

Completion report of the “Enhancing the Haze Free Sustainable Land Management in Shan State Myanmar” Project

Activity 1. To verify the hotspots area in Eastern Shan State using satellite imageries Landsat

The agreement of this project was signed between the Global Environment Centre (GEC) and Forest Resources Environment Development and Conservation Association (FREDA) on 23 March 2023. On 24 March 2023, FREDA, EC met with responsible person from GEOCAD GROUP company limited and discussed about the activity (1). Then, the agreement between FREDA and GEOCAD GROUP Company was signed on the same day to verify the hotspots area in Eastern Shan State using satellite imageries Landsat.

On 25 March 2023, the EC members and responsible officials of the company discussed details about the process of the activity (1) at the FREDA office.

(a) Attendees

- (1) U San Lwin (Chairman of FREDA)
- (2) U Mya Win (Vice Chairman of FREDA)
- (3) U Soun Htwe (Secretary of FREDA)
- (4) Dr San Thwin (Internal Audit of FREDA)
- (5) U Aung Htoo Myaing (Project Manager of FREDA)
- (6) U Zin Wai Naing Tun (Remote Sensing Expert of GEOCAD)

(b) Agreed processes

(1) The Eastern Part of Shan State (Tachileik District) bordering with Myanmar, Thailand and Laos was selected as a project site covering with the following townships;

Tachileik township (2559 sq. kilometre)

Monghpyak township (811 sq. kilometre)

Mongyawng township (299 sq. kilometre)

Keng Tung township (18 sq. kilometer)

A location of the project area is attached with shape file.

(2) The numbers of hotspots in each project area were studied in the Landsat imageries of March and April between 2018 and 2022 and given priority for the most occurrence of Haze.

(3) The study of hotspots will be completed and submitted to FREDA with completion report not later than 5 April 2023.

U Zin Wai Naing Tun, Remote Sensing Expert presented the work done to the EC members at FREDA office on 6 April 2023. Based on the comments and suggestions given by FREDA, EC members

and U Zin Wai Naing Tun presented again the revised progressive report at FREDA office on 18 April 2023.

Based on the discussion between FREDA and the company, U Zin Wai Naing Tun selected three priority areas as follows;

- (1) 16 locations which were used to burn every year between 2018 and 2022 were selected as priority 1.
- (2) 16 locations which were used to burn years and more between the same periods were selected as priority 2.
- (3) 16 locations which were used to burn only one year between the same periods were selected as priority 3.

The works done of the company were mentioned step by step in their completion report. It was attached in the appendix 1.

Activity 2. To identify the project target areas

On 11 April 2023, the Project Manager U Aung Htoo Myaing met with Field Manager U Htay Maung and Project Officer U Tin Win, and then discussed about the selection of first appropriate locations out of the 16 locations of first priority area based on the ease accessibility and better security for the project staff. The locations of the five selected project areas are shown in shapefile.

On 29 April 2023, Project Manager U Aung Htoo Myaing, Field Manager U Htay Maung, Project Officer U Tin Win and U Nay Lin Kyi (Staff officer of Forest Department of Tachileik Township) discussed about the final selection of five selected areas. U Nay Lin Kyi suggested that the project area should be easily accessible, a better security and walkable on the ground. He also suggested that the forest officer of Monghpyak township should be invited to discuss about the final project locations as some areas are within his township. The location of the finalized five selected project area in Tachileik district is shown in shapefiles.

Activity 3. To conduct Free, Prior and Informed Consent (FPIC) and public awareness at the targeted villages

On 24 March 2023, FRED A submitted a letter of request for granting permissions for “Enhancing Haze-Free Sustainable Land Management in Shan State” Project to the general office of Environmental Conservation Department on 23 May 2023, D-G’ office of ECD sent a letter of instruction to director office of ECD in Shan State to cooperate with FRED A in the implementation of the project. On 25 May 2023, U San Lwin (Chairman of FRED A), U Aung Htoo Myaing (Project Manager) and U Tin Mg Tun (Field assistant) met with the director of ECD in Shan State at his office and explained about the objectives, activities and work plans in details. The director of the ECD explained about the present situation Haze-Free activities and said that he will submit the proposal to the higher authorities of Shan State Government.

On 7 June 2023, U Aung Htoo Myaing (Project Manager), U Htay Maung (Field Manager) and U Tin Win (Project Officer) from FRED A went to the Tachileik Township and met with the following departmental officials and discussed about the project in details.

Meeting attendees

1. U Soe Win Aye, Deputy Director Department of Forestry, Tachileik
2. U Chan Myae Soe, Assistant Director Environmental Conservation Department, Tachileik District
3. U Nay Lin Kyi, Staff Officer, Department of Forestry Tachileik Township
4. U Zin Min Khant, Range Officer, Department of Forestry Tachileik Township
5. U Aung Htoo Myaing, FRED A, Yangon City
6. U Htay Maung, FRED A, Taunggyi city
7. U Tin Win, FRED A, Tachileik City
8. U Maung Maung Cho, Standing Tachileik City

Objective

“Enhancing the Haze-Free Sustainable Land Management in Shan State, Myanmar” project activities are carried out by FRED A Association and Tachileik District. It is held in order to cooperate with related departments in the township.

Project activities

1. To verify the hotspots area in Eastern Shan State using satellite imageries Landsat
2. To identify the project target areas
3. To conduct Free, Prior, and Informed Consent (FPIC) and public awareness at the targeted villages
4. To find the root causes of fire on ground
5. To form the integrated fire management committee
6. To provide of firefighting equipment
7. To form the firefighter team
8. To conduct firefighting training
9. To conduct Forest Fire Management Training in Tachileik. (2 days training)
10. To conduct training on sustainable agriculture practice

11. To establish demonstration plot about 1 acre for sustainable agriculture practice in Tachileik, Taunggyi and Nyaungshwe Township project area.
12. To conduct the cost and benefit analyze between sustainable agriculture practice and traditional agriculture.

U Aung Htoo Myaing also explained that the areas which were burned annually between 2018 and 2022 had been identified using the satellite imageries taken in March and April between 2018 and 2022.

Based on the results of the satellite imageries, 5 appropriate areas with the most of fires occurrence were selected as follows;

- (1) Tachileik Township, Nam Kham Village Tract, Wanlang Village
- (2) Tachileik Township, Mong Hpone Village Tract, Par Tawng Village
- (3) Tachileik Township, Mong He Village Tract, Pan Hsi Li Village
- (4) Monghpyak Township, Taw Nyu Village Tract, Hsut Pang Village
- (5) Monghpyak Township, Taw Nyu Village Tract, Side Khaung Village

In the discussion, U Soe Win Aye (Assistant director of Forest Department, Tachileik District) and U Nay Lin Kyi (Staff officer of Forest Department, Tachileik District) suggested that the beat officer of Forest Department in respective areas will participate in help the FREDa team during the field visit to the target villages. Then, the date of schedule to visit to the director office of the administration department to have the approval and to the fire services department and department of agricultural to conduct the training courses were discussed and approved.

In consultation with U Nay Lin Kyi (Staff Officer of Forest Department, Tachileik District), U Zin Min Khant (Range officer), U Myo Min (Forest Ranger), U Min Naing(Deputy Forest Ranger), U Sai Mine (Deputy Forest Ranger), U Khin Mg Aye (Deputy Forest Ranger), U Khin Mg San (Deputy Forest Ranger), U Nyi Nyi Lwin (Forester) and U Than Htun Aung(Staff Officer of Forest Township, Monghpyak Township) , U Pyae Phyo Mg (Deputy Forest Ranger),U Win Mg (Deputy Forest Ranger) and the FREDa project team selected most important 6 villages among the 16 locations with the most forest fire occurrence areas in March and April of a period of 5 years from 2018 to 2022. The selection was finalized with 3 criteria-

- (1) The areas must be accessible.
- (2) The villages must be willing to participate in the project activities with knee interests.
- (3) The villagers can speak Myanmar Language.

The selected 6 villages are as follows;

No	Township	Village tract	Village	Remark
1	Tachileik	Mong He	Pang Hsi Li	
2	Monghpyak	Taw Nyu	Hsut Pang	
3	Monghpyak	Taw Nyu	Side Khaung	
4	Tachileik	Mong Hpone (Kha)	Par Tawng	
5	Tachileik	Mong Hpone (Ka)	Nam Lwe	
6	Tachileik	Mong Pa Hlyo	Nam Wan (2)	

Activity 4. Study of the root causes of hot spot in the project target area by means of personal interview and group discussion with the local people

This activity was carried out together with the activity-3 on the same days. Due to the language problems, individual interviews and group discussions were carried out together. The FREDA team conduct the study using questionnaire in each selected village. The work plan of the study for the roots caused of fire was shown as follows;

No	Date	The participants involving in operation (FREDA)	The participants involving in operation (Forest Department)	Township	Village Tract	Village	Remark
1	10-6-2023	U Aung Htoo Myaing U Htay Maung U Tin Win U Kyaw Myat Khine (GIS)	U Myo Myint (Range Officer) U Khin Mg San (Deputy Rang Officer) U Zayyar Min Myat (Forester)	Tachileik	Mong He	Pang Hsi Li	
2	11-6-2023	U Aung Htoo myaing U Htay Maung U Tin Win U Kyaw Myat Khine (GIS)	U Than Tun Aung (Township Forest Officer) U Win Aung (Deputy Range Officer) U Pyae Phyo Mg (Deputy Range Officer)	Monghpyak	Taw Nyu	Hsut Pang	
3	11-6-2023	U Aung Htoo Myaing U Htay Maung U Tin Win U Kyaw Myat Khine (GIS)	U Than Tun Aung (Township Forest Officer) U Win Aung (Deputy Range Officer) U Pyae Phyo Mg (Deputy Range Officer)	Monghpyak	Taw Nyu	Side Khaung	
4	12-6-2023	U Aung Htoo Myaing U Htay Maung U Kyaw Myat Khine (GIS)	U Myint Naing (Deputy Range Officer) U Sai Mine (Deputy Range Officer) U Kya Le (Forester)	Tachileik	Mong Hpone (Kha)	Par Tawng	
5	12-6-2023	U Aung Htoo Myaing U Htay Maung U Kyaw Myat Khine (GIS)	U Myint Naing (Deputy Range Officer) U Sai Mine (Deputy Range Officer) U Kya Le (Forester)	Tachileik	Mong Hpone (Kka)	Nam Lwe	
6	13-6-2023	U Aung Htoo Myaing U Htay Maung U Tin Win U Kyaw Myat Khine (GIS)	U Khin Mg Aye (Deputy Range Officer)	Tachileik	Mong Pa Hlyo	Nam Wan (2)	

