni a. Mizoram chhungah pawh khaw tam takah ran vulh an awm a. Chuvangin hun leh hmun te, tha leh zung sen belh em em ngai lovin heng ran chi hrang hrang vawk, ar, varak, bawng etc. te nena sangha khawi kawp hi a remchang em em a. Hetiang anga sangha leh thildang khawi/vulh kawp hi “Integrated Farming System” an ti a ni.

### A tum ber :

Integrated farming system in a tum ber chu hmun zau zawng inang reng atanga hun leh tha leh sum sen belh lutuk si lova hlawk zawka sangha leh thildang thar chhuah a, kut hnathawk tu ten hlawk zawka thil an tharchhuah theih dan tur kawng zawnpui hi a ni. Tin, farmer ten an ram leh hmun awl neih tangkai zawkin an chhawr a, tawng upa in lung pakhat a sava pahnih vawmthlak an sawi ang deuh hi a ni awm e.

### Sangha leh vawk vulh kawp :

Mizoram ah chuan vawksa hi kan ei tlanglawn ber a ni a, huan leh ram nei tha ten sangha dil an neih chuan tangkai takin he chindan tha hi a tih theih dawn a. Self Help Group member te pawhin hun leh tha sen belh nasa lutuk si lo in hlawk takin a tih theih a ni. Tin, hriselna atan mipui lo pun ang zela ei tur tha thar chhuah tam a tul ve avangin intodelhna na atan a tangkai dawn hle a ni.

## **Sangha leh ar vulh kawp :**

Arsa hi Self Help Group member ten sum leh tha seng nasa lutuk si lo a kan vulh mai theih a ni a. Arsa mai bakah artui thlengin kan nitin nunah pawimawhna tam tak a nei a. Mizoramah pawh Self Help Group member tam takin arsa leh a tui atanga hlawkna hmuh tumin vulhtu an pung nasa hle a. Sangha dil hmun rem deuh nei leh awmchilh thei te tan chuan ar leh sangha khawi pawlh hi a hlawk hle a ni.

## **Engvangin nge sangha leh vawk kan vulh kawp ang?**

- Vawk ek ah hian lei ti tha tu Nitrogen leh Phosphorus tam tak a awm.
- Dil a vawk ek kan dah in, dil lei a tit ha a, chu chuan sangha chaw Plankton nasa takin a ti pung.
- Vawk ek a za a sawmsarih (70%) hi sangha ten chaw ah an ei nghal mai thei a ni.
- Vawksa hi mizote sa duh ber anih avangin a hralhna lamah harsatna a awm lo.
- Sangha leh vawk vulh kawp hian a hranpa a sangha chaw pek a ngai lo.
- Vawk ek mai bakah vawk chaw ei bang nawi te sangha in an chhawr tangkai nghal a, chaw ei loh a riral mai mai a awm lo.
- Lei tihthatna turin fertilizer a hranpa a pek a ngai lo.
- Sangha leh vawk vulh kawp hian sangha khawia senso tur tul zat 60% chu khawh ral ngai lovin, Self Help Group member in a help thei nghal a ni.

## **Engvangin nge sangha leh ar kan vulh kawp ang?**

- Ar ek hi bawng ek aiin a tak tha a, phosphorus leh nitrogen pawh a pai tam zawk a ni.
- Ar ek hi dillei tih tha turin hman tam a ngai lo bawk.
- Arte hi chaw tha taka chawm an nih chuan, chaw an ei zing a, an e zing bawk a, an ek ah hian sangha tana chaw tha tam tak a la awm thin.
- Ar ek chu sangha tan chaw tha tak anih mai bakah ar chaw ei bangte chu dil lei tithe tu niin sangha chaw plankton nasa takin a tipung thei a ni.
- Sangha chaw a hranpa a pek a ngaih loh avangin sangha khawia senral ngai zat 60% in a tlahniam a ni.

## **Sangha dil buatsaih dan :**

- Hlawk taka sangha khawi tur chuan mithiam ten tih tur an sawi ang thlapa dil buatsaih a tul.
- Sangha dil chu tuihna kang lo, kumluana tuihna tha leh dil a tui duhtawk awm rengna a ni tur a ni.
- Sangha dil chu Self Help Group member te enkawl zawh tawk a zau a ni tur a ni.
- Sangha dil awmna chu lei thur lutuk emaw al lutuk emaw anih chuan sangha an thang tha thei thin lo.
- Sangha dil lei pH chu 6.5-7.5 vel anih chuan a hang tawk chauh a, sangha tan a tha tawk a ni.
- Lei thur lutuk ph 6.5 aia hniam te sangha ngeih tawk chauh a siam tur chuan chinai hman a tul thin.

### **Lei thur lutuk siam that nana chinai hman dan :**

pH range	Lei thur dan	Chinai dah zat
4.0 – 5.0	Thur lutuk	2000 kg/ha
5.0 – 6.0	Thur deuh tak	1200 kg/ha
6.0 – 7.0	Thur deuh	1000 kg/ha
6.5 – 7.6	A tawk chauh	400 kg/ha

- Chinai hi lei thur lutuk siamthatna bakah sangha dil lei leh tui tihthianghlimna leh natna hrirk tihremna tha tak a ni.
- Sangha dah hmain chinai kan hman tur zat ve chu dilah phul tur a ni.
- A bak zawng chu tum hnih emaw tum lie maw vel phul a hman tur a ni.
- Sangha dil a hnim hnawk ho thenfai vek tur.

### **Sangha khawi tur thlan dan :**

- Sangha khawi chi hrang hrangte hi an chaw zawnna hmun a hrang thluah a. Heng chi hrang hrang khawi pawlh hian hlawk zawkin sangha a thar chhuah theih. Sangha khawi pawlh chi te chu – Silver carp, Catla, Rohu, Mrigal leh Common carp te hi an ni.
- Sangha dil Hectare 1 a zauah sangha note (fingerlings) 6000 vel a dah theih.

### **Vawk in sak dan :**

- Vawk ek leh zun te awlsam taka lakkhawm anih theih nan sangha dil kiangah vawk in sak tur.
- Vawkin chhuat hi thingphel anih chuan vawkin kawmthlangah a zun leh ek lakkhawmna tur lei laikhuar ni se.
- Vawkin chhuat cement anih chuan a slope deuh a sak tur. Vawk zun leh ek te chu lei laikhuar ah chhun khawm tur.
- Vawk in hi ni eng hmu tha leh thawleng tha a sak tur a ni.

### **Ar in sak dan :**

- Ar in hi dil chungah emaw, dil kotlang remchang laiah a sak theih.
- Ar in sakna hmanrua atan chuan mau emaw thildang hmanrua man tlawm deuh chi a hman theih.
- Ar in bang chu a phui lutuk tur a nil ova, boruak thianghlim leh ni eng lut thei a ni tur a ni.
- A chhuat atan thirlen awng sin emaw phelsep kawkalh emaw a hman theih.
- Ar in chhuat atangin sangha dilah ar ek tla zung zung thei ni se.
- Ar chaw pekna leh tui chhawpna dah bawk tur a ni.
- Ar in hi tui chim chin atanga metre chanve vel tala sanga sak tur a ni.

### **A hlawk thei ang ber a seng :**

- Sangha leh ar/vawk vulh kawp hian dila sangha ten eitur hnianghnar engtik lai pawn an nei a, sangha te an thang lian chak thin.
- Sangha lian leh ei tham deuhte len hmanga a man a, hralth zel mai tur a ni.
- A lian deuh kan man chhuah zat chiah sangha note (fingerlings) dah belh leh mai theih a ni.
- Vawk lian chi kan vulh te pawh thla sarah hnu ah chuan 60-70 kg an lo tling tawh thin.

- Mizo ten kum tling kher vawksa ei kan tum hi tih tawp a hun, a chaw ei mila a than hlawk ber hun laia tihral mai hi a hlawk ber.
- Artui chi chu tuktin leh tlaitin a lakkhawm theih a, hrалh mai theih a ni.
- Layer te hi kum khat leh a chanve thleng hlawk takin an tui thei a, chumi hnuah chuan a hlawk vak tawh loh chuan hrалh mai tur a ni.
- Broiler te hi hrалh an tling hma em em a. Thla 2 hnuah chuan hrалh tham an ni mai thin.

#### **Sangha leh vawk vulh kawp hlawkna :**

- Vawk leh sangha te tangkai taka in ringtawn a vulh annih avangin farmer in sangha chaw a senso tur 60% chu senral ngai tawh lovin, a help nghal thei a ni.
- Kum khat chhungin vawk hrалh tham leh dil Hectare 1 a zauah sangha 3-4 tonnes a thar chhuah theih.

#### **Sangha leh ar vulh kawp hlawkna :**

- Layer pakhat hian kum khat chhungin tui 250-280 a nei thei.
- Broiler te hi thla hnih/thum hnuah hrалh tham an ni a, 1.5 – 2 kg vel an tling thei thin.
- Kum khat chhungin hetiang hian tum ruk lai broiler hi a invulh chhawk theih.
- Ar leh sangha kan vulh kawp hian hetiang hian Hectare khat ah kum khat chhungin a hlawkna a seng theih :
  - o Sangha : 4500 – 5000 kg
  - o Arsa : 1250 kg
  - o Artui : 70,000 nos.

## **Topic 24 – Exposure visit to best practice site**

### **Objectives :**

Exposure to best practice site (Livestock, Agriculture, Horticulture) to aware the participants of the best practice within the state/district

**Duration :** 1 day

**Expected outcome :** Participants will develop understanding and awareness on best practice on farm and off farmed based activities

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Field Visit	<ul style="list-style-type: none"><li>* Visit to best practice site on :<ul style="list-style-type: none"><li>- Sustainable Agriculture</li><li>- Farm school</li><li>- Horticulture</li><li>- Livestock</li><li>- Soil testing</li><li>- Vermicompost unit</li><li>- Seed treatment</li><li>- Pest management</li><li>- Nutrient management</li><li>- Kitchen gardening</li><li>- Sericulture</li><li>- Fish pond</li></ul></li></ul>	Field trip	Vehicle will be hired to visit the best practice site within the district/state	Vehicle

## **Topic 25 – Ni hmasa lama zir thlirletna**

### **Objectives :**

Knowing the trainees understanding from the previous day field visit

**Duration :** 45 minutes

**Expected outcome :** Participants will develop understanding and awareness on best practice on farm and off farmed based activities

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Recap of previous day	* Gap analysis * Learning from previous day * Scope for improvement	Group discussion	Small group of 5 members each will be formed where the trainees will discuss the entire previous day topic with his/her partner. Quick recap will be done by representative of each group	Chart paper, Marker

## **Topic 26 – Non-farm based documentary film thlir ho**

### **Objectives :**

To motivate the participant to adopt new technology practice by others

**Duration :** 30 minutes

**Expected outcome :** Participants will learn the best practice done by successful farmer

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Documentary Film	Video clips on non-farm based activities	Audio Visual Aids	Documentary film showing the success story of non-farm base livelihood will be shown to the participants	LCD projector, Laptop

## **Topic 27 – Skill enhancement : RSETI & DDU-GKY**

### **Objectives :**

To aware the participants of the various training and skill enhancement available under NRLM

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness on skills enhancement available under NRLM

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Skill enhancement - RSETI, DDUGKY	* Objectives * Trades skill training * Business plan preparation	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on various schemes available under NRLM through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

### **Rural Self Employment Training Institute (RSETI) :**

#### **A lo pian chhuah chhan :**

- Kum tin in zirlai nuai chungain an zirlai an zo a, heng ho hian hna mumal thawh tur neiloan an awm thin a.
- Lo neih lamah pawh hmasawn a har tawh avangin hna thawh tur a vang telh telh a ni.
- Heng ho tan hian hna thawh mai tur a awm loh avangin tam tak chuan eizawn nan dan phalloh thil te pawh an tih phah hial a.
- Sawrkar chuan hmalakna tam tak nei mahse a hlawhchham na lai tam tak a awm bawk a.
- He model hmang hian heng thalai te rilru puthmang leh thiamthil tih hmasawn na hian rah tha tak tak a chhuah avangin beiseina sang tak nen sawrkar laipui chuan hma ala tan a ni.

#### **Beiseina :**

- BPL chhungkua te tan an mamawh ang thiamna zirtir hian an chhungkaw dinhmun a chawikang thei dawn a ni.
- Bank te nena tang kawp in ahma lama an buaina thin sum leh pai ah harsatna a tlem beisei a ni.
- Mahni khua chauh nilo ram pumpui in a a mamawh thiamna zir chhuah ngei.

#### **A thil tum te :**

- Thinglang khua a BPL chhungkaw member thalai te anmahni in tundin nan a training pek.
- Mamawh mila training pek.
- Training tur te phak tawk a training neih tur a ni.
- Bank atanga sum an puk theih nan a puuh.
- Kum 2 chhung puuh chhuhzawm zel tur a ni.
- Mahni a an din theih na tur training pek an ni anga, an training chhunga senso tum sak an ni ang.

## **Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) :**

Sawkar laipui hian thalai eizawnna ngialnghet neilo tam lutuk hi a vei em em a. Engtin nge ram pum a thalai te hian hna, mahni in todelhna tur leh an chhungte chawm thei tur in kan siam ang tih hi an ngaihtuah NASA hle a ni. India ram hi thalai hna thawk rual tam na ber pawl a ni a, chuti chung chuan thiam nei thalai an tam lutuk hian hnazawnna kawngah thalai ten harsatna an tawk NASA em em a ni.

Hemi hre reng chung hian sawrkar laipui chuan thil tum lian tak mai a nei a, chu chu kum 2022 a her chhuah rual a thalai maktaduai 500 te skill training pek hi a ni. Kum 2011 census thlirin India hian kum 15 atang a kum 35 inkar thalai nuai 55 thingtlang lamah an awm a ni. Ram tam takin an buaina chu tun atanga reilo teah hian thalai hnathawk tur an neih dawn loh avangin buaina NASA tak an tawk thei dawn a ni. Heng kan population a thalai thiamna neilo tam tak te hi ramdang nena kan danglamna lian tak a ni thei dawn a, hei vang hian sawrkar laipui chuan a ngai pawimawh em em mai a ni.

DDU-GKY hi skill training huam chhungah chuan a tha ber leh danglam ber te zing ami a ni awm e. A that bik na em em chu he training programme hian thingtlang lam a thalai te a kawk ber a, training naran pe ringawt lo in training an zawh hnu a hna zawn pui te. Chu hna an thawh ah chuan an thawk rei thei em, chu hna atang chuan engtin nge hma an lo sawn zel ang tih te thlengin a buaipui tel dawn a ni. India hian khawvel huapah pawh thiam nei thalai ngah ber leh thawn chhuak hnem ber ni thei tura hma alak mek lai hian harsatna tawn tlang tur pawh a awm tih chu a hmu a. Thingtlang mi te zirna in tha leh thiamna fumfe neilo te hi hi an tam a ni tih a hria a. Heng te ti bo tur hian tuna DDU-GKY hi a hmachhawp te zing ami a ni.

DDU-GKY hi sawrkar laipui atanga kaihhruai tur ani ang a, state tin ten mawhphurhna lian tak an nei theuh bawk dawn a ni. State te mawhphurhna hi a sang dawn hle a, a hlawhtlin leh tlin loh pawh NASA takin an chungah a innghat dawn a ni.

### **A thil tum te :**

1. A ruaitu leh a trainer in tangkai taka an hman theih tur training tha chhawpchhuah
2. An hmalam hun zel tur atana kawng kawhhmu
3. Hnathawk tlak leh eizawnna ngialnghet siam
4. Trainer te leh training na hmun siam that
5. Sector hrang hrang mila hnathawk thei siam leh theh chhuah
6. A ruaitu ten an mamawh dan a zira rampum mamawh anga hna thiam chher chhuah
7. Technology thar te hmang tangkaia a thui zawk leh zau zawk thliar thiam
8. Hnathawn chunga training te hriatpui

### **Industry leh company te mawhphurhna :**

1. An mihring mamawh te hriattir
2. Thiam thil hrang hrang mamawh te tarlan
3. An mamawh bik thiam thil a ruahmannna siam leh chutiang tur mithiam neih
4. In ziahluhnah ah te, hriatpuina ah te, certificate pek chhuah ah te a in ang tlang hman
5. Training pe tu tur te training pek leh hemi atana sawrkar laipui lam leh state te thawh pui
6. Zirna tha tak siam
7. SC, ST leh minority te tana an thiamna mamawh a sawrbing bik
8. Hlawh pangngai tak neia hna thawh

## **Hmalak dan tur :**

1. Training zagh ah hian hna hmuh sak tur a ni a, heng an hna atang hian hlawh pangngai tak an nei tur a ni a, heng an hna thawh te hi kum khat tal en zui reng tur a ni. Tin heng hna te hi kumkhat an thawh tlin theih nan hmalak pui tur a ni.
2. Heng training a lo kal te hi man nei lo a training pek tur anni a. Training chhimtu te hi rethei chhungkua ami te, hmeichhia, SC/ST leh rualbanlo te anni tur a ni.
3. Hmun danga hnathawhna hmuh sak annih chuan an in ben bel theih nana sum leh paia puah.
4. Training a tha tawk em tih leh hna an hmuhsak te chu hna tha tak ani em tih te enfiah.
5. State te YP atanga AP a kai chhoh vat tur a ni a. Tin, share 10% hi an ngai pawihmawh tur a ni. Hei hian PIA te hnathawh a ti hlawk dawn a ni.
6. SHG te leh Village Council te an in rawlh ve tur a ni.
7. Thingtlang mi kum 18–35 inkar te tana ruahmannna a ni a, ST/SC te tan kum 45 thleng pawh fan a ni bawk.
8. Training na ah hian hmun thum a thena hmuh khat hi hmeichhia an ni tur a ni a. ST/SC te hi 50% an ni tur a ni. Hnam tlem bik te 15% an ni tur a ni a, tin rualbanlo te 3% an ni tur a ni bawk.
9. Hnazawnna mela (kut) te siam tur a ni a, tin state pawn lama hna hmute puinhna tur centre te siam tur a ni.
10. Foreign a hna hmusak an nih chuan hlawh hi Rs 25,000 aia tlem a ni tur a ni lo.

## **Training hi chi thum a awm a :**

- a) Thla thum (3)
- b) Thla ruk (6)
- c) Thla sawmpahnih (12)

Training kal te hian an riahchilh lo anih chuan nitin an eiman leh veivahna manah Rs 50 pek thin tur a ni. PIA ten hnathawk chunga training nei (on the job training) te an in atanga training na hmun thleng an zinman an pe ang. Hei hian Rs 4500 a pel tur a ni lo. Hei hi nitin kalna nilo in vawikhath an hnathawhna/training na hmun an panna senso a ni. Tin, PIA ten stipend Rs 3000 thlatin heng mite hi an pe bawk tur a ni. An training chhung hian, an bank account ah transfer thin tur a ni. PIA te hian hna an hmuhsak te hi Rs 10,000 aia hniam ani tur a nilo a ni.

## **Topic 28 – Start-up Village Entrepreneurship Project (SVEP)**

### **Objectives :**

To improve the knowledge and skills of the participants on skill enhancement, marketing, and physical infrastructure

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding and awareness on Start-up Village Entrepreneurship Project (SVEP)

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Micro-Enterprise promotion - Start-up Village Entrepreneurship Project (SVEP)	<ul style="list-style-type: none"> <li>* Objectives</li> <li>* Importance</li> <li>* Statutory compliances</li> <li>* Source of finance &amp; financial linkages</li> <li>* Marketing</li> <li>* Physical Infrastructure</li> <li>* Skill up gradation</li> </ul>	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on SVEP through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Start-up Village Entrepreneurship Project (SVEP) project hnuiah hian ramchhung thingtlang mite eizawnna tih ziaawmna tur zawnpui a ni a. An sum lakluhna ti ngialnghet a, kawng dang tha zawk kawhhmu te hi a tum a ni. Theih ang tawk a puih an ngaihna lai a puih a, tanpui an ngaih na laia puih hi he project tum pawimawh tak pakhat a ni.

### **A dil thei te:**

- Community Resource Person – Enterprise Promotion (CRP-EP)
- Entrepreneur

### **CRP-EP thlan dan tur :**

- Kum 18- 45 inkar
- SHG awmna chhungkua ami ni thei se
- Block chhung ami ngei a ni tur a ni
- Mizo tawng thiam tak a ni tur a ni
- Mi biangbiak thiam
- Zin veivah hrehlo leh sumdawnna lam pawh hre ve tak
- Chhiarkawp (Mathematics) thiam

### **Entrepreneur thlan dan tur :**

- An khua ami ten an thlang tur a ni
- A mamawh dan a zir in
- A sumdawnna chu a kal pui thei dawn tak tak chuan
- Eng chhungkua atangin nge a lo seilen (rethei tak nge)

### **A kal hmang :**

- CRP-EP ten hetianga a hma la duh te an lo zawng kual ang
- Heng mite hi training pek an ni ang
- Test te an paltlang hnuah CIF loan an dil thei ang
- Heng loan te hi CRP-EP in a recommend ang
- Community organization in CRP-EP recommend-na hi alo zir chiang ang a, he a sumdawnna hi a kalpui thei ngei dawn nge dawn lo alo zir chiang dawn a ni
- Hnam hnuaihnung, SC/ST leh hmeichhia te hi duhsak bik an ni ang

### **Loan Rate :**

- An loan puk pung hi 12% aia tamlo ni thei se
- Block khat chhungah chuan loan punna hi in ang tlang thei se

### **Phalloh te :**

- Mimal hamthat na atana assets siam
- Motor lei phal a ni lo
- Office bungrua reng reng lei te hi village organization ta tur a ni

### **Phal te :**

- Sumdawnna thil hrim hrim kut themthiam te pawh huap in
- Puantah/puanthui leh danin a a phal chin chhunga mi chu a huam thei vek

## Topic 29 – Ei leh in him chungchang (Food safety & security)

### Objectives :

To understand the needs for food safety and security at household level

**Duration :** 60 minutes

**Expected outcome :** Participants will develop understanding on the needs for food safety and security at household level

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Food safety and security	*Identification of food * Importance of food safety and security * Household approach * Storing of food	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on food safety and security through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Chaw kan han tih hian kan rilru ah chuan thil tam tak a lang awm e, engpawh in rilru a lo lang kha chu chaw vek a ni. He kan zir hona turah hian chaw hi engnge anih te leh chaw venhim dan leh vawn that dan kan thlir ho dawn a ni. Chaw chu mithiam zawk in an sawina ah chuan kan riltam ti rehtu leh kan taksa tan a hriselna a thlen tawh phawt chuan chaw a ngaih a ni.

### Chaw :

Chaw chu eng thil pawh kan ka a lut a, kan taksa tan a chakna leh hriselna pe thei anih phawt chuan chaw a ngaih a ni. Chaw chu a tlangpuiin thlai atangin emaw ransa atangin emaw a hmuh thin a ni a, chung ho chuan chakna hrang hrang vitamin te, carbohydrates te, protein te, fats te leh mineral te min pe a ni. Heng chaw hi kan ka ah lutin kan pumin a lo pai tawih a, chung chuan kan taksa tan chakna te, thanlenna te leh nunna min pe a ni.

### Chaw chi hrang te :

- Comfort Food:** Comfort food chu chaw a eitu tan a hlutna nei leh chakna pai hnem leh siam awl si hi a ni. Entirnan – Samosa, alu puri, etc.
- Fast Food:** Fast food chu chaw rang tak leh hmanhmawh tak a ei mai theih, a siam chhung rei si lo hi a ni a. A tlangpui in eisiam a sumdawng hi a kawk deuh bik thin, chaw dang aiin chakna a pai tlem deuh bawk. Entirnan - Chow kan, fried rice etc.
- Natural foods:** Natural foods chu chaw siam danglam vakloh leh a nihna ang ang a ei mai theih hi ani. Entirnan - Apple, Sangha etc.
- Organic Food:** Organic foods chu chaw organic hmanga neih leh siam hi a ni a, a bik takin organic farming atanga neih hi a kawk bik hle.

5. **Slow Food:** Slow food chu chaw a bulthut atanga neih leh siam hi a ni. Chaw siamna tur pawh a hmanbik neih a, a siam danah pawh a bik nei a kawk ber. Entirnan - Cultural chaw, Self garden food etc.
6. **Whole Food:** Whole foods chu chaw tih danglam leh siam danglam miah loh a kawk ber a, tihdanglam pawn a tlem thei ang ber a tih danglam a ni thin. Entirnan - artui, bawngnute etc.

## **FOOD SAFETY AND SECURITY:**

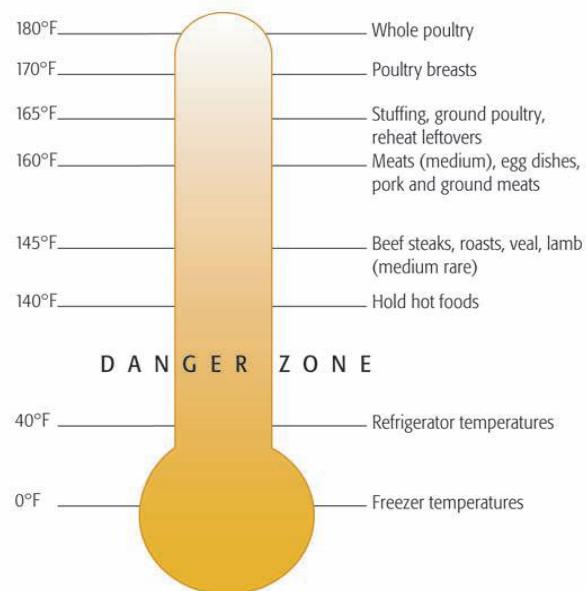
Food safety han tih hian kan chaw leh ei leh in reng reng chemical lak atang te, bacteria lak atangte leh kan tih bawlhlawh tur lak atangte a venhim hi a ni a, chung thlai thar atanga kan ka a a luh thleng a huam thei. Heng lak atanga ven that loh chuan eiin atanga natna kan vei theih kawthalo te, cholera te, ei sual te, typhoid leh natna dang tam tak a huam thei ang.

### **Eiin ven him dan kawng panga te:**

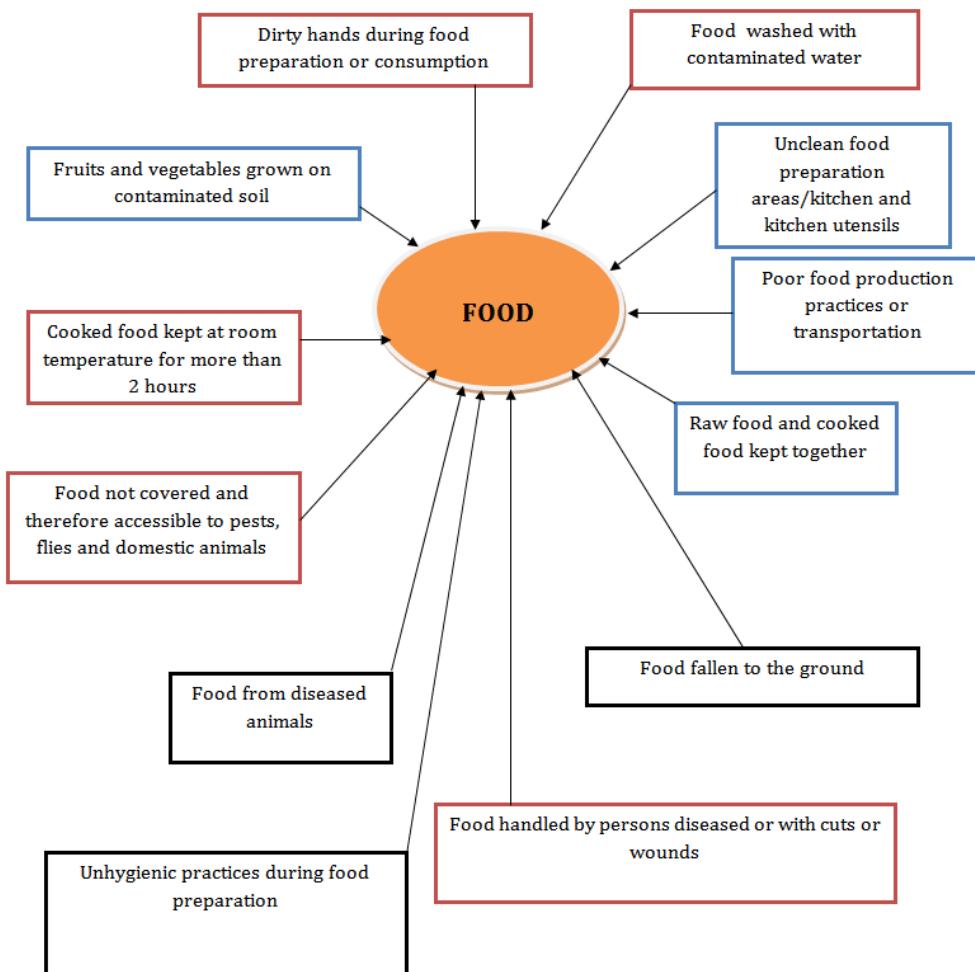
- 1) Keep clean ( Vawn fai)**
  - a) Eisiam hma reng reng in kut sil hmasak tur.
  - b) Kan ei siam tur te chu fai tak a sil thin tur.
  - c) Kan ei siamna hmun leh a vel chu fai tak a dah tur.
- 2) Separate raw and cooked (A hel leh a hmin dah hran)**
  - a) Sa reng reng chu thil dang nen a dah dun loh tur.
  - b) Eiin chu bawm ah dah that thin tur a ni.
  - c) Eisiamna bungbel hman pawlh loh tur.
- 3) Cook thoroughly (Tih hminthat)**
  - a) Kan eiin siam chu a hmintha tur a ni.
  - b) Eiin hmin tawh ei leh dawn in chuan sau that tur a ni.
- 4) Keep food at safe temperature ( Eiin temperature vawn that)**
  - a) Eiin reng reng chu  $40^{\circ}\text{F}$  ( $4.4^{\circ}\text{C}$ ) hnuailam ah emaw  $140^{\circ}\text{F}$  ( $60^{\circ}\text{C}$ ) chunglamah dah thin tur.
  - b) Eiin  $40\text{-}140^{\circ}\text{F}$  inkar hi danger zone tih a ni a, hemi inkar ah hian eiin chu natna in a beih theih lai a ni.
- 5) Use safe water and raw material (Tui thianghlim leh eiin thianghlim)**
  - a) Tui chu fim leh thianghlim chauh hman tur a ni.
  - b) Kan eiin tur reng reng tur chu a hrisel in a thianghlim tur a ni.

**FIGURE 5.**  
**Temperature Rules for Safe Cooking and Handling of Foods**

Safe cooking and holding temperatures for foods. Bacteria multiply rapidly between 40°F and 140°F, doubling in number in as little as 20 minutes. To keep food out of this danger zone, keep cold food cold and hot food hot. Keep food cold in the refrigerator, in coolers, or on the service line on ice. Set your refrigerator no higher than 40°F and the freezer at 0°F. Keep hot food in the oven, in heated chafing dishes, or in preheated steam tables, warming trays, and/or slow cookers. Use a clean thermometer that measures the internal temperature of cooked food to make sure meat, poultry, and casseroles are cooked to the temperatures as indicated in the figure.



**Figure: Possible food contamination and food insecurity**



## Storage Guidelines

A tha ber ah chuan eiin siam nan a kan hman thil reng reng chu First in, First out (Lut hmasa, chhuak hmasa) dan kan hmang tur a ni. Hemi awmzia chu kan eisiam a hlui hlui kan hmang hmasa a, a thar thar kan hmang hnuhnung tihna a ni.

### **Freezer (Dah khalna) :**

- Freezer chu 0°F aia hniam ah kan dah reng tur a ni. Hriat theih dan tha ber chu bawngnute a khalna khawp a vawt ni tur a ni.
- Tuihu lut theilo turin kan freezer a thil kan dah reng reng chu kan tuam thin tur a ni.
- Eiin kan dah khal reng reng chu hun tiam aia rei kan dah chuan ei thei tho mahse a tuina leh a chakna a hlauh thin a ni.
- Kan freezer a kan dah luh leh lak chhuah chu fel takin kan ziak tin tur a ni.

### **Refrigerator (Dah vawhna) :**

- Thermometer hmang in a vawh zat kan check ang a, 34°F leh 40°F inkar velah kan dah reng tur a ni. Refrigerator hi hawn hawn loh tur a ni, a bik in khaw lum zual lai phei chuan a temperature a khawih buai thei a ni.
- Eiin chhe hma chi chu kan fun thlap zel tur a ni. Hei hian a chhe hma tur leh thil dang nen a a in pawlh buai tur a veng a ni.
- Sa la siamloh reng reng chu tuam emaw fun that tur a ni a, hei hian thil dang a va ti bawlhlawh mai tur a veng a ni.
- Sa tihhmin tawh leh eiin bang dah that chu kan fun tha emaw bawm ah kan dah thlap zel tur a ni, hei hian a lo ro mai tur leh a leak tur a veng a ni.

### **Pantry (Eiin ro dahna) :**

- Eitur dahna chu a ro in a dai tha tur a ni. Tuihu luh theina lai chu hmanloh hram a tha, tui hu chuan eiin ro cu ti hnawng in a tichhe thei a ni.
- Hmun lum lutuk leh hnawng tam lutuk hian eiin a that theih hun chung a ti hniam thei a ni.
- In tin deuh thaw ah hian rannung in eitur a beih thin avang in eitur kan dah reng reng chu kan fun tha emaw bawmah emaw kan dah tha thin tur a ni.
- Chhuar a eitur kan dah te hi tha rei viau thin mah se dahrei leh lutuk chuan a tuina leh a hriselna a hlauh thei a ni.

## COLD STORAGE CHART :

<b>Product</b>	<b>Refrigerator</b> 40°F (4.4°C)	<b>Freezer</b> 0°F (-17 °C)
<b>Artui</b>		
Fresh, in shell	3 to 5 week	Do not freeze
Raw yolk & whites	2 to 4 days	1 year
Hard cooked	1 week	Does not freeze well
<b>Sa sen chi</b>		
Steak	3 to 5 days	6 to 12 months
Chops	3 to 5 days	4 to 6 months
Roasts	3 to 5 days	4 to 12 months
Variety meat – tongue, heart, liver, kidney.	1 to 2 days	3 to 4 months
Process meat (pre dressing)	1 day	Does not freeze well
Gravy & meat broth	3 to 4 days	2 to 3 months
Process or package meat (sausage, ham, bacon)	1 week	1 to 2 months
<b>Ar</b>		
Fresh whole	1 to 2 days	1 year
Fresh pieces	1 to 2 days	9 months
Giblets	1 to 2 days	3 to 4 months
Fried chicken	3 to 4 days	4 months
Cook chicken gravy or broth	3 to 4 days	6 months
<b>Chaw bangnawi</b>		
Bread item ( hamburger, pizza)	3 to 4 days	1 to 2 months
Soup and stews	3 to 4 days	2 to 3 months
Raw salad or entrees	Week	3 to 4 months
<b>Bawnghnute</b>		
Pasteurized milk	3 days	Does not freeze well
Raw milk (boiled)	2 days	Does not freeze well

## **Engvangin nge eitur kan vawn that ang?**

Eiin vawn that chan pathumte chu :

- Eiin a nihna vawn that.
- Eiin a lan dan leh hmelhmang vawn that.
- Eiin rei zawk dah that nan a vawn that.

## **Natural Food Preservatives (Chemical hmanglo a vawn)**

- Chhum hmin, dah khal leh dah vawh, pasteurizing, tihro, rep, pickling heng ho hi chemical hmanglo a vawn that dan hrang hrang chu a ni.
- Chini, chi, alcohol (zu), vinegar heng pawh hi chemical hmanglo a vawn that dan chu a ni. Chini leh chi phei hi chu hmasang atang tawh a thil vawn that nana an hman a ni a, hei hian eiin a bacteria thang tur a veng hle a ni. Sa leh sangha te vawn that nan chi phei chu la hman nasat ber a ni.
- Coffee leh thingpuife te chu a vawn that nan an pho ro thin a ni.

## **Eitur vawn thatna chi hrang hrangte :**

1. **Sugar (Chini) :** Chini tam deuh hman hian a chhe tur a veng a, entirnan jam ah te, thil thlum ah te, chithlum ah te an hmang nasa hle. Tunlai ah chuan chini chu chemical chini in a thlak nasat tak avang hian dah khang te a lo ngai ta a ni.
2. **Alcohol :** Zu 13% volume aia sang ah hian eng bacteria mah dam theilo tluk a ngaih a ni a, thil tihfai nan leh vawn that nan an hmang nasa hle a ni.
3. **Heat (Sa) :** Sa hian eiin a bacteria awm tur a veng hle a, eiin hmin tha ah pei chuan bacteria awm a that a rei tak a vawn that theih phah thin a ni.
4. **Salt :** Chi hian eiin a vawng tha thei hle a, chi ah hian bacteria a awm theih loh avangin, a bikin sa leh sangha phei chu vawn that nan a tha hle a ni.
5. **Cold :** Vawt hian kan eiin a natna thang tur a ti tawp thei a, mihring pawh vawt lutuk ah chuan kan damrei theilo ang chiah in, natna hrik pawh vawt a chuan a thi emaw an in thlahpung theilo thin a ni.
6. **Acid pH :** Acid hian thil nung reng reng chu a ei chhe ti ila a dik ber awm e. Kan eiin a acid a tawk chiah a kan hman hian natna hrik awm tur a veng a , a tihlum thin a ni.
7. **Dessication :** Dessication han tih hian eiin a tui awm tih ro vek a kawk ber a, eiin ro tha ah chuan thilnung in an mamawh tui a awm si loh ah chuan thilnung awm nan a theih thin ta lo a ni.

## Topic 30 – Scientific way of packaging

### Objectives :

To upgrade the knowledge and skills of the trainees on packaging and labelling technology

**Duration :** 45 minutes

**Expected outcome :** Participants will develop understanding on packaging and labelling technology

### Module Plan

Topic	Content	Methodology	Process	Materials Required
Scientific way of packaging	*Introduction to packaging * Types of packaging *Machinery * Product life cycle	Powerpoint presentation, Interactive learning method	The trainer will deliver lecture on scientific way of food packaging through powerpoint followed by an interactive session with the participants	LCD projector, Laptop

Packaging kan tih chuan industrial leh market technique a ni a, fun khawm, ven that, hriattir nan te kan thil zawrh min puitu a ni.

A then chuan packaging chu ei theih leh ei theihloh pawh hmun khat leh a fel fai zawk a kan dah hian. Entirnan glass te, thir ah te, plastic ah te kan fun hi a ni. Packaging chuan kan thil chu min venghim sak a, pawnlam bawlhhlawh lut tur atangin veng tha a ni. Tunlaiah phei chuan kan thil siam chhuah atanga 20-30% man hi chu packaging atan hman thin a ni.

### Packaging hnathawh te :

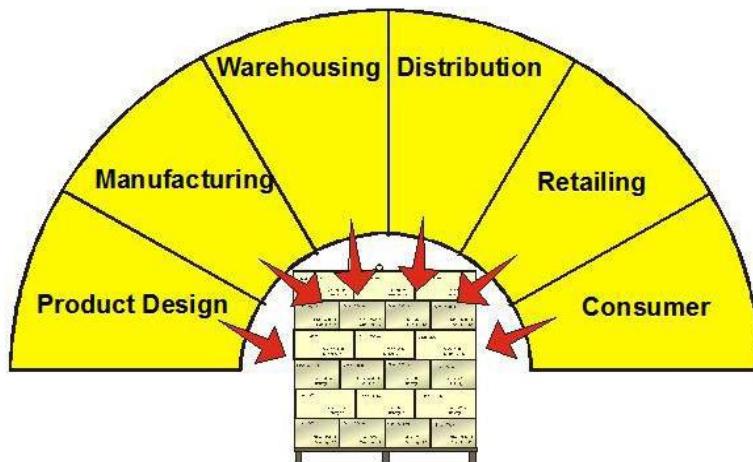
- 1) **Contain (dawng)** : Package chuan kan thil siam chu a a dawng thei leh a veng tha tur a ni. Chung a thil fun khawm chu rihna emaw tam zawng emaw chu a teh theih tur a ni a, chung chu kilogram(kg), litre (lt) leh number (zat) ten teh thin a ni. Kan thil fun chu a leng tawk tur a ni a, a thawl emaw a tawt emaw a nih chuan thil fun atan khan a pawi thei mai bakah sum paikh thlawnna a ni.
- 2) **Protect (Veng):** Package chuan kan thil siam chu a venghim tha hle tur a ni a, che thei leh keh thei tur in kan fun tur a ni lo bawk. Package chu primary, secondary leh tertiary in kan pack tur a ni a, a chak tha in chhe mai mai thei a ni tur a ni lo.
- 3) **Promote (Chawisang):** Packaging kan thil siam funna chu ngawireng a kan thilsiam min lo zawrh sak tu tur a ni. Chung ti thei tur chuan kan funna chu kan chei nahl in mi hip thei zawngin kan siam tur a ni. Chu mai bakah a changkang in hmuh a nuam tur a ni.

## Packaging then hrang dan :

- 1) **Primary package** : Primary pack chu retail pack tih a ni bawk, hemi pack na hian kan thilsiam nen an in hnaih ber a, a fun hmasa ber tu a ni. Heng retail pack an tih hi kan thil siam chawisang tu leh ti chiang ber tu a nih avangin a pawimawh hle. He pack na hian kan nihna a pho lang chiang hle a ni.
- 2) **Secondary package**: Secondary pack hi transport pack an ti bawk a, primary pack vengtu leh fun chhawng leh tu a ni. Hemi pack tangkaina ber chu kan thil siam kan zawn sawn leh phurh kual vel a lo veng him tu ber a ni.
- 3) **Tertiary package**: Tertiary pack hi unit pack emaw pallet loads emaw tih thin a ni. Heng pack hian secondary pack kha khawm zawk leh felfai zawk in a kengkhawm a, han phurh kual mai pawh a awl phah a ni.

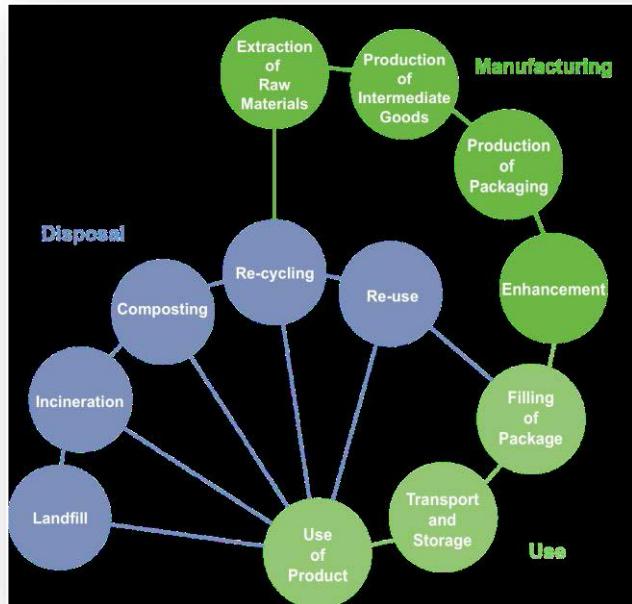
## Packaging design :

Thil kan lei reng reng chuan kan thil lei chu a him em tih kan en hmasa ber ziah anga hemi ti chiang thei tu chu a pack na hi a ni. A pack na hian kan thil lei chu engnge anih min hrilh a, chu mai bakah a venghim thin a ni. Tunlai ah phei chuan a hmannawn theih emaw recycle theih leh theihloh ah kan en tawh hle a ni. Chuvang chuan kan thil siam chu kan pack down in he a hnuai a lem hi kan ngaihpawimawh a tha.



## Packing life cycle:

Life cycle tih chuan a bul atanga a tawp thleng tihna ni mai a. Packaging bikah chuan a pack tur siam atanga kan pahi thleng a huam thei ang. Chung inkar zawng ah chuan kan package hman chu kan boruak leh lei atan thil pawi a thlen thei em tih kan chhut ngun a tha.



### Pakaging thlan dan :

Market a hlawkna leh hlutna neih ve kan duh a nih chuan heng a hnuai ami te hi kan ngaih pawimawh a tha.

#### **Step 1. Know your product (Thil siam hriat chian)**

A hmasa berah chuan kan thil siam chu anihna leh a chemical te kan hriat chian hmasak a tha. Kan thil siam chu acidic em tih te, tuihu a hua em tih te, dah vawh reng a ngai em tih te leh lum a mamawh em tih te kan hriat a tul.

#### **Step 2. Check the packaging facilities (Kan packing na hmun endik)**

Kan packing na tur khawl kan mamawh dan chu heng GMP (Good manufacturing Practices) leh GHP (Good handling Practices) kan en dik chian hian a hriat a, a packing dan tur pawh min kawhhmuu thei dawn a ni. Kan packing na hmun chuan kan khawl dah nan a him em tih leh chet velna a rem em tih kan endik hmasa tur a ni.

#### **Step 3. Know your target market (Kan zawrh chuahna tur hriat chian)**

Packaging hian kan thilsiam chu a awmna tur leh a thlen chin a ti lang a. Heng zawhna pathum tunge zuar, engnge a zawrh leh tu hnenah nge? Tih hi kan chhan theih chuan kan thilsiam chu a market thlen chin kan hre thei dawn a ni.

#### **Step 4. Choose appropriate packaging materials (Kan pack na tur hmanrua thlan thiam)**

Kan pack na tur hmanrua thlan thiam hi a tangkai in a pawimawh hle mai. Consumer pack turah chuan glass emaw plastic emaw lekha atang a siam emaw hman a tha. Transport pack atan chuan thing emaw buara emaw thir emaw plastic emaw hman a tha. Mahse kan thlan tur a chu kan awmna hmun a zirin a danglam thei hle ani. Kan awmna hmun a zir a thlan thiam a pawimawh bawk.

## **Step 5. Optimize logistics and supply chain management processes and costs (Supply man tih tlem)**

Kan thil siam chhuah kan market dawn reng reng in market a thlen hma in hmun tam tak leh thil tam tak a paltlang a ngai a, chung zawng zawng paltlang thei tur chuan kan packaging pawh kan thlan thiam a tha. Chu mai bakah tlemte te a kan thawn thin hian transport a lo sang a, him pawh a himlo duh bik a ni. Chuvang chuan thenkhat chuan stock point an nei thin reng a ni. Stock point ah hian a khawmin an dah tha a, heng atang hian a sem chhuak ta mai thin a ni.

## **Step 6. Meet all health, safety and environmental requirements (Hriselna leh himna vawng tlat)**

Kan thilhralh tur kha a lei tu te tan a him em tih leh a hrisel em tih kan ngai pawimawh hle tur a ni. Dan leh dun tam tak a awm avangin, heng dan te hian min phuar tlat a ni tih kan hriat a ngai. Chung dan te chuan leitu te tan hriselna leh himna a ngai pawimawh hle a ni.

## **Step 7. Use caution with claims on environmentally friendly materials (Hman nawn theih emaw tawih thei hman)**

Tunlai khawvel thiamna lo sang zel takah hian tawih thei leh hman nawn theih thil hman a uar ta hle a, chu a vang chuan kan thil pack na tur pawh a tawih thei leh hman nawn theih kan hman hram a tha.

## **Step 8. Test your packaging (I Package chu enfiah rawh)**

I thil pack na chu check ngun a tha, kan thil pack kha a him tha em tih te leh thil atan khan pawi thei a awm em tih kan enfiah fo a tha. Kan packing na kha a lo hlui tawh em thlak a hun tawh em tih kan enfiah thin anga design thar a ngaih leh ngaihloh kan endik bawk tur a ni.

### **PACKAGE ENVIRONMENTS (Chheh vel) :**

Kan package chuan a tih tur heng kan chehvel pathum ah hian a ti thei tur a ni. Chung kan chheh vel kan ngaih pawimawh loh chuan package tha lo, pawisa sen thlawn, leitu lungawilo leh kan thil siam duhlo na hial a thlen thei a ni.

#### **- Physical Environment :**

Hemi environment ah hian kan thil siam chu thlauh te, shock te, tauh palh te a tawk thei. Chung thlen thei te chu kawngah te, transport ah te leh kan dah dan ah te a ni.

#### **- Ambient Environment (Boruak)**

Kan boruak leh a chheh vel hian kan package ah khan thil tam tak a thlen thei a, chung chu tuihu te, nisa lutuk te, lum leh vawt te, bacteria te leh tui te a ni. Heng hian khan thil siam kha a him that loh chuan a tichhia in zawrh tlakloh ah a chhuah thei a ni.

#### **- Human Environment (Mihring)**

Hemi ah hian kan package kha mihring nen a a in tawn hun a ni a, hemi chhehvel pal tlang tur chuan thlir lawkna tha leh rem hriatna tha a ngai a ni. Chu mi tur chuan kan package ah khan a leitu tur te tan kan thil zawrh kha an hriat chian theih nan a chanchin kan ti chiang tur a ni. Chu mai bakah danin a phal chin leh dah tur a tih chin thu kan chhu lang tur a ni. Kan package chu mihring tana khawih chet vel nuam in kan siam tur a ni.

**Shelf life** chu kan eiin a dam leh that theih hun chhung a ni. Kan siam zawh atangin kan thil siam a kha ei tlakloh a lo nih thleng kha a huam a ni.

**Factors influencing shelf life :** Hei hian thil siam, package leh a chheh vel a huam.

**Product :** Kan thil siam ah hian a dam hun chhung a in thlak thei viau mai a, kan thil siam a kha a nih dan tur loh emaw a tul tihtur tih loh a awm hian a nih tur ang lovin a chhe hma ta thin a ni.

**Package :** Package chuan kan thilsiam chu eng lak atang pawh a venghim thei tur a ni a. Chu a venhim theih zawng chu water vapour transmission rate (WVTR) leh oxygen transmission rate (OTR) a teh thin a ni. Entirnan - chips chi hrang hrang te hi tuihu an haw hle a, tuihu a luh hian a ramna leh a hnipna chu a hlauhthin a ni.

**Environment :** Kan thilsiam hmun hrang hrang a kan phurh kualna ah hian harsatna tam tak a tawk thin a, chungte chu boruak inthlak, sik leh sa, kawng tha lo, dahthatna himlo leh a dang tam tak hian kan thilsiam ah khan a nih dan ti danglam in a dam hun chhung a pawt tawi ta thin emaw a tichhe emaw thin a ni.

### **Types of Packaging Materials :**

1. **Plastics** : Plastics hi a tlawm in hman a awlsam hle a, duhdan a siam danglam a awl a, a zang hle bawk a ni. A thatlohma chu pawn boruak atang tui hu leh sik leh sa ah a him lo hle a ni.
2. **Metal (Tin , steel, alluminium)** : Steel, tin leh aluminum hi metal ah chuan kan hman uar deuh ber a ni. Metal chu can siam nan te kan hmang nasa hle a, eiin lam fun nan a tha hle bawk. Thir (metal) chu a chak tha a kan thilsiam a venghim tha hle a, thlaupalh emaw sik leh sa lakah a him a ni. A thatlohma chu a rit a, tauhpalh leh tuiiek lak atang a himlo a ni.
3. **Glass** : Glass a thil pack hi hlu ber leh changkang ber a ngaih a la ni reng a, thil man tam pack nan chuan la hman ber a ni. Tuihu leh boruak atangin a him tha a, a lang tlang na hian a chhunga awm a ti lang chiang a, rawng hrang hrangin atih danglam theih bawk. A thatlohma chu uluk a ngai a, a keh hma avangin dim a ngai a, a to duh hle bawk.
4. **Wood** : Thing atanga package siam hi boruak atan a tha a, boruak leh a chhevel atan hlauhawm a siam ve loh avang hian eitur pack nan an hmang nasa hle. A that na ber chu a tlawm a, a zang bawk a, a fei a leh tih danglam a awl bawk. A thatlohma ber chu tui hu leh boruak atanga natna lak atang a himlo a ni.

## **Topic 31 – Business plan and marketing**

### **Objectives :**

To impart the knowledge of business activity, market analysis and importance of making a business plan

**Duration :** 60 minutes

**Expected outcome :** Participants will develop the importance of making a business plan

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Business and Marketing plan	* SWOT analysis * Producer group * 4 P's * Value chain	Powerpoint presentation, Brain storming	The trainer will deliver a lecture then the participants will be divided in to groups and make a business plan	LCD projector, Laptop, Chart paper, Marker

### **SWOT Analysis :**

SWOT kan tih hi a lam pum chu strength, weakness, opportunity and threat a ni a, organization leh company lian ho in an in relbawl that theih nan a strategy an hman thin a ni. A awmzia ber chu eng nge kan chakna leh kan chaklo na, khawilai ah nge kan tan kawng inhawng tih leh khawilai atangin nge buaina leh chhiatna lo thleng thei tih kan thlir thiamna tur a hmanrua pawimawh tak a ni.

Hlawtling tak tak tur chuan kan theihna zawng zawng seng a kan thawh a ngai thin. Chutiang bawkin kan chaklo nate kan hriat lawk chuan buaina kan neih tlem phah thei dawn a ni.

He strategy hi hmang tur chuan a hnuai a zawhna te hi kan chhang hmasa tur a ni.

### **Strength :**

1. Midang aia theihna leh thiam bikna engnge i neih?
2. Hmanrua engte nge i neih?
3. Midang in nangmah ah eng theihna nge an hmuh?
4. Hlawhtlinna i chan tawh ah eng nge ila chhuan ber?

Heng zawhna te hmang hian i chakna leh theihna te i hre thei dawn a, chutiang chakna leh theihna te chu tangkai leh hlawk taka hman tur a ni.

### **Weakness :**

Kan chakloh nate hre tur chuan zawhna hrang hrang kan in zawh leh a ngai dawn a, chungte chu:

1. I inrin tawk lohvang in eng hna te nge i tih loh phah thin?
2. I bul hnaia awm ten eng thilah nge chaklo a an hriat che?
3. I zir thiamna leh training atanga thiamna i neih te kha i hmang thiam em? Chumi hmang tur chuan i inringtawk em?
4. Engnge i hnathawhna ah mize thalo i neih? Entirnan, hna ah te i kal tlai thin em?

- I mizia ah khan nangmah hnuk hniam thin tu i nei em? Entirnan, mipui hma a thusawi ngamloh nate i nei em?

### **Opportunity :**

- Khawl thar emaw internet i hmang tangkai thei em?
- Tuna i sumdawnna kha a hlawk em? A hlawk chuan engtin nge i hman tangkai zel ang.
- Midang thurawn lak theihna leh nangmah puitu tur i nei em?
- I elpui ten thil tihawm tak tihloh annei em? An neih chuan chu chu i hmang tangkai thei dawn em?

### **Threat :**

- I thil tihlai ah khan eng harsatna nge i tawh?
- Tute nge i elpui te?
- Technology chhuak thar vangin harsatna i tawk thei em?
- I chaklo nate kha harsatna leh buaina thlen thei tu che an ni em?

Khitiang atang khian mahni theuh inteh ila, kan chakna te leh eng kawng nge kan tan inhwang tih te hria in, tangkai taka hman kan tum tur a ni. Chubakah kan chaklo na leh chhiatna kan tawh theihna zawng zawng te thlir thiam a, hmang tangkai turin theihtawp i chhuah ang u.

### **PRODUCER GROUPS :**

Producer group hi thinglang khaw lamte chawikan nan kawng engkimah a tangkai a. Heng mai bakah hian an thil tharchhuah te zawrh leh hrall na kawngah pawh an tangkai hle dawn a ni. Producer group te hian lo neitu ten a mala an tih theih miahloh tur thar chhuah lamah leh zawrh chhuah kawngah hlawkna tam zawk nei turin a pui dawn a ni. Duhthusamah chuan producer group pakhatah hian mi 10-20 ni thei se, heng member te hian an account tha taka vawn tum se, tin, bank ah account hawn bawk tur a ni.

Heng te hi producers group siam dawn chuan zawm tur a ni.

- Member te in zawkhawm
- An thil tum a theih ngei dawn nge dawn lo tih zirchian
- Sumdawn na tur plan siam
- Member thlan te tana training kal tir
- Producer group din
- Sum chungchang in siam rem
- Technical thil bik atana training siam
- Bungrua lakkhawm dan tur ruangam siam
- A lakkhawmna hmun ruat
- Lo thliar fel leh pack na hmun siam
- Zawrh chhuah dan tur ngaihtuah a siam
- Account vawn that

Heng producer group te hi MKSP staff ten kawng engkimah an pui dawn a. Pawn lam puinha telloin hna hi hlen chhuah an tum dawn a ni.

He producer group te hi MKSP hnuiah din an ni a, a thil tum ber pakhat chu thinglang lam miten sum hnar dang an neih theih nan a tih a ni. Hei hian an khawtlangah pawh nghawng nasa tak a nei thei dawn a hriat a ni. Producer group ah hian hmeichhia member 10- 20 an awm tlangpui a. Tin, an hmalakna zawng zawng hi an kutah a awm bawk dawn a ni.

A hun hmassa lamah chuan tlhai lamah hma lak a ni ang a. Producers group ten theih ang tawkin heng lo neitu te hi an pui ang. Sangha lam buaipui tu te chuan a theih anga tam chawm theih nan hman an tum dawn a ni. Tin tlhai chi producer group te pawh an la awm ang a, heng te hian lo neitu te tan a man tlawm zawk a a chi zawrh chhuah an tum dawn a ni.

### **The 4 P's of marketing mix :**

#### **1) Product :**

Product chu engpawh kan thar chhuah siam chhuah a ni thei ang a. Thenkhat chuan TV te an siam a, chutih lai chuan thenkhatin sawhthing leh tlhai te an thar bawk a. He miin a tum ber chu eng thil nge kan neih (engnge kan thar chhuah/Siam chhuah) tih hi a ni.

#### **2) Price :**

Hei hi a leituin kan thil thar/siamchhuah a leina man zat a ni a. Hei hian kan tharchhuah leh zawrh ah nghawng nasa takin a nei thei a ni. Hemi hi a nih avangin a man zat tur kan bithliah in thil dang kan thil thar chhuah/siamchhuah milpui nen a in tlau lutuk em tih te kan in zawh a ngai a ni.

Kan thil zawrh te leituin a thillei atang khan a beisei ang a hmu em? A lei nawn leh duh ang em? Midang te aiin ka ti to bik em? tih te in zawh a tha awm e. Kan thil zawrh ang zuar an awm in an ni aia a lo to chuan min dawr na chhan tur kha a awm lemlo a ni.

#### **3) Place :**

Kan thil thar chhuah te hi amahin kan lo atangin a in lei mai ngai meuh lo a. Hemi anih avang hian kan thil thar chhuah te chu mi lei thei tur a chhawp chhuah a ngai ta a ni. Khawiah nge ka chhawp chhuah ang? Engtin nge ka thawn ang? Engtin nge mite helai hmunah hian he ka thilsiam hi le tur a awm tih ka hriattir theih ang? tih te hi in zawn thin tur a ni.

#### **4) Promotion :**

Eng hmang pawh a thil siam chhuak tu in a thilsiam a tiilar na hi promotion kan tih chu a ni a. Fakna lam hawi zawng zawng hi promotion chu a ni. Fakna hian kan thil siam leh thar chhuah te hi mi in an lo hriat ve loh avangin kan hriat tir hi a tul ve a ni.

### **Value Chain Analysis :**

Value chain analysis hi rosum inrelbawlna kawnga hmanraw tangkai tak a ni. He thil hi American economist ropui Michael Eugine Porter-an kum 1980 laihawl vela a ngaiantuah chhuah a ni. A bikin thil siamchhuah lamah te, tlhai tharchhuah leh hrallh chuangchangah te kan lo hlawk theih zawk nan a kan thil neih ang ang (hmanrua a ni emaw thiamna a ni emaw) te thiam taka hman a ni.

Entirna pakhat han pe ta ila, sumchang tlhai ching mi chuan a tlhai chi a lakna te uluk tak leh man tlawm zawka a neih theih dan a ngaiantuah tur a ni a, tin a chin hnua a tlhai enkawl danah te a hlawk zawk dan a ngaiantuah ang. Mithiam zawkte leh hlawhtling tawh te tihdan te a chik peih tur a ni. Tin, chumi mai bakah a hrallhna lamah pawh a market chanchin a hre chiang tur a ni (khawvel zau zawk leh ramdangin an tlhai chin ang an tharchhuah zat a zirin a man/rate hi a danglam ve zel ani tih hriat tur). Heng zawng zawng te hi awmze neia a hman chuan a hma aiin hlawkna a lo chang tam thei dawn a ni.

## **Value Chain :**

Value chain awmzia chu thil hrang hrang (hnathawh dan, thilsiam dan, thil tihdan leh a dangte) awmze nei zawk emaw hlawk zawk emaw a chantir ti ila kan sawi sual em em awm love, hnathawktu/thiltitu leh kan tihdan hrang hrang te a hlawk zawk theihna atan te, a hlutna kan belh a a hma aia tha zawka chantir a, a leitu tur te emaw a hmang tangkai tu tur te emaw hnena chhawp chhuahsak hi value chain kan tih chuan a sawi fiah bawk awm e.

Value chain hi awmze neia a tangkaina hmang chhuak tur chuan heng supply tu, zuarchhawngtu, hnathawktu, hralh chhawngtu leh midang inhnamhnawih ve zawng zawng ten thawhhona tha leh inlungrualna an neih hian thil tha zawk leh hlawk zawk an tharchhuak/siamchhuak thei dawn a lo ni. Value chain hi supply chain (lakluh, dahthat, a leitu tur hnena hralh chhuahna kawng) nen a danglam tih pawh hriat a tha ve awm e.

Value chain chuan kan thil tharchhuah/siamchhuah na atan a kan mamawh hrang hrang heng bungraw kalkawng te, market rate hriathiamna te, sum inrelbawlna te, a thar chhuaktu te leh hnathawktu intelkhawm te hi a huam tel vek bawk.

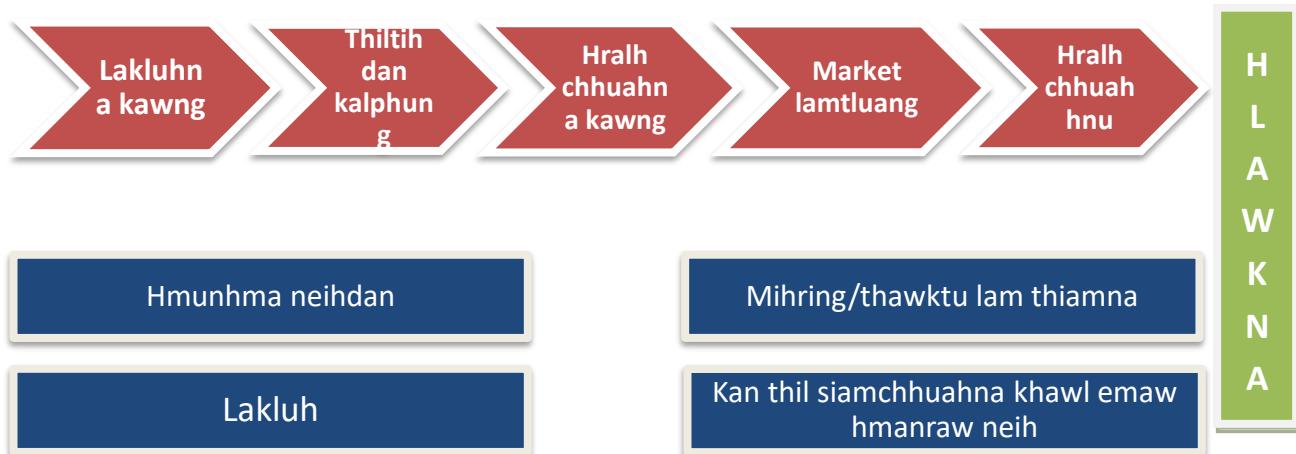
Market kan tih fo hi value chain-ah chuan a pawimawh em em a. Market chanchin hi a hraltu lam leh a thar chhuaktu lam te hian an hriat a tangkai a ni. Hemi awmzia chu heti hian han sawi ta ila, market chanchin hian a tharchhuak tu hnenah engzatin nge a thil tharchhuah man zat kha a bituk ang tih te, a tharchhuah zat hi a leitu lam ten an mawmawh em tih te, a quality te an duh ang zawng a ni em tih te leh engtin nge a leitu tur hnenah engtinge an va thlen ang tih te hi a hriattir thei a ni. Chu mai bakah a leitu lam te tana a tangkaina ve na chu a tharchhuaktu te leh a zuartu hnen atangin an leitheih zat te, a man te, a lei theih hun te, hralhna hmun te leh a tharchhuaktu tena an harsatna tawh te a hrilhfiah ve thung a ni. Value chain ah chuan a leitu lam emaw a hralh chhawngtu lam te hian tute pawh an lo hlawk tlan zawk nan a tharchhuaktu lam te hi kawng chi hrang hrangin a pui ve thin bawk a ni.

Value chain analysis hi a hmanna tak chu thil siamchhuah leh tharchhuah na lama a man tlawm zawka siamchhuah theih dan ngaihtuah te hi a ni a, chumi tur chuan kan thil tharchhuah tur ah khan a englai ber hi nge hlu a, tih phuisui ngai lai emaw, tih tlem emaw lam a kawk a. Chumi chuan thil siamtute leh tharchhuaktu tan an elpui te lak atangin a man man zawkin an siamchhuah theih phah ang a, tin, an elpui te aia tha zawkin an tharchhuah phah thei bawk a ni. Hemi avang hian a hlawkna leh hlawk lohna kawng tam takin a chhut theih thin a ni. Value chain hian elpui te aia hlawk zawk theih dan kawng hnih a kawhhmu a, chu chu midang aia man tlawm zawka siamchhuah a ni a, a dang leh erawh chu midangte aia tha a siam a ni. Chumi chu a tharchhuaktu ten an ti hlawhtling thei anih chuan a vaia chhutin an sumdawnna emaw an thil hralhna lamah an lo hlawk zawk daih thei a ni.

Michael Porter-a value chain model ah chuan a hnuia mi ang hian kan thiltih (process) chu a inkhaidiat chho a ni :

## Porter's Value Chain Model

Pawimawh hmasa



A puibawmtu

A chunga pawimawh hmasa kan sawi khi a puibawmtu aia kan tih hmasak ngei ngei tur tihna lam a nilo a, an kalkawp ve tlat a ngai zawk a ni. Midang aia hlawk zawk tur chuan tunlai mila kan thiamna hriatna te her rem a, kan thiltih dan kalphung tha zawka tlak te leh kan inrelbawlna tichangtlun emaw tih hmasawn emaw te hi a ni.

Agriculture value chain ah chuan tlai chi tha zawk emaw ran chi tha zawk emaw lakluhnna kawng te, hnathawktu intelkhawm te, tlai chin dan emaw ran enkawl dan tha zawk te, tharchhuah hnu a buaipui dan te, a fun dan (pack) tha zawk te, hralh chhuahna kawng te leh sum inrelbawl dan te pawh a huam tel vek a ni.

Tuna kan rama kan kalpui danah hi chuan tlai tharchhuak tute hian a tlangpuin a mahni ta an hralh mai emaw an kharchhawn tir mai zel a. Hei hian kawng tamtak ah an hlawkna tur a tihtlem phah fo reng a ni. Hlawk zawka kalpui tur chuan anmahni tichak turin an intelkhawm a, man man zawk leh hlawk zawkin an thil neih ang ang an hralchhuah theih phah zawk a ni. Man mumal neilo a kan kalpui reng ai chuan a man bituk sa anga kan hralchhuah reng na na na chuan hun rei zawkah hlawkna tamtak a keng tel thei a ni tih hriat a pawimawh lehzual hle.

**Value chain hmanga hlawkna kan neih theih dan :**

A chunga kan sawi ang khan hlawkna nei thei tur chuan man tlawm zawka kan siamchhuah/tharchhuah a ni a. Tin, midang/elpuite aia quality tha zawka siamchhuah pawh hian hlawkna a tel theih bawk a ni.

**Cost advantage :**

Hemi awmzia chu man tlawm zawka thil siamchhuah/tharchhuah a ni. A hnuaiah hian chumi tlentir theih dan kawng lo en ta ila :-

**I-na: A tharchhuaktu tena thil pawimawh hmasa leh a puibawmtu hriatchian hmasak :**

Kan thilsiam na a kawng hrang hrang heng tlai chi emaw ran chi emaw kan lakluh dan te, kan hnathawh dan kalphung te, hralchhuahna te leh market chungchang te a hrampa te te a hriatchian a, man man zawka kalpui theih dan ngaiantuah chhuah a ni.

**2-na: Thil hrang hrang inkungkaih dan leh pawimawhna theuh hriatchian :**

A chunga kan sawi ho heng thlai chi emaw ran chi emaw kan lakluh dan te, kan hnathawh dan kalphung te, hralhchhuahna te leh market chungchang ah te an pawimawhna hrang hrang leh an hlutna te teh a, an man hriat tur a ni. Chumi chuan kan hnathawhna kalphung ah a hlawklo lai te leh chawibelh nia kan inhriatna lai te a hai lang thei a ni.

**3-na: Hnathawh mil a a man chhut :**

Hlawnka tel tak tak tur chuan kan hnathawh leh thiltih mil a a man kan insenna chhut chhuah hi a pawimawh hle a. Hun leh tha sen teuha chawi belh chu tuman kan duhlo ang chiah hian kan hnathawh hian hlawnka nge channa min thlen tih hi chhut a pawimawh hle.

**4-na: Inkhaidiat chhoh dan mumal tak a neih :**

Thil pakhata a man kan tihhniam theih chuan a dawt leh a kan tihtur ah kawng tamtak in hlawnka a chher chhuak thei a ni. Entirnan - thlai chi tha kan lakluh/chin chuan kan tharchhuah tam phah tal loh pawhin hralhna lamah harsatna kan tawk lo thei a ni. Chuvang chuan mumal leh awmze nei tako kan thiltih reng reng hi a inkhaidiat chhoh chuan hlawnka kan tel zel dawn a lo ni.

**Differentiation advantage :**

Value chain hian thil man tihtlawm ngawr a kawk bik lo a, midang emaw kan elpuite aia thil tha zawk siamchhuah emaw tharchhuah te pawh a huam tel vek tih hriat a tha. Hemi awmzia chu thil tha zawk na na na chu a duhna chin pawh kan nei vek a, a leitu lamin an inhuam phawt chuan man to zawk pawhin thil tha chu a lei mai dawn a ni.

Value chain analysis hi entirna nen a hnuiah hian table a dah a ni :

*Example :*

<b>1-na: Pawimawh hmasa</b>					
Thlai chi lakna leh a man	Hmanrua leh buangraw neih	Lei enkawl dan leh sawngbawl dan	Hlo leh natna laka ven dan	Tharchhuah lakna kalkawng	Hralhna kawnga inhnamhawih te (kharchhawngtu)
<b>2-na: A man hrang hrang leh an pawimawh dan</b>					
Rs. 1000 Pawimawh ve tho	Rs. 5000 Pawimawh lutuk lo	Rs. 5000 Pawimawh hle	Rs. 7000 Pawimawh hle	Rs. 2000 Pawimawh lutuk lo	Rs. 1000 Pawmawh
<b>3-na: A man siamtu</b>					
A ram leh leilung mila chi tha lak	Hmanraw that dan leh changtlung dan	Ram len zawng leh hlawhfa man (rate)	Ram len zawng, hlawhfa man (rate) leh damdawi man	Lirthei hawh man leh ram hlat zawng	Kharchhawngtu leh an ngamna man (rate)
<b>4-na: Inkhaidiat chhawndan</b>					
<ul style="list-style-type: none"> <li>• Chi tha lak a chin chuan a lo thar hnem ang a.</li> <li>• Thiamna thar zawk nen a thlai enkawl chuan natna lakah te an lo him in enkawlna senso a lo ti tlem ang a.</li> <li>• Market chanchin hriatchian chuan a man pawh kan chhiar thiam zawk ang a.</li> <li>• Thlai tharchhuah te dahthat.</li> </ul>					

## **Topic 32 – Training kharna leh sawihona**

### **Objectives :**

- 1) To recollect and assess the key lessons learnt
- 2) To get the feedback on the entire training program

**Duration :** 30 minutes

**Expected outcome :** The trainer understand the impact of training on the trainees

### **Module Plan**

<b>Topic</b>	<b>Content</b>	<b>Methodology</b>	<b>Process</b>	<b>Materials Required</b>
Closure and feedback	* Rating of training * Rating of trainer * Rating of training content	Group activity	The participants will be given a printed format to write their learning during the training	Foolscap paper, Pen