Progress report of the project on "Advancing Cooperation Between Lower Mekong Countries to support governance, transparency and local voices, concerning with Water and Water Related Ecosystem"

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1. PROJECT OVERVIEW/SUMMARY

Program Name:	Advancing Cooperation Between Lower Mekong Countries to support governance, transparency and local voices, concerning with water and Water Related Ecosystem
Activity Start Date and End Date:	Activity 1: Activity Start Date and End Date: 5th October -2022 ~ 15th August -2023 1. Target of monthly Online consultation meeting with 30 National/Local NGOs, CSOs, invited people who live along the river is (12 meeting X 30 participants = 360 participants) 2. Progress of monthly online consultation meeting from 5th October, 2022 to 15th August, 2023 had submitted. 3. Created a network, communicated with NGO, CSO, stakeholders, government organizations with email, and conducted online zoom meeting. 4. Collected information 5. Need assessment, 6. Questionnaire survey, 7. Information sharing for environmental justices, 8. News article writing, 9. Connect regional networks, 10. Participate in Pact's implementation, global lessons learned and best practices on challenges and issues in the region and beyond and 11. Propose concrete policy approaches to address the challenges discussed and proposed policy solutions, strengthening Mekong networks etc
	Activity 2: Four Desk research were done

	1. "Developing and piloting a new tool for measuring waterborne diseases in Mekong, Ayeyarwady, and other rivers to identify hot spots for disease outbreaks, which results in policy recommendations on improved water management" 2. "Impact of the disposal of black water, solid waste and liquid waste into stream and rivers." 3. "Environmental Benefits and Environmental Justices" 4. "Selection of one to two hotspot/ target area to give awareness raising on water related ecosystem, waste disposal, environmental justice, mitigation measure at targeted city/region located at the bank of Aye Yar Waddy river, and field observation, data collection Field observation, Data collection, questionnaire survey at selected sites on Waste disposal, gold mining at stream and river"
	Activity 3: Awareness raising on water related ecosystem, watershed management, Waste disposal, environmental management" at the following six places were done in person. 1.Pathein, Located at The westernmost distributary of the Irrawaddy delta, the Pathein (Bassein) River, 2.Mawlamyaing, located beside the Thanlwin river. 3. Pyay, located beside the Irrawaddy River 4.Magway, located beside the Irrawaddy River 5.Mandalay, located beside the Irrawaddy river. 6. Yangon located beside the Yangon river, easternmost stream of the Irrawaddy delta In person meeting was not able to done at the following two targeted cities due to the current

	situation of Myanmar. However, stakeholders from that places attended the online meetings. 1. Myit Kyi Nar, Kachin State, located beside the Irrawaddy River 2. Homemalin, Sagaing Region located beside the Chindwin River
	Activity 4: Conduct need assessment for environmental justices in Myanmar by holding online consultation. (By Program manager and consultant)
Name of Organization:	Forest Resource Environment Development and Conservation Association (FREDA)
Pact Grant Number:	066-17432
Geographic Coverage (cities and or countries)	Water and water related ecosystem of Ayeyarwddy river, Yangon river, Thanlwin river, Bilin river. The cities along the watercourse buffer and watershed area of these rivers, including Myitkyina, Homelin, Mandalay, Pyay, Magwe, Pathein, Yangon, Mawlamyaing in Myanmar, Lower Mekong Country.
Reporting Period:	From 5th October, 2022 to 15th August, 2023

I.I Project Description/Introduction

*Short and concise introductory section that gives a quick overview of the project, goals/objectives, target beneficiaries, geographical locations, etc. This is a standardized paragraph that can be used in each quarterly report. It should be **BRIEF**, no more than one page.*

1.1 Goal

The goal of the program on "Advancing Cooperation Between Lower Mekong Countries to support governance, transparency and local voices, concerning with

water and Water Related Ecosystem" is to advance cooperation between Lower Mekong Countries, focusing on governance and transparency in public decision making, and development of required policy in water related ecosystem.

1.2 Objectives

The objectives of the program on "Advancing Cooperation Between Lower Mekong Countries to support governance, transparency and local voices, concerning with water and Water Related Ecosystem" are;

1. To create a network and strengthen community voices in water related ecosystem.
2. To develop recommendations to provide environmental justices in water related ecosystem of Myanmar.
3. To connect regional networks and share lessons learned and best practices to develop required policy.