Based on the analysis of root cause study, the following findings were summarized as follows:

No	Township	Village Tract	Village	Root causes of fire
1	Tachileik	Mong He	Pang His Li	- Control burning in private rubber plantation 70% - Firing before hunting 30%
2	Monghpyak	Taw Nyu	Hsut Pang	- Firing before hunting 70% - Land clearing by fire for shifting cultivation 30%
3	Monghpyak	Taw Nyu	Side Khaung	- Firing before hunting 70% - Land clearing by fire for shifting cultivation 30%
4	Tachileik	Mong Hpone (Kha)	Par Tawng	- Firing before hunting 70% - Land clearing by fire for shifting cultivation 30%
5	Tachileik	Mong Hpone (Ka)	Nam Lwe	- Control burning in private rubber plantation 60% - Land clearing by fire for shifting cultivation 20% - Firing before hunting 20%
6	Tachileik	Mong Pa Hlyo	Nam Wan (2)	- Control burning in private rubber plantation 70% - Firing before hunting 30%

Activity 5. Formation of integrated fire management committee

As suggested by the office of Administration Department, instead of forming integrated fire management committee, the existing Environmental Conservation Committee will be used by adding some appropriate person of FREDA and representative of the selected villages. The committee is consisting of thirty-four members as follows;

No	Name	Occupation	Department/ Village	Remark
1	U Ye Tun	Deputy Director	Forest Department, Shan State (East), Keng Tung	
2	U Htay Maung	Field Manager	Taunggyi City	
3	U Aung Htoo Myaing	Project Manager	Yangon City	
4	U Soe Win Aye	Assistant Director	Forest Department, Tachileik District	
5	U Chan Myae Aye	Assistant Director	Environmental Conservation Department, Tachileik District	
6	U Chit Ko Ko Win	Deputy Staff Officer	General Administration Department Tachileik Township	
7	U Nay Lin Kyi	Township Staff Officer	Forest Department, Tachileik	
8	U Nwe Htun Myint	Deputy Director	Department of Fishery, Tachileik	
9	U Aung Myo Min	Deputy Staff Officer	Fire Service Department, Tachileik	
10	U Naing Lin	Deputy Staff Officer	Department of Agriculture, Tachileik	
11	Dr.Tin Ko Ko	Deputy Director	Deputy Director of Animal Husbandry and Veterinary Department	
12	U Tin Win	Project Officer	FREDA	
13	U Kyaw Myat Khine	GIS	FREDA	
14	U Maung Maung Cho	Standing Tachileik City	Tachileik	
15	U Myo Myint	Range Officer	Forest Department, Tachileik	
16	U Aung Zaw Khaing	Range Officer	Forest Department, Tachileik	
17	U Zin Min Khant	Range Officer	Forest Department, Tachileik	
18.	U Khin Mg San	Deputy Range Officer	Forest Department, Tachileik	
19.	U Aung Kyaw Soe	Deputy Range Officer	Forest Department, Tachileik	
20.	U Sai Mine	Deputy Range Officer	Forest Department, Tachileik	
21.	U Khin Mg Aye	Deputy Range Officer	Forest Department, Tachileik	
22.	U Myint Naing	Deputy Range Officer	Forest Department, Tachileik	
23.	U Kya Le	Forester	Forest Department, Tachileik	
24.	U Nyi Nyi Lwin	Forester	Forest Department, Tachileik	
25.	U Zayyar Min Myat	Forester	Forest Department, Tachileik	
26.	U Sai Zin Min Htun	Villager	Hsut Pang Village, Monghpyak	
27.	U Tun Tun Oo	Villager	Hsut Pang Village, Monghpyak	
28.	U Ar Gar	Villager	Hsuat Pang Village, Monghpyak	
29.	U Maung Hla	Villager	Side Khang Village, Monghpyak	
30.	U Ar Bay Hla	Villager	Nam Wann Village, Kenglat	
31.	U Yar Kaut	Villager	Nam Wann Village, Kenglat	
32.	U Kya Shi Dat	Villager	Nam Wann Village, Kenglat	

33.	Daw Soe Myint Soe	Villager	Pang Hsi Li village, Tachileik	
34.	U Law Lo	Villager	Pang Hsi Li village, Tachileik	

The above-mentioned committee held a meeting on 16th June 2023 and discussed focusing on the following issues;

The forest officials discussed that the root cause of some forest fire is due to land clearing by fire for shifting cultivation. They also suggested that shifting cultivation practice should be reduced and eradicated and should encourage them to establish community forest.

Dr Tin Ko Ko (Deputy Director of Animal Husbandry and Veterinary Department) discussed that some root cause of forest fire is due to set fire for hunting and suggested that instead of firing they should use more hunting dogs.

U Nwe Htun Myint (Deputy Director of Fishery Department) suggested that shifting cultivation and hunting practice should be reduced by introducing small aquaculture should be introduced.

After thorough discussion, among the participants of the meeting the following ways and means were found of.

No	Root cause of forest fire	Ways and means to solve
1	Control burning in private rubber plantation	Buffer zone management should be applied
2	Firing before hunting	More hunting dogs should be used or alternative livelihood should be introduced
3	Land clearing by fire for shifting cultivation	Community forest should be encouraged, perennial orchard should be established

Activity 6. Formation of voluntary firefighting team (Auxiliary fire Force)

On 14 June 2023, the FREDa project team and Assistant Director of forest Department met with the Assistant Director of the fire service Department, Tachileik discussed to form Voluntary firefighting team to supply the basic firefighting equipment and to conduct short- term firefighting training.

The officials from Fire Services Department explained that firefighting equipment are very expensive and cannot be bought in Tachileik and suggested that it is better to provide the bottle of fire extinguishers instead of equipment. They also suggested that the firefighting training courses could be conducted on 19 and 20 of June.

He also suggested that uniform should be provided to the members of the Voluntary Fire Fighting team. The Fire Fighting was formed with 14 members who are interested to participate with knee interests from the targeted villages. The uniforms for the members of the Fire Fighting teams could be provided in time.

The names of the members of Fire Fighting Team are as follows;

No	Name	Township	Village
1	U Uparta	Tachileik	Nam Lwe
2	U Ar Chu	Tachileik	Pang Hsi Li
3	U Ar Hu	Tachileik	Pang Hsi Li
4	U Hywe Hla	Tachileik	Nam Wan (3)
5	U Saw Hla Mon	Tachileik	Nam Wan (3)
6	U Tun Tun Oo	Monghpyak	Hsuat Pang
7	U Arr Gar	Monghpyak	Hsuat Pang
8	U Khin Win	Monghpyak	Side Khaung
9	U Su Wa Na	Tachileik	Par Tawng
10	U Sai Mal	Tachileik	Par Tawng
11	U Aik Hta	Tachileik	Par Tawng
12	U Thet Paing Htun	Monghpyak	Hsuat Pang
13	U Yu Da	Tachileik	Nam Wan (2)
14	U Maung Hla	Monghpyak	Side Khaung

Activity 7. Provision of fire-fighting equipment

On 14 June 2023, the FREDa project team and assistant director of Forest Department met with the assistant director of Fire Services Department discussed about the supply of firefighting equipment. The assistant director of Fire Service Department explained that the prices of firefighting equipment are very expensive and cannot be bought easily in Tachileik. He suggested that instead of firefighting equipment should be provided to all firefighting teams. Instead of firefighting equipment, the bottle of firefighting extinguishers should be provided. At present it will take a few days to buy fire extinguishers from Yangon or Thailand due to transportation problem. He said that he will help the project by selling the required amount of fire extinguisher which they stored at the station with the original prices. At the meeting, the FREDa project team handed over the fund to buy 32 bottles of fire extinguishers to the junior staff officers of the Fire Department. Due to some difficulties in buying fire extinguishers the materials could be handed over on 22 June 2023.

The numbers of fire extinguishers distributed to the target villages are as follows;

No	Township	Village Tract	Village	Numbers of fire extinguishers
1	Tachileik	Mong He	Pang Hsi Li	6
2	Monghpyak	Taw Nyu	Hsuat Pang	6
3	Monghpyak	Taw Nyu	Side Khaung	4
4	Tachileik	Mong Hpone (Kha)	Par Tawng	6
5	Tachileik	Mong Hpone (Ka)	Nam Lwe	4
6	Tachileik	Mong Pa Hlyo	Nam Wan (2)	6

Activity 8. To conduct firefighting training

On 19 June 2023, the opening ceremony for the short-term firefighting was conducted at 9:30 am the office of Forest Department in Tachileik District.

Attendees at the 2 days training firefighting course;

No	Name	Occupation	Department/ Village	Remark
1	U Nay Lin Kyi	Township Staff Officer	Forest Department, Tachileik	
2	U Htay Maung	Field Manager	Taunggyi City	
3	U Aung Htoo Myaing	Project Manager	Yangon City	
4	U Sai Than Nyunt	Range Officer	Forest Department, Tachileik District	
5	U Sai Mine	Deputy Range Officer	Forest Department, Tachileik	
6	U Phyto Nyi Nyi Soe	Deputy Staff Officer	Environmental Conservation Department, Tachileik District	
7	U Maung Maung Cho	Standing Tachileik City	Tachileik	
8	U Uparta	Trainee	Nam Lwe, Monghpyak	
9	U Ar Chu	Trainee	Pang Hsi Li Tachileik	
10	U Ar Hu	Trainee	Pang Hsi Li, Tachileik	
11	U Hywe Hla	Trainee	Nam Wan (3), Tachileik	
12	U Saw Hla Mon	Trainee	Nam Wan (3), Tachileik	
13	U Tun Tun Oo	Trainee	Hsuat Pang, Monghpyak	
14	U Arr Gar	Trainee	Hsuat Pang, Monghpyak	
15	U Khin Win	Trainee	Side Khaung, Monghpyak	
16	U Su Wa Na	Trainee	Par Tawng, Tachileik	
17	U Sai Mal	Trainee	Par Tawng, Tachileik	
18.	U Aik Hta	Trainee	Par Tawng, Tachileik	
19.	U Thet Paing Htun	Trainee	Hsuat Pang, Tachileik	
20.	U Yu Da	Trainee	Nam Wan (2), Tachileik	
21.	U Maung Hla	Trainee	Side Khaung, Tachileik	

First day program of training course on 19, June, 2023

.Agenda (1)

At the beginning of the opening ceremony, U Htay Maung (project field manager of FREDa) introduced about FREDa. He explained about the enhancing Haze-Free sustainable management which was being conducted with the financial assistant of the Global Environment Centre (GEC) based in Malaysia.

Agenda (2)

The project manager handed over 4.5 million Myanmar kyats to the officials of firefighting Services Department for supplying bottle of fire extinguishers and firefighting uniforms.

Agenda (3)

Between 10:30 and 12:00 session, U Nyan Myint Htun (Junior Staff Officer of Fire Services Department) explained about the Forest Fire occurred in Thailand borders in Tachileik area. He also explained about the root cause of forest fire and gradually in those areas. He also explained that fire smog and haze came out from the firing of residues of sugar cane plantation during March and April every year. He also suggested that early burning should be started in January in order to reduce thick layer of fire smog and haze. He also explained about three types of fire namely surface fire, Median fire from surface up to four feet and crown fire. He also explained about the impact of serious impact of forest fire such as loses of valuable and important trees species, damage of forest structures, loses of biodiversity and damage of surface soil. He also added that forest fire of about one acre may lose about 10 tons of timber and may lose surface soil from 30 to 70 tons, consequently soil erosion may occur in heavy rail, they occurred soil erosion and sedimentation problems in downstream areas. During March and April of 2023, his problem occurred in Tachileik area causing health and transportation problems. The serious impacts of his problems occurred not only in the country but also cross the border of other country. It was recorded that forest fire occurred near Side Khaung Village in 2019 spread into the village. Because of that forest fire many baskets of paddy seeds were burned due to the late information to the Fire Department. Therefore, the villager should inform the occurrence of fire as soon as early in time to the Fire Department in future. It is very important to put out the fire with using some branches with leaves or small bamboo handles at the beginning of fire so that the flame of fire cannot become largest state. In case of fire, important fire equipment are necessary and some traditional handmade firefighting, tools and equipment, small water tank with water storage should be prepared the advance before the dry season. He also explained about the serious damage due to forest fire as follows;

- (1) The value of forest ecosystem
- (2) The value of watershed ecosystem services
- (3) Wild life and biodiversity
- (4) Recreation value
- (5) The value of grazing ground
- (6) Socioeconomic value

He explained about the root causes of forest fire are land clearing for shifting cultivation, setting fire for hunting, collecting hunting, charcoal burning and misconduct of some villagers. He also explained about the three types of forest fire namely;

- (1) Peat land fire
- (2) Service fire and
- (3) Crown fire

There are three main necessities for firing. They are Oxygen, inflammable materials and high temperature, if one of these missing, there will no fire. The most effective and inexpensive ways of fire prevention is to make the fire breaking lines as necessary within the forest areas before the dry season.

On Inflammable materials should be totally cleared out within the 15 feet width of fire lines and this is the most effective and inexpensive ways of fire prevention. The basic firefighting equipment are

aces, shovels, jungle knives, Rakes etc. The firefighting teams should have to wait and see the fire conditions for at least one hour in order to ensure there will be no move fire again.

Agenda (4)

The training course was at 12:00 for having lunch. At 13:00, U Tin Htun Aung, the Deputy Staff of Fire Services Department demonstrated the trainees how to handle and use the firefighting equipment systematically and the trainees were trained individually how to use the equipment step by step.

Agenda (5)

U Tin Htun Aung, the Deputy Staff of the Fire Services Department explained about the objectives and activities of Fire Services Department.

Agenda (6)

The first day training course program ended at 15:30 hours.

Second day program of training course on 20, June, 2023.

Agenda (1)

U Aung Htoo Myaing (Project Manager) opened the second day training course with a few words of thanks.

Agenda (2)

U Aung Myo Min, Deputy Staff officer, Fire Service Department gave a lecture on basic firefighting techniques and gave a demonstration how to handle a portable firefighting tools and equipment for 2 hours from 10:00 am to 12:00 noon.

Agenda (3)

The training was temporary stopped at 12: 00 noon until 13:00 for lunch.

Agenda (4)

At 13:00 U Nyan Myint Tun, Deputy Staff Officer, Fire Service Department demonstrated how to use the bottles of fire extinguisher systematically for one and half hours until 14:30.

Agenda (5)

Then he gave a lecture on rules and regulations and punishment for fire accidents with projector from 14:30 to 15:30.

The second day of training course ended at 15:30.

Activity 9. To conduct training on zero burning agricultural practice and using the natural organic fertilizer in Tachileik Township

The zero burning agriculture practice training course was conducted at 9:30 on 21 June 2023 at the meeting room of Forest Department in Tachileik District.

The attendees at the 2 days training courses are as follows;

No	Name	Occupation	Department/ Village	Remark
1	U Khing Mg San	Deputy Range Officer	Forest Department, Tachileik	
2	Daw Nan Htwe Kham	Accountant (3)	Forest Department, Tachileik	
3	U Zeyyar Min Myat	Forester	Forest Department, Tachileik	
4	U Win Myo Thu	Forester	Forest Department, Tachileik	
5	U Ar Chu	Trainee	Pang Hsi Li village, Tachileik	
6	U Uparta	Trainee	Nam Lwe, Tachileik	
7	U Ar Hu	Trainee	Pang Hsi Li, Tachileik	
8	U Hywe Hla	Trainee	Nam Wan (3), Tachileik	
9	U Saw Hla Mon	Trainee	Nam Wan (3), Tachileik	
10	U Tun Tun Oo	Trainee	Hsuat Pang, Monghpyak	
11	U Arr Gar	Trainee	Hsuat Pang, Monghpyak	
12	U Khin Win	Trainee	Side Khaung, Monghpyak	
13	U Su Wa Na	Trainee	Par Tawng, Tachileik	
14	U Sai Mal	Trainee	Par Tawng, Tachileik	
15	U Aik Hta	Trainee	Par Tawng, Tachileik	
16	U Thet Paing Htun	Trainee	Hsuat Pang, Monghpyak	
17	U Yu Da	Trainee	Nam Wan (2), Tachileik	
18	U Maung Hla	Trainee	Side Khaung, Tachileik	

First day program of training course on 21, June, 2023.

Agenda (1)

U Aung Htoo Myaing (Project manager of FREDA) opens the training courses with a few words of welcome.

Agenda (2)

Daw Mya Ohmar (the in charge of the District Land Use and Land Management Department) explained about the sustainable Agricultural Land Management to the Trainings.

She also explained about the main causes of soil due to over use of fertilizers, pesticides and practices shifting cultivation. She also explained about the surface-soil erosion, soil damage due to over uses of fertilizers and pesticides, lack of reforestation after timber exploitation. She also explained that smoke and haze which came out from land clearing fire for shifting cultivation caused respiratory problems due to air pollution. She added that due to the lack of trees and forest covers, the heavy rain washed out the surface soil and made the mountains and hills bare land. The fertile soil is also damaged due to the strong wind and sand storms. Due to the lack of forest cover, the higher temperature of sun made the sun dried and caused the surface water easily evaporated.

In the sloping area of hilly area, terrace cultivation along the contour should be introduced instead of planting against the contour in order to reduce soil erosion due to heavy rainfall. If the surface fertile soil is loss the protection of crop cultivation will be reduced.

In land with the basic principle of soil conservation, zero burning techniques should be applied, the soil should be protected from direct falling of rainfall, soil working should be done to absorb the raining water easily, the soil should be protected against blowing strong winds directly and against blowing soil particle due to strong winds. The cultivation of maize and sunflower are used to be consumed more fertility of the soil. In order to rehabilitate the soil fertility, the area should be replanted by trees which can produce more fertility to the soil. Terrace farming should be introduced, plating alternative crops in a year, planting along the codon and planting with safeguard.

Modern slop agricultural land techniques

She explained that the modern sloping agricultural land techniques should be applied in the sloping and hilly areas instead of shifting cultivation practices. The objectives of the application of slops are to conserve the soil moisture, to produce more crop yields, to reduce the impact of climate change, to promote the livelihood of shifting cultivators.

Agenda (3)

The training course stopped at 12:00 noon for lunch until 13:00.

Agenda (4)

Daw Mya Ohmar (the in charge of District Land Use and Land Management Department) continued her lecture ranging to sustainable agriculture practice to the training.

There are about three methods in agricultural practices without damaging the environmental and ecosystem services are as follows;

- (1) The surface soil should be always covered by organic materials
- (2) The soil should be ploughed as minimum as possible
- (3) Different agricultural crop should be grown alternatively instead of using the same crop

The advantages of the covering the soil with organic materials is to protect the soil particles from erosions through strong winds, heavy rainfall and sunshine. It also protects the shelter of microorganisms. The numbers of microbes are increased and caused the soil fertile because of rapid decomposition of the materials by microbes. Land clearing by fire may cause damaged to the microorganisms enhance it should be avoided as much as possible.

The soil should not be ploughed too much and the straw should not be totally cleared. Straw can be used for feeding cattle and they are also useful for nutrients of agricultural crops.

Two or three different agricultural crops should be growing alternatively instead of using one crop throughout the year. If only one crop continuously grows, it can be easily affected by diseases and insects. Maize plantation with three lines of maize, one line of bean required no fertilizers for three years.

Agenda (5)

Between 14:00 and 15:00, the participants raised the questions and the trainers responded to them. After that, demonstration was conducted how to make A frame technique practically and practices to measure the contour lines.

Agenda (6)

Daw Mya Ohmar (the in charge of District Land Use and Land Management Department) explained about the paddy seeds. It is important to change the paddy seeds once in three years. It is better to use only good quality paddy seeds produced by department and good company. It is more saved to collect the good paddy seeds from their own cultivation fields. It should be noted that only good seeding can produce higher paddy yields. The average lifespan of the paddy is about 135 days.

The training course on sustainable agricultural practice ended at 15:30.

Second day program of training course on 22, June, 2023.

Agenda (1)

U Aung Htoo Myaing (Project Manager) opened the second days training course with a few words of thanks.

Agenda (2)

At 10:00 the resource persons of the Department of the agricultural in Tachileik gave lectures on the importance of soil fertility, the important of natural fertilizers, the advantages of using EM making EM fertilizer and EM bokashi, preparation method of fish amino acids, preparation process

of EM liquids for medicinal uses, preparation techniques of organic fertilizers using cow Tung and urine of castles and making process of Dochatking fertilizers.

Agenda (3)

The training course temporary stopped at 12:00 noon and for lunch until 13:00.

Agenda (4)

Between 13:00 and 14:30, practical demonstration on making EM Bokashi fertilizers was conducted in the compound of Forest Department in Tachileik township District.

Agenda (5)

Between 14:30 and 15:30, discussion session was conducted and the resource person responded the questions raised by the participants.

Agenda (6)

The training course ended at 15:30 successfully.

Activity 10. To conduct training on peatland integrated fire management

Completion report of training course on peatland integrated fire management

1. Name of training course

Peatland integrated fire management.

2. Objective

To reduce the transboundary haze and the occurrence of forest fire by given training and awareness on the importance of peatland, main causes of forest fire and preventive measures to each stakeholder including departmental staff, some members of the NGOs, CSOs and some representative of local community.

3. Organizers

Forest Resource Environment Development and Conservation Association (FREDA) in cooperation with Environmental Conservation Department and Forest Department.

4. Project funding

Funded by Global Environment Centre (GEC) based in Malaysia.

5. Place of training

Golden Lake Hotel in Tachileik township, Tachileik District, Shan State.

6. Date of training

13th September 2023 (9:30am to 3:30pm).

7. Trainees

There are all together 23 trainees including 7 persons from Township Forest Department, two persons from Fire Department and 14 persons from project targeted villages. The names of the participants are mentioned in the list of attendants as attached Appendix (1).

8.Resource persons

No	Name	Occupation	Department
1	U Sann Lwin	Chairman	FREDA
2	U Soun Htwe	Secretary	FREDA
3	U Chan Myae Soe	Assistant Director	Environmental Conservation Department, Tachileik District
4	U Aung Htun (3)	Assistant Director o	Forest Department, Tachileik District
5	U Aung Ko Win	Junior Staff Officer	Fire Services Department Tachileik District

9. Subject of training course

- (a)Basic information about Peatland
- (b)ASEAN Guidelines on Peatland Fire Management (Part 1)
- (c)ASEAN Guidelines on Peatland Fire Management (Part 2)
- (d) Environmental Conservation and Transboundary Haze
- (e) Heritage Sites of Myanmar
- (f) Prevention of Forest Fire in Myanmar

The names of the resource persons and subjects are mentioned in details in Appendix (2).

10. Preparation

FREDA sent a request letter for contacting training course to the Director of ECD in Shan State on 6 September 2023. The secretary of FREDA also discussed in advance for the preparation of PowerPoint with U Ye Htun, Deputy Director of Forest Department, Eastern Shan State, U Chan Myae Soe, Assistant Director of ECD, Tachileik District and U Aung Htun (3) Assistant Director of Forest Department, Tachileik District. FREDA also prepared CD discs containing PowerPoint Presentation of all subjects in order to distribute to the trainees. FREDA sent invitation letter to the Department concerned and trainees with the help of U Ye Htun, Deputy Director of Forest Department and U Nay Linn Kyi, Staff Officer of Township Forest Department.

FREDA went to Tachileik by plane on 11 September 2023. FREDA responsible persons discussed about the preparation of training course on 12 September 2023 with U Aung Htun-3, Assistant Director of Forest Department, Tachileik District, U Chan Myae Soe, Assistant Director of ECD, Tachileik District and U Nay Linn Kyi, Staff Officer of Township Forest Department.

In the afternoon of 12 September 2023, FREDA team, together with U Aung Htun-3 Assistant Director of Forest Department met with U Myint Naing, Head of the District Administrative Department and explained about the objective of the project and Agenda of training course and workshop to be conducted at Golden Lake Hotel in Tachileik.

11. Conducting of Training Course

(a) Opening Ceremony

The opening ceremony of training course started at 9:30 am in Golden Lake Hotel. The opening ceremony was attended by U Myint Naing, Head of the District Administrative Department, U Aung Htun-3 Assistant Director of Forest Department in Tachileik District, U Chan Myae Soe, Assistant Director of ECD in Tachileik District, Dr. Tin Ko, Deputy Director live Stock Breeding and Veterinary Department, U Thant Zin, Head of the District Officer of Immigration Department, U Nwe Htun Myint, District Officer of Fishery Department and U Aung Ko Win, Junior Staff Officer of Fire Department. U Myint Naing Head of the District Administrative Department gave an opening speech focusing on the problems of Transboundary Haze in Tachileik, impacts of Transboundary Haze and asking to find the ways and means to decrease the occurrence of forest fire and hance to mitigate the impacts of Transboundary Haze. After that, U Sann Lwin, the Chairman of FREDA explained about the project in cooperation with GEC and the objectives of training course.

(b) Giving the lectures

The lectures are provided starting from 10:00 am up to 3:30 pm. Each resource persons gave the lectures for about 1 hour and discussions were made about half an hour. The timetable for training course was mentioned in Appendix (3).

(c) Discussion by trainees

(C-1) U Tun Tun from NGO (Than Lwin Thitsar) requested to provide more about Peatland in details. The Chairman of FREDA replied that these training courses only focuses on Peatland Fire Management and Peatland training course are needed to be provided in another appropriate time.

(C-2) U Myo Myint, Forest Ranger of Forest Department said that he really thanks FREDA resource persons

for conducting such kinds of training course as they have many valuable information about fire management that are very useful for them.

(C-3) U Yway Hla from Nant Wan Village in Tachileik Township explained that the fire occurred two times in his villages and many houses were burned down due to the lack of fire extinguishers. Now they have been trained by fire department and they have some fire extinguishers from FREDA under this project and therefore they do hope a good manage and protect their villages from fire in future.

(C-4) U Khin Maung Sann, Forest Ranger of Forest Department explained that he has experience Zero Burning Techniques and pointed out that has there was no forest fire for land clearing, many weeds came out heavily and disturbed the planting seedling and therefore they caused of weeds clearing was very high. He also advised that gap planting should be encouraged as there was no need to clear the land by fires.

(C-5) U Sai Sein Win Tun from Sout Pann Village, Mine Pyat Township explained that about 20 houses and many paddy seeds of his villages were burned down due to fire spread of forest fire in 2021. He would like to thanks FREDA on behalf of his village people for being conducting firefighting training and provision of fire extinguishers.

(c) Closing ceremony

Closing ceremony was conducted at 3:30pm on 13th September 2023. Assistant Director of Environmental Conservation Department gave a closing speech and U San Lwin, Chairman of FREDA said a few words of thank.

11. Supervision

The training was conducted under the guidance of U Sann Lwin, the Chairman of FREDA, U Soun Htwe (the Secretary of FREDA) and under the closed supervision of U Aung Htoo Myaing (Project Manager) and U Soe Min (Field Manager).

12. Evaluation

As the trainees have many experiences of the negative impacts of forest fire and Transboundary Haze pollution, they gave serious attention to all lectures provided by resource persons, the training course was evaluated successfully completed.

13. Suggestions

(a) All of the key Departments Concerned should urge training participants to share their experiences gained from the training to other Departmental Colleagues and relevant villagers for more effective prevention of forest fire.

(b) FREDA also suggested that this kinds of trainings and provision of fire firefighting equipment should also be provided not only to the targeted villages but also to other villages who are facing the same problems of forest fire and Transboundary Haze.

Note. Recorded photos of the training course are also attached in this training course.

Participants List

Appendix (1)

No	Name	Occupation	Department/ Village
1	U Arr Lon	Sergeant	Fire Services Department, Tachileik District
2	U Zin Ko Tun	Junior Sergeant	Fire Services Department, Tachileik District
3	U Myo Myint	Range Officer	Forest Department, Tachileik Township
4	U Zin Min Khant	Range Officer	Forest Department, Tachileik Township
5	U Khin Maung San	Deputy Range Officer	Forest Department, Tachileik Township
6	U Sai Mai	Deputy Range Officer	Forest Department, Tachileik Township
7	Daw Nan Htwe Kham	Cleark	Forest Department, Tachileik Township
8	U Maung Maung Cho	Standing	Tachileik Township
9	U Sai Sein Win Tun	Villager	Hsut Pang Village, Monghpyak
11	U Tun Tun Oo	Villager	Hsuat Pang Village, Monghpyak
12	Daw Ei Lee	Villager	Side Khang Village, Monghpyak
13	U Maung Shae Hla	Villager	Nam Wann Village, Kenglat
14	U Kya Shae Dad	Villager	Nam Wann Village, Kenglat
15	U Sai Thura Aung	Forest Guard	Forest Department, Tachileik Township
16	U O Kalick	Villager	Wam Lon Village, Tachileik

17	U Sai Maung	Villager	Wam Lon Village, Tachileik
18	U Khin Win	Villager	Side Khang Village, Monghpyak
19	U Aite Hta	Villager	Wam Lon Village, Tachileik
20	U Arh Kham	Villager	Wam Lon Village, Tachileik
21	U U Pa Ta	Villager	Wam Lon Village, Tachileik
22	U Aung Thu	Villager	Mai Sai village, Tachileik
23	U Sai Myint Htwe	Villager	Pang Hsi Li village, Tachileik

The names of the resource persons and subjects are mentioned in details Appendix (2).

Sr.	Name	Position	Subject
1	U San Lwin	Chairman, FREDA	Basic information of peatland and ASEAN Guidelines on Peatland Fire Management (Part 1)
2	U Chan Myae Soe	Assistant Director, Environmental Conservation Department (ECD)	Environmental Conservation and Transboundary Haze
3	U Soun Htwe	Secretary, FREDA	ASEAN Guidelines on Peatland Fire Management (Part 2)
4	U Aung Htun	Assistant Director, Forest Department	Environmental Conservation and Transboundary Haze
5	U Aung Ko Win	Junior Staff Officer, Fire Services Department, Tachileik District	Prevention of Forest Fire in Myanmar and Heritage Sites of Myanmar

Activity 11. To conduct workshop on root causes of forest fire and mitigative measures

Completion report of workshop on “Root causes of forest fire mitigative measures to reduce forest fire and Transboundary Haze pollution in Tachileik District”

1.Objective

To find out the root causes of forest fire and to develop possible ways and means to reduce the occurrence of forest fire after through discussion with key stakeholders including responsible staff of department concerned and representative of the targeted villages.

2.Organizers

Resource Environment Development and Conservation Forest Association (FREDA) with the cooperation of Environmental Conservation Department (ECD) and Forest Department (FD).

3.Funding Agency

Global Environment Centre (GEC) based in Malaysia.

4. Place of workshop

Golden Lake Hotel in Tachileik township, Tachileik District,Shan State.

5. Date of workshop

14th September 2023 (9:30am to 3:30pm).

5. Participants

There are all together 34 persons including departmental staffs of FREDA, ECD, FD, Agriculture Department, Live Stock Breeding and Veterinary Department, Fishery Department, Fire Services Department and representative of targeted villages in the project area. The details list of participants is mentioned in Appendix 1.

6. Conducting workshop

Item One

U Zin Min Khant, Forest Ranger of Tachileik Township of Forest Department headed as master of ceremony and read out the agenda of workshop.

Item Two

U Chan Myae Soe, Assistant Director of ECD made an opening speech focusing on appreciation of FREDA activities on conducting firefighting training and providing firefighting equipment also hoped that FREDA will do more activities relating to mitigation of Transboundary Haze pollution as well as to promote sustainable land management by zero burning land techniques.

Item Three

The chairman of FREDA said that he was very grateful to all department concerned for attending to this workshop and explained about the serious impacts of Transboundary Haze produced from Peatland and Forest Fire in ASEAN countries. And then, urged a participant to provide valuable advices based on their experiences and local knowledges in the project area in order to find out a good solution to reduce the forest fire and Transboundary Haze solutions.

Item four

FREDA took group photos of all participants for documentary record.

Item five

U Aung Htoo Myaing (Project Manager) of FREDA presented about the project with PowerPoint. In his explanation, he explained that his project 'Enhancing Haze Free and Sustainable Land Management' was being implemented in Tachileik, Taunggyi and Nyaung Shwe townships with the agreement of Environmental Conservation Department and under the permission of Shan State Government. The project area of Tachileik District in Golden Triangle area was estimated about 0.9 million acres. It was found out that there were about 619 hotspots during a period of five years from 2018 to 2022. During that period, it was alerted that there were about 16 locations which were burned out every year. Among those areas, 5 locations and nearby 6 villages were selected as the targeted areas in consultation with local forest officers.

FREDA study team visited some places of Tachileik and Mongphyak townships to find out the root causes of forest fire. From this study, it was found out that the main causes of forest fire included that setting fire for hunting, lack of fire systematic fire prevention in rubber plantations and land clearing by fire to make shifting cultivations. He also requested to the participants to add other causes of forest fire if it is necessary.

U Sann Lwin, the chairman of FREDA advised to add one more cause, that was forest fire caused by careless action of passing by people such as throwing cigarette into the forest, leaving the fire after cooking etc.

After that, the participant discussed the targeted villages about the traditional hunting in the forest and agricultural cultivation practices in the project areas.

Item Six

U Soun Htwe, the Secretary of FREDDA explained about the impacts of Transboundary Haze caused by land clearing by fire for shifting cultivation and also the advantages and disadvantages of land clearing by fire for practicing shifting cultivation. He also explained about his experience in Kathar area in relating to zero burning practices in shifting cultivation and how to reduce the practice of shifting cultivation with PowerPoint presentation.

U Nwe Tun Myint, District Officer of Fishery Department said that the local people mainly supported their families by extracting wood and fuel wood from the natural forest and excessive catching the fishes. Even in the fish breeding season in July and August, they are used to catching the fishes resulting decrease of fishes year after year. As they cleared the forest and substituted the oil plantations, the forest ecosystems were damaged and the people will now facing the serious impact of the climate change. He also said that the local people will now facing the impact of Transboundary Haze Pollution caused by forest fire in Tachileik District.

Daw Mya Ohnmar, Staff Officer of the Agriculture Department said that she had given some lectures on Slopping Agriculture Land Techniques 'SALT', making natural fertilizers and forming organic using perennial crops on 21th and 22th June 2023 to support 'Enhancing Haze Free and Sustainable Land Management'.

The workshop was temporary stopped at 12:00 am for lunch break and resumed at 1:00pm.

Item Seven

U Aung Htoo Myaing (Project Manager) explained that we had discussed about four topics as follows;

- (a) Alternative methods of hunting by using more numbers of hunting dogs instead of traditional methods of hunting by setting fire
- (b) Introducing alternative livelihood of livestock breeding using pigs, cows and fishery instead of hunting
- (c) Forming buffer zone between rubber plantations and natural forests
- (d) Introducing a new pattern of setting-fire in different days in advance instead of setting fire at the same time for forming shifting cultivation in order to reduce the intensity of Transboundary Haze. He also requested the participants to discuss more in details.

U Chan Myae Soe, Assistant Director of ECD explained that forest fire occurred due to setting fire for hunting, lack of preventive measures for forest fire in rubber plantations and land clearing by fire for shifting cultivation. He also explained that ECD is now conducting public awareness on reducing Transboundary Haze pollution in many places in the whole country. The ECD had also planned to conduct more public awareness on Transboundary Haze pollution in consultation with Information and Public Relations Department.

U Nay Linn Kyi, Staff Officer of Forest Department explained that although the Forest Department was now forming the community forest more and more, but the practices of shifting cultivation could not be eradicated.

Outside the forest areas, the practices of shifting cultivation should be substituted by introducing perennial orchards as an alternative way of livelihood. He also suggested the perennial species of orchards should be carefully based on the sustainable market.

U Aung Htun (3), Assistant Director of Forest Department in Tachileik District explained that Forest Department was now increasing information of community forests, and if they could manage their community forest systematically according to CF Management plans, the practices land clearing by fire shifting cultivations could be reduced gradually.

The participants from the targeted villages suggested that the perennial crops such as tea leave, coffee and avocado could be planted in the project area, they hoped that the practices of land clearing by fire for shifting cultivations would be reduced enhance the impacts of Transboundary Haze Pollution would be mitigated.

U Tun Tun Oo, Than Lwin Thitsar (NGO) from Nat Pan Nwae villages explained about his experiences in planting macadamia in his fields as a testing due to good markets and also practice of ‘SALT’.

Daw Mya Ohmar from Agriculture Department explained that the success of planting orchards depends on local weather conditions, soil types and properties. Her department was ready to help in soil testing if they sent the soil samples. She also said that she would have the people who were interested to grow coffee, avocado and macadamia to contact with experts. She also explained about the importance of good quality seeds and was ready to demonstrate how to form the ‘SALT’. She also added that it would take one day to train on growing one perennial species.

U Myo Myint, Forest Ranger from Forest Department, Tachileik District explained that if they set the fire for shifting cultivation on April only, there would be dense intensity of Transboundary Haze.

U Sann Lwin, the Chairman of FREDa explained that in some remote ethnic areas, hunting was a traditional habit and not easy to stop those practices. Therefore, it should be cleared first whether the hunting practice was the traditional habits for traditional income. U Nay Linn Kyi, Staff Officer of Forest Department replied that there were Akhar, Lar-hu, Shan ethnics living in the project areas and they were familiar with hand made guns and used to hunting as a traditional habit.

U Aung Htoo Myaing, Project Manager asked about the market situation for selling the dead body of wild animals. The local villagers replied that there was a good market at nearby villages for buying the dead body of wild animals.

U Mg Ba from Site Khout village, Mine Phat township suggested that the hunting practices should be substituted by livestock breeding with draught animals.

Dr Tin Ko, Deputy Director from Live Stock Breeding and Veterinary Department explained that in breeding draught animals, priority should be given to select pure breed rather than domestic one. There is a good market for draught cows and most are sent to Laos for better price. He also suggested that local poultry farming is better than draught breeding.

U Eike Khan from Wan Lone village, Tachileik Township also suggested that hunting practices could be reduced by introducing goat breeding as an alternative livelihood. Dr Tin Ko also suggested that goats breeding is better than cows breeding and in goat breeding, priority should be given to select pure breed rather than domestic one. There is a good market for draught goats and most are sent to Laos for better price. He also explained that as there was African pig disease occurred often in Tachileik District, mass pig breeding should not be encouraged.

The local participants from the project area explained that they were interested in local poultry farming and goat breeding and these alternative livelihoods could change the present livelihood of hunting practices.

Dr Tin Ko explained that traditional hunting by firing could be substituted with hunting using more numbers of hunting dogs. Therefore, we might need to breed more hunting dogs.

He also gave information about the training of poultry farming. He said that it would take about two days for a training course for each animal.

U Myo Myint, Forest Ranger of Forest Department in Tachileik District suggested that the hunting area should be fixed and setting fire for hunting in those areas should be done alternatively in March, April and May in order to reduce the intensity of Transboundary Haze.

The representatives of the villages suggested that the local people were also interested in fishery enhance fishery should be encouraged in order to reduce hunting and practicing shifting cultivation.

U New Tun Myint, District Officer of the Fishery Department explained that there was a good market for selling fishes and they could provide training for fish breeding which will take about two days.

U Myo Myint, Forest Ranger of Forest Department suggested that the Forest Department should conduct a short training on fire prevention and making fire break line and buffer zone in the rubber plantations.

The representatives of the targeted villages also explained that careless firing should be avoided by means of public awareness and watching the people who were going into the forest for fishing and collecting fuel woods especially in the dry periods.

No	The root causes of forest fire	Ways and means to solve the problems
1.	Land clearing by fire for forming shifting cultivation	<ul style="list-style-type: none"> - Formation of community forest - Formation of perennial orchards and - Gap planting ‘no burning, no ploughing’
2.	Setting-fire for hunting	<ul style="list-style-type: none"> -Hunting using more numbers of hunting dogs -Introducing alternative livelihood such as breeding draught animals, poultry farming, goat breeding and fish breeding

		-Control burning in December to reduce fire intensity and smoke
3.	Early burning in private rubber plantations	Formation of buffer zone between rubber plantations and natural forests
4.	Careless action of humans	Providing public awareness and prevented measures

Item Eight

U Aung Htoo Myaing explained that the project established one acre plot of maize plantations with zero burning methods in each Tachileik Township, Taunggyi Township and Nyaung Shwe Township. And then, he compared the advantages and disadvantages for both traditional methods of maize plantations and that of zero burning.

In the case of traditional methods of maize plantations after land clearing by fire

- (a) All the residuals of old maize plantations were used to burned down in order to kill the weeds and getting ash for soil improvements and easy to plough.
- (b) Because of land clearing by fire the soil needs to be ploughed only one time.
- (c) The plantation needs weeding two times.
- (d) The cost of fertilizer is the same as the plantations with zero burning.
- (e) The cost of pesticides and herbicides is the same as the plantations with zero burning.

In the case of maize plantations with zero burning techniques

- (a) After clearing the crop residuals, weeds and climbers, the soil needs to be ploughed by tractor.
- (b) Ploughing needs to be done three times.
- (c) It also requires weeding three times.
- (d) As the crop residuals, weeds, climbers and grasses were being ploughed together, natural fertilizers will be available and chemical fertilizers are not necessary after three years. The cost of pesticides and herbicides is the same as the plantations with zero burning.
- (e) The cost of pesticides and herbicides is the same as the plantations with land clearing by fire.

Daw Mya Ohmar of Agriculture Department added that they had already practiced gap burning ‘no burning, no ploughing’ in Tachileik area and the maize seeds were sown by submerged farming in the gap among the crop residuals, weeds and climbers. She also pointed out that if other crops are sown with these methods, there will be no fire and no Transboundary Haze pollution.

U Aung Tun, Assistant Director of Forest Department said a few words of thanks to FREDa and participants and also requested to include the study of smoke pollution due to cause by large numbers of cars in future.

Item Nine

U San Lwin, the Chairman of FREDA stated in his closing remark that every methodology to be applied should be practicable cost effective and beneficial to the local people, environmentally friendly for sustainable development and also keen interested by the local people. Only if the selected methodology is effective and beneficial to the local people, they will apply it and only if the selected methodology is environmentally, friendly, it will be sustainable land use and development may be sustainable.

Participants list

Appendix – 1

No	Name	Occupation	Department/ Village
1	U Sann Lwin	Chairman	FREDA
2	U Soun Htwe	Secretary	FREDA
3	U Chan Myae Soe	Assistant Director	Environmental Conservation Department, Tachileik District
4	U Aung Tun (3)	Assistant Director	Forest Department, Tachileik District
5	Dr. Tin Ko Ko	Deputy Director	Deputy Director of Animal Husbandry and Veterinary Department
6	U Nwe Htun Myint	Deputy Director	Department of Fishery, Tachileik Township
7	U Nay Lin Kyi	Staff Officer	Forest Department, Tachileik Township
8	Daw Mya Ohnna	Staff Officer	Agriculture Department, Tachileik District
9	U Myo Myint	Range Officer	Forest Department, Tachileik Township
10	U Zin Min Khant	Range Officer	Forest Department, Tachileik Township
11	U Khin Mg San	Deputy Range Officer	Forest Department, Tachileik Township
12	U Sai Mine	Deputy Range Officer	Forest Department, Tachileik Township
13	Daw Nan Kham Htwe	Upper Clark	Forest Department, Tachileik Township
14	U Aung Htoo Myaing	Project Manager	FREDA
15	U Soe Min	Project Assistant	FREDA
16	Ma Phu Thinzar Ko	Computer (Project)	FREDA
17	U Ar Lon	Sergeant	Fire Service Department, Tachileik Township

18	U Zin Ko Tun	Junior Sergeant	Fire Service Department, Tachileik Township
19	U Shae Hla	Villager	Nam Wann Village, Kenglat, Tachileik Township
20	U Maung Ba	Villager	Side Khang Village, Monghpyak Township
21	U Khin Win	Villager	Side Khang Village, Monghpyak Township
22	U Sai Sein Win Tun	Villager	Hsuat Pang Village, Monghpyak Township
23	Daw Ei Lee	Villager	Side Khang Village, Monghpyak Township
24	U Tun Tun Oo	Villager	Hsut Pang Village, Monghpyak Township
25	U Aite Hta	Villager	Wan Lon village Tachileik Township
26	U Kya Shi Dad	Villager	Nam Wann Village, Kenglat Tachileik Township
27	U Sai Mocw	Villager	Wun Lone Village, Tachileik Township
28	U Aike Kham	Villager	Wun Lone Village Tachileik Township
29	U Par Ta	Villager	Wun Lone Village, Tachileik Township
30	U Sai Lon	Villager	Hsut Pang Village, Monghpyak Township
31	U Yaw Han	Villager	Side Khang Village, Monghpyak Township
32	U O Kalis	Villager	Wun Lone Village Tachileik Township
33	U Aiet Kit	Villager	Partaung village Tachileik Township
34	U Sai Maung	Villager	Partaung village Tachileik Township

Activity 12. To establish demonstration plot about 1 acre for sustainable agriculture practice in Tachileik, Taunggyi and Nyaungshwe Township project area.

In the southern Shan State, most of the farmers are used to growing the Maize in many areas. As a traditional practice they are used to firing the residual of the agricultural crops before they ploughed the soil as a preparation for planting new agricultural crops. In order to study the benefit of zero burning plantation technique, about one acre demonstration plot was established in each Tachileik, Taunggyi and Nyaungshwe Township respectively. The project provided the required amount of fund to each farmer to cover the implementation costs of ploughing cost, seeds, fertilizers, pesticides and harvesting cost. The locations of the demonstration plots were shown in shapefiles. FREDA project team had recorded the cost of each operation from land clearing operation to the last harvesting operation in Maize Plantation Establishment. At the time of harvesting each plot produced 850 Viss on the average.

Activity 13: (a) To conduct training on Peatland Integrated fire management (Nyaung Shwe)

Completion report of Peatland integrated fire management training Course

1. Name of training course

Peatland Integrated Fire Management

2. Objectives

To reduce transboundary haze and forest fire in the project area

To share knowledge regarding importance of peatland fire protection and conservation of peatland ecosystem among the key stakeholders including departmental staff, members of Non-governmental Organization and local social organization

3. Implementing organization

Forest Resource Environment Development and Conservation Association (FREDA)

4. Funding Agency

Global Environment Center (GEC), based in Malaysia

5. Venue

Grand Inle Hotel, Nyaungshwe Township, Taunggyi District, Shan State

6. Date and time

19th October 2023 from 09:30 to 15:30

7. Participants

There was a total of 15 participants including trainees from Forest Department, Information and Public Relations Department, Department of Meteorology and Hydrology, Fire Services Department, Maize and Sugarcane Farmers from Taunggyi and Nyaungshwe Townships. The list of trainees was attached in Appendix (1).

8. Resource persons

U San Lwin Chairman, FREDA

U Htay Maung, Retired Director of Forest Department, Central Committee Member of FREDA

U Than Naing, Assistant Director, FD, Shan State

U Ran Naing Oo, Sergeant, Fire Services Department, Nyaungshwe Township

9. Subjects taught

- (a) Basic information about peatland
- (b) ASEAN Guidelines on Peatland Fire Management (part1)
- (c) ASEAN Guidelines on Peatland Fire Management (part2)
- (d) Environmental Conservation and transboundary Haze
- (e) Heritage sites of Myanmar
- (f) Prevention of Forest Fire in Myanmar

The list of resource persons was attached in Appendix (2).

10. Preparation

The Chairman of FREDa sent a letter of request to the Director of the ECD of Shan State to conduct a training course and workshop in Nyaung Shwe township, Shan State. The chairman of FREDa had discussed online with the director of ECD, Shan State regarding to conduct a training course and workshop. FREDa chairman has also prepared with the Director of FD, Shan State, U Than Naing Assistant Director of FD, Shan State, Daw Thae Nu Tun, Assistant Director of ECD, U Pyae Phyo Kyaw, Staff Officer ECD, Shan State, U Min Thiha, the Deputy Officer of the ECD of Shan State, to present Power Points at the workshop. On 17th and 18th October 2023 U Soe Lwin, Forester, Forest Department, Nyaung Shwe Township and Chief Officer (Inlay Lake Watershed Conservation Department) had arranged to distribute the invitation letters to all the participants. On 15th October, 2023, FREDa team left Yangon to Nyaung Shwe by car.

On 17th October 2023, the FREDa team led by the chairman discussed with the Director FD, Shan State and the Director of ECD about the agenda of training and workshop and also the list of participants to be invited.

11. Conducting training course

- (a) Opening ceremony of the training Course

The opening ceremony of the training course was held at the Grand Inle Hotel in Nyaung Shwe Township at 9 am on 19th October 2023. Opening ceremony was attended by 45 participants including Director of the ECD, Shan State, U Than Naing, Assistant Director of Shan State FD, Shan State and other invited officials. U Thein Htay, Director of ECD made an opening speech. And then, U San Lwin, Chairman of FREDa explained about the purpose of training course and the information about the project.

- (b) Lecturing

The training course started at 10:00 am and ended at 3:30 pm. The resource person gave a lecture about one hour and the trainees discussed for about 30 minutes in question-and-answer session. The training schedule is attached as Appendix (3).

(c) Closing Ceremony

The training course ended at 3:30 pm on 19th October 2023 and U San Lwin, Chairman of FREDA, expressed his gratitude to all the participants.

(11) Course supervision

The training was overall supervised by U Htay Maung, retired Director of Forest Department, Central Committee Member of FREDA. U Soe Min and U Aung Htoo Myaing also gave close supervision.

(12) Reviews

(a) The training course was conducted by FREDA officials with experience in peatland fire protection. The course was considered a success because the participants were interested in listening and learning about peatland fire protection due to the presence of peatland in Taunggyi and Nyangshwe townships.

(13) Recommendation

(a) It is also recommended that all the participants of the training should be encouraged by the relevant local departments to share the knowledge gained from the lectures on peatland fire protection in the relevant villages.

Note. Photographs of the training course were already attached.

No	Name	Occupation	Department/ Address
1	U Soe Htet Ko Ko	Survey – 3	Department of Metrology and Hydrology D
2	U Sai Thet Naing	Photographer	Information and Public Relations Department
3	U Soe Lwin	Forester	Forest Department, Nyaung Shwe Township
4	U Ne Win Swe	Forester	Forest Department, Nyaung Shwe Township
5	U Yan Naing Oo	Sergeant	Fire Services Department, Nyaung Shwe Township
6	U Toe Wai Zin	Sergeant	Fire Services Department, Nyaung Shwe Township
7	U Win Naing	Farmer	Nyaungwun Village, Nyaung Shwe Township
8	U Tun Win	Farmer	Zeepin Koung village, Nyaung Shwe Township
9	U Tun Yin	Farmer	Taung Po Gyi village, Nyaung Shwe Township
10	U Myo Win	Farmer	Kanswar village, Nyaung Shwe Township
11	U Nyunt Htay	Farmer	Kyauk Te village, Taunggyi Township
12	Daw Nwe Kyi	Farmer	Kyaukte village, Taunggyi Township
13	U Tin Maung Win	Farmer	Nyaungwun village, Nyaung Shwe Township
14	U Zaw Myo Tun	Farmer	Kyaukte vilkage, Nyaung Shwe Township
15	U San Maung	Farmer	Kyauk village, Nyaung Shwe Township

Sr.	Name	Position	Subject
1	U Sann Lwin	Chairman, FREDA	Basic information of peatland and ASEAN Guidelines on Peatland Fire Management (Part 1)
2	U Htay Maung	Retired Director of FD, Central Committee Member FREDA	ASEAN Guidelines on Peatland Fire Management (Part 2)
3	U Than Naing	Assistant director, Forest Department, Shan State	Integrated Fire Management on Natural
4	U Yan Naing Oo	Sergeant, Fire Services Department, Nyaung Shwe Township	Fire Fighting and Management

Activity 13: (b) To conduct workshop on Root causes of forest fire and mitigative measures in Taunggyi and Nyaung Shwe township

Completion report of workshop on “Root Causes of Forest Fire and Mitigative Measures in Taunggyi and Nyaung Shwe Township”

1. Objectives

- To learn underlying root causes of forest fire
- To find out possible mitigation measures in consultation with local people and key stakeholders
- To share knowledge regarding importance of peatland fire, protection and conservation of peatland ecosystem among the key stakeholders including departmental staff, members of Non-governmental Organizations and local social organizations

2. Implementing Organization

Forest Resource Environment Development and Conservation Association (FREDA)

4. Funding Agency

Global Environment Center (GEC) based in Malaysia

5. Venue

Grand Inle Hotel, Nyaung Shwe township, Taunggyi District, Shan State

6. Date and time

20th October 2023 from 9:30 am to 3:30 pm

7. Participants

There was a total of 28 participants including three participants from Environmental Conservation Department (ECD), five participants from Forest Department, one participant from Agriculture Department, one participant from Department of Metrology and Hydrology, two participants from Fire Services Department, five local farmers from Taunggyi Township, five local farmers from Nyaung Shwe Township and six participants from FREDA. The list of participants was attached as Appendix (1).

7. Conducting Workshop

The workshop was conducted with ten agendas.

Agenda 1

U Soe Min, Project Assistant from FREDA announced the opening of the workshop at 9:30 am.

Agenda 2

U San Lwin, Chairman of FREDA, made an opening speech, focusing on the objectives of the project and purposes of the workshop. The project was conducted with the permission of Shan State Government and in cooperation of Environmental Conservation Department of Shan State by FREDA. The main objectives of this workshop are to study of the agricultural farming after land clearing by burning and new farming method without burning for land clearing. The traditional method of farming with burning has been practiced in Myanmar since many years ago. As land clearing was done by burning, the land was cleared in short time and less cost but the microorganism, valuable bacteria and nutrients were lost due to burning. On the other hand, the fire in that agricultural land may spread to other plantations and forest area, that is why we have to reduce the practice of this traditional method of farming and so we are conducting this workshop inviting key stakeholders relating to the formation of new agriculture and forest plantations.

Agenda 3

A group photo of all participants was taken and refreshment was served to all participants.

Agenda 4

U Aung Htoo Myaing, Project Manager from FREDA, explained about the project and project activities in detail. The project was conducting in Tachileik Township and Mongphyak Township in Tachileik District and also Taunggyi Township and Nyaung Shwe Township in Taunggyi District. The main objectives were to find out the root causes of forest and haze and then to find out the ways and means to reduce them. When we study the root causes of fire, we found out three causes. They are

1. Land clearing by burning for shifting cultivation
2. Burning the forest for hunting
3. Early control burning to protect the private rubber plantations

As the first two causes are due to the traditional practice of local ethnics such as Larhu, Akhar and Shan races are not easy to stop the practices. But we have to find out some alternative livelihoods, providing technical awareness and financial assistance to reduce such practices. As early burning in private rubber plantations were used to spreading to other areas, early control burning should be systematically conducted with great care not to spread to other areas. Therefore, proper guidelines and systematic procedures should be provided to rubber owner of rubber plantations in order to reduce the large-scale forest fire.

Agenda 5

Daw Thae Nu Tun, Assistant Director of ECD, Taunggyi District discussed about the environmental

conservation and transboundary haze pollution. She explained that haze means that dust, smoke, or light vapor causing lack of transparency of the air. Haze was caused by combining various kinds of smoke emitted from vehicles, factories, shifting cultivations and forest fire. Negative impact of haze are respiratory diseases, lung disease (Pneumonia), Trachoma Cancer.

In addition, it also affected climate change by increasing global warming. She also explained that the Environmental Conservation Department is now implementing to reduce the transboundary haze pollution in cooperation with other related departments. She also explained some documentary photos about the study of the air pollution in Shan State with power point presentation.

Agenda 6

U Pyae Phyo Kyaw, Staff Officer of ECD, Taunggyi District shared his experience on his visit to Thailand. He said that he had visited project area in Chiangmai, Thailand and study agricultural land of about 50 acres. He said that the local people are used to practice shifting cultivation instead of permanent farming. Before the project started, they used to grow only one crop and hence their incomes were not good enough to support their families. As their agricultural crops mainly depend on rain water, the production is generally low and their living standard is below the average. After the project started, the socio-economic survey was conducted and introduced mixed cropping practice such as sugar cane and various kinds of beans. The project also introduced method of compost making using residual of sugar cane instead of burning them. The project also introduced alternative livelihood relating to ecotourism and handy crafts. Due to the project intervention for local people good practice agricultural farming throughout the year and their standard of living also became higher. In addition, they could reduce the burning practice and hence the soil fertility was improved and the haze pollution was decrease. U Zaw Myo Tun the farmer of Kyaute village, Taunglaylone Village Tract explained that they have no experience mixed planting of beans together with sugar cane. The chairman of FRED A explained that mixed planting of beans in other agricultural crops good provide Nitrogen into the soil and hence improve the soil fertility in the long term.

Agenda 7

U Min Thiha Aung, Junior Staff Officer of ECD Shan State shared his experience on peatland relating workshop in Indonesia. He said that he had studied about the practice of agriculture at Sepahat village in Indonesia. The peatland was nine hectares in area and the depth of peat soil varied from 0.5 meter to 4 meters. The local people of that village mainly depend on fishery and agricultural livelihoods.

They mainly planted palm oil, rubber, pine apple and sago. According to the nature of the species they planted, they had to dig small ditches and canal in order to make water table lower to some extent. On the other hand, the upper layer of peat soil became dry and easy to get fire. Under this condition the peatland can get

easily fire in dry season and very difficult to put off the fire, and hence transboundary haze occurred in that area. In 2015 the very big peatland fire occurred in Indonesia and many schools, offices etc. were closed. In order to mitigate such problems, the GEC provided fire-fighting training and fire fighter's equipment to the local people in that area. Other companies also provided necessary support to the local people. The project also provided technical and financial assistance in mobile application, preparation, monitoring and firefighting. He also shared his experience on his study of peatland agriculture at Temiang village, Dumai city in Indonesia. He explained that he noticed of mixed plantation of cabbage in rubber plantation. In order to prevent the peatland fire, it is very important to conserve the water content and moisture in the peat soil. And hence the rewetting should be conducted by making canal blocks.

Agenda 8

“Opening discussion on Sustainable Agriculture Practice without Burning and present situation” was conducted among the participants. U Zaw Myo Tun, the Farmer from Kyakte Village, Taunglaylone Village Tract, Taunggyi Township shared his experience that they were planting maize in lines and the soil between the lines were covered with mixed maize residual without burning. This practice could reduce the cost of ploughing and also protected the soil moisture.

U Aung Htoo Myaing, Project Manager explained that this practice of no burning and no ploughing was also applied in Tachileik and Katha areas. Other farmers were also requested to participate in this discussion.

U Thet Khaing, the farmer from Nyaungwun village, Nyaung Shwe Township discussed that they also used maize residual to cover garlic plantation with paddy straw for protection of soil moisture. This practice reduced the cost of irrigation in garlic plantation.

U Aung Htoo Myaing, Project Manager explained that he had learned the sugar cane residual were burnt within one week after harvesting the sugar cane plantation. He also asked if there was any other good practice for clearing sugar cane residual. U Thet Naing explained that if we didn't want to burn the sugar cane residual, we could place these sugar cane residuals in a big earth pit and kept them to form the organic fertilizer. But the cost of digging a pit would be about 160000 Myanmar Kyats for one acre of sugar cane plantation. The main problem is to hire the labor for digging pit and collect the sugar residual in short time. That is why it was not so easy to find another alternative way to stop this practice.

Agenda 9

In addressing the closing speech by the Chairman of FREDa, U Sann Lwin said a few words of thanks to all participants for open and friendly discussion and fruitful suggestions. In fact, this project was to find out possible ways and means to reduce the number of hotspots caused by agriculture and forest fire and hence, to reduce the transboundary haze. Other ASEAN countries were also conducting such kind of project activities in

order to have the same objectives. As all of you know, the people in many countries were facing serious impact of climate change

due to global warming for many years. But this problem cannot be solved effectively. The practice of planting with zero burning was one of the solutions to this global warming and climate change. As it was a good practice, ASEAN countries were encouraged to apply this practice more and more with the technical and financial assistance provided by ASEAN projects. In line with the Asian guidelines, we have to reduce the forest fire and also the transboundary haze pollution. By reducing the number of forest fire, we could reduce the emission of carbon dioxide which was the main cause of global warming. It could also improve the health and socio-economic status of the local people. In conclusion all the participants were requested to do their best for their community development based on the knowledge gained in this workshop.

Agenda 10

The workshop successfully completed at 3:30 pm.

Participants list

Appendix – 1

No	Name	Occupation	Department/ Address
1	U Sann Lwin	Chairman	FREDA
2	U Htay Maung	Retired Director Forest Department	Central Committee Member, FREDA
3	Daw Thae Nu Tun	Assistant Director	Environmental Conservation Department (ECD), Shan State
4	U Zin Ko	Staff Officer	Forest Department, Shan State
5	U Kyaw Zin Maung	Staff Officer	Forest Department, Taunggyi District
6	U Pyae Phyo Kyaw	Staff Officer	ECD, Shan State
7	U Min Thiha	Junior Staff Officer	ECD, Shan State
8	U Aung Aung	Staff Officer	Forest Department, Nyaung Shwe Township
9	U Patrick Mu	Staff Officer	Agriculture Department, Nyaung Shwe Township
10	U Aung Htoo Myaing	Project Manager	FREDA
11	U Soe Min	Project Assistant	FREDA
12	Daw Eider Htet	Computer Expert	FREDA
13	U Tin Maung Tun	Project Assistant	FREDA
14	U Htet Ko Ko	Survey – 3	Department of Metrology and Hydrology, Nyaung Shwe Township
15	U Soe Lwin	Forester	Forest Department, Nyaung Shwe Township
16	U Ne Win Swe	Forester	Forest Department, Nyaung Shwe Township
17	U Yan Naing Oo	Sergeant	Fire Services Department, Nyaung Shwe Township
18	U Toe Wai Zin	Sergeant	Fire Services Department, Nyaung Shwe Township
19	U Tun Win	Farmer	Zeepin Koung village,

			Nyaung Shwe Township
20	U Yan Naing	Farmer	Khaung Tie village, Nyaung Shwe Township
21	U Tun Yin	Farmer	Taung Po Gyi village, Nyaungshwe Township
22	U Myo Wai	Farmer	Lay Thake village, Taunggyi Township
23	U win Khaing	Farmer	Nyaungwun village, Nyaung Shwe Township
24	Daw Nwe Kyi	Farmer	Kyaukte village, Taunggyi Township
25	U Tin Maung Win	Farmer	Nyaungwun village, Nyaung Shwe Township
26	U Zaw Myo Tun	Farmer	Zeepin Kong vilkage, Nyaung Shwe Village
27	U San Maung	Farmer	Kanswar village, Nyaung Shwe Township
28	U Nyunt Htay	Farmer	Kyaukte village, Taunggyi Township

Activity 14. To conduct the analysis cost and benefit between sustainable agriculture practice and traditional agriculture

Completion report of Study on the Strength and Weakness between traditional method of planting with land clearing by burning and sustainable agriculture practice with zero burning

The majority of farmers in Shan State were now forming maize plantations in many parts of Shan State due to stable and good market. Therefore, under the project three demonstration plots of one acre each were established to form maize plantation with zero burning in Taunggyi Township and Nyaung Shwe Township in Taunggyi District and Tachileik Township, Tachileik District in cooperation with local farmers. In each demonstration plot, like traditional method of maize plantation, the same necessary activities such as land clearing and land preparation, application of natural fertilizers and pesticides, weeding and harvesting were conducted according to the work plan. The project staff also recorded the cost of each activity together with the farmers in the project sites. In addition, FRED A conducted a workshop on “Root causes of forest fire and Mitigative measures” on 14th September 2023 in Tachileik Township. FRED A also conducted another workshop on “Root Causes of Forest Fire and Mitigative Measures” on 20th October 2023 in Nyaung Shwe Township, Taunggyi District. This report was prepared based on the information collected from three demonstration plots and two workshops conducted under the project.

(a) Study on Maize plantation of one acre with Zero burning method

Three demonstration plots of maize plantations without zero burning were conducted in cooperation of U Kyaw Myint Oo, the farmer of Taunglaylone Village, Taunggyi Township, Taunggyi District, U Tun Yin, the farmer of Taung Po Gyi Village, Nyaung Shwe Township, Taunggyi District and U Arr Lu, the farmer of Pansili village, Tachileik Township, Tachileik District.

The activities and cost of each activity were mentioned as follow;

No	Activities	Objective	Cost (Myanmar Kyat)
1	Land clearing and Land preparation	To clear the weeds and to mix the earth and weeds	-
a	Ploughing First time	Cleaning and killing weeds and grass and soil improvement	100000
b	Ploughing Second time	Cleaning and killing weeds and grass and soil improvement	100000

c	Ploughing Third	Clearing and killing weeds and grasses and soil improvement	50000
2	Purchase of seeds	-	50000
3	Planting	-	30000
4	Weeding	To protect the pests and disease and to get the maize growth	150000
5	Application of fertilizer	To get the maize growth	70000
6	Harvesting		30000
Total cost (Myanmar Kyat)			650000

According to the above table the total cost of maize plantation was about 650,000 Myanmar kyats per acre. At the time of harvesting each plot produced 850 Viss on the average.

As the prize of maize was about 1,000 kyats per Viss, the farmer got 850,000 Myanmar kyats and his profit was 200,000 kyats per acre. On the other hand, his profit for one acre of maize plantation was about 30.7 percent of his investment. The weakness of this method of planting with zero burning was to plough the soil three times to clear the weeds and grasses. And hence, the cost of ploughing was 150,000 Myanmar Kyats more than the traditional method.

(b) Study on Maize plantation of one acre with Land clearing by burning

The activities and cost of this each activity for land clearing by burning were mentioned as follow;

No	Activities	Objective	Cost (Myanmar Kyat)
1	Land preparation		
A	Construction of fire lines	Not to spread fire to other area	20000
B	Burning	To get Phosphite, soil improvement	50000
C	Ploughing First time	To mix the soil and phosphite	50000
	Ploughing Second time	To mix the soil and phosphite	50000
2	To purchase seeds	-	50000
3	Planting	-	30000

4	Weeding	To protect the pests and disease and to get the maize growth	150000
5	Application of fertilizer (First Time)	To get the maize growth	70000
6	Harvesting		30000
Total cost (Myanmar Kyat)			570000

According to the above table the total cost of maize plantation was about 570,000 Myanmar kyats per acre. At the time of harvesting each plot produced 850 viss on the average.

As the prize of maize was about 1,000 kyats per viss, the farmer got 850,000 Myanmar kyats and his profit was 280,000 kyats per acre. On the other hand, his profit for one acre of maize plantation was about 49.1 percent of his investment. In this method of planting with burning, they have to collect the maize residual for burning and also construct the fire lines not to spread the fire to the other areas. The cause of these activities was only 70,000 kyats.

(c) When compared these two methods of planting, the strength of traditional method of planting with land clearing by burning was less expenditure and more profit. On the other hand, the application of zero burning planting was more costly and less profitable. Under the planting method of zero burning, seeds were sowed and along the ploughing line and the soil between lines were covered by maize residual without burning so that weeds and grasses could not survive under the maize residual. As the soil were covered by maize residual, the soil moisture would be conserved for long time and the soil fertility will be improved two to three years. Similarly, under the method of planting with land clearing by burning all the maize residual, weeds and bushes were burnt and as a result most of the microorganism, valuable bacteria and useful nutrients were lost in burning. And hence more fertilizers have to be applied in two to three years. In favor of sustainable land use and conservation of soil fertility, zero burning planting method should be encouraged by providing public awareness, technical transfer and other necessary assistance.

Suggestion

According to the study it was found that the application of zero burning planting method was costly and less profitable, but soil fertility would be improved in the long run. This method was also one of the solutions to reduce the emission of transboundary haze and enhance reduce the negative impact of transboundary haze pollution for the local community. Therefore, this method of zero burning planting method should be encouraged among the local farmers by means of public awareness, technical training and financial assistance to support smooth and successful application of these zero burning planting methods.