1.3 Activities

Activity 1: Monthly Online consultation meeting with 30 National/Local NGOs, CSOs, invited people who live along the river (Target is twelve times with 360 peoples)

FREDA planned to conduct (12) monthly online meeting with (360) participants. 12 online meeting had done in November, December, 2022 January, February, March, and April, May, July and August, and the participants list is shown at Annex I.

Activity 2: Desk research

The following finding of the desk research were submitted,

1. Desk research finding on "Developing and piloting a new tool for measuring waterborne diseases in Mekong, Ayeyarwady, and other rivers to identify hot spots for disease outbreaks, which results in policy recommendations on improved water management"
2. Documentary research finding on "Impact of the disposal of Black water, solid waste and liquid waste into stream, rivers",
3. Desk research finding on "Environmental benefit and Environmental justices"
4. Desk research findings on "Selection of hotspot/ target area to give awareness raising on water related ecosystem, waste disposal, environmental justice, mitigation measure at targeted city/region located at the bank of Aye Yar Waddy river, and field observation, data collection Field observation, Data collection, questionnaire survey at selected sites on Waste disposal, gold mining at stream and river"

5.

Activity 3: Awareness raising on water related ecosystem, watershed management, Waste disposal, environmental management" was doneat six places out of the eight target city depending on the current situation of Myanmar.

1. Pathein, Located at The westernmost distributary of the Irrawaddy delta, the Pathein (Bassein) River,
2. Mawlamyaing, located beside the Thanlwin river.
3. Pyay, located beside the Irrawaddy River
4. Magway, located beside the Irrawaddy River
5. Mandalay, located beside the Irrawaddy River
6. Yangon located beside the Yangon river, easternmost stream of the Irrawaddy delta

List of participants, who attended in person is shown in Annex II.

Activity 4: Conduct need assessment for environmental justices in Myanmar by holding online consultation. (By Program manager and consultant)

Need assessment were done for environmental justices in waste disposal, use of chemical fertilizer, pesticide, conservation of water related ecosystem at online consultation meeting. program manager asked strategic question to participants, who attended online meeting. the participants and consultant give needs to address issues and threat. issues and required management actions were given at activity implementation progress

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Activity 5: Conduct questionnaire survey for environmental justices, water and water related ecosystem, at online consultation with CSOs, NGO from Myanmar.

Activity 6: Development of op-ed or news article on the recommendations from Myanmar and dissemination to the public.

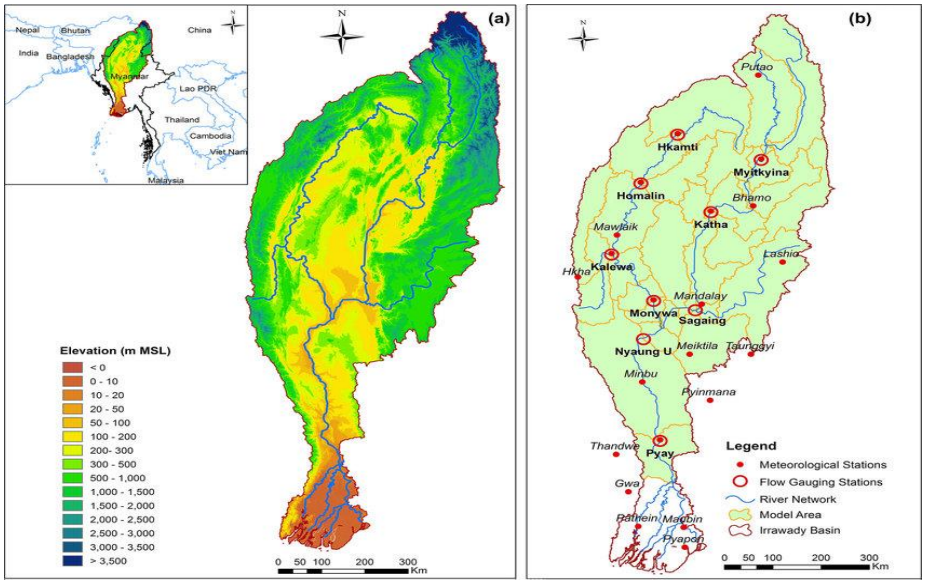
Activity 7: Workshop participation

1.4 Target Beneficiaries

Target beneficiaries are the people who live along the water related ecosystem of Ayeyarwaddy/ Irrawaddy river Basin, Thanlwin/ Salween River Basin, Yangon river, Bilin river. NGOs, CSO who have the experiences in addressing the issues found in water related ecosystem participated in the program.

The total population in the Ayeyarwaddy/ Irrawaddy river Basin -ARB was estimated at 39.5 million people in 2015, with about 1.9 million in Yunnan, 2.8 million in India and 35 million in Myanmar– making up about 66% of that country's total population. The population is concentrated in the agricultural heartlands of the basin, the Dry Zone and the Delta region. (Tarek Ketelsen-2017)

The Thanlwin River runs through Myanmar, China, Tibet and Thailand and creates a basin 271,914 square kilometres in length, on which about 10 million people rely(Eleven -2016).



Map of Ayeyarwaddy/ Irrawaddy river Basin

Map of [Thanlwin/ Salween River Basin]

2. ACTIVITY IMPLEMENTATION PROGRESS

2.1 Progress Narrative

This brief narrative (1 or 2 pages) should highlight key achievements and whether the program is on/off track as far as work plan/targets in terms of (1) overall program progress for year and (2) the current reporting period (quarter).

2.1.1: Monthly Online consultation meeting with National/Local NGOs, CSOs, invited people who live along the river (Targeted Twelve times with 360 peoples) were held on November, December 2022, January, February, March, April, May, July, August 2023.

2.1.11 FREDA applied permission to implement the project to Environmental conservation department- ECD, in October, 2022. ECD recommended to change the location site for awareness raising from Kachin state and Sagaing region due to the security. ECD advice to apply approval from ministry directly. So FREDA applied the approval to implement the project from ministry on 16-1-2022. Union minister agreed and give remarks to forest department and environmental conservation department to help FREDA on 1st February, 2023.Moreover, FREDA had to applied State and Regional governments, Environmental Conservation Department for their approval to conduct in person meetings.

2.2 Implementation Status

This should consist of a narrative of activities implemented per Intermediate Result Area, and include what was planned versus what was actually achieved.

Activity 1: Monthly Online consultation meeting with 30 National/Local NGOs, CSOs, invited people who live along the river (Twelve times with 360 peoples)

Monthly online consultation meeting was planned to conduct for twelve times from October, 2022 to August, 2023, and targeted with 360 peoples. All targeted 12 times was conducted, and 342 participants attended, including 172 male, and 170 female.

In person meeting target participants number is 120. (156 participants attended including 99 male and 57 female.

Sr	Meeting type	Target participants number	Actual attended number	Attended male	Attended Female
1	Online meeting	360	342	172	170
2	In Person meeting	120	156	99	57
	Total	480	498	271	227

In total, target number of participants online meeting and in person meeting is 480, and actual attended number is 498, including 271 male and 227 female.

1. The list of participants is shown in Annex I

Sr	Name of Meeting	Date	Result		
			Participants	Male	Female
1	1st online consultation meeting	November 28, 2022	14	10	4
2	2nd online consultation meeting	December 28, 2022	22	7	15
3	3rd online consultation meeting	January 25, 2023	38	15	23
4	4th online consultation meeting	February 27, 2023	27	12	15
5	5th online consultation meeting	March 29, 2023	31	23	8
6	6th online consultation meeting	April 21, 2023	33	14	19
7	7th online consultation meeting	May 29, 2023	38	26	12
8	8th online consultation meeting	July 14, 2023	37	15	22
9	9th online consultation meeting	July 21, 2023	27	9	18
10	10th online consultation meeting	July 26, 2023	19	14	5
11	11th online consultation meeting	August 11, 2023	35	17	18
12	12th online consultation meeting	August 14, 2023	21	10	11
		Total	342	172	170

2.2.1 Summary of the discussions and recommendations on the impact of chemical fertilizer

2.2.1.1 Polluter Pay Principle

Every person and citizen living in Myanmar has the right to access a clean and healthy environment, and the duty to protect the environment. It is recommended to conduct stakeholder identification and promote stakeholder engagement to protect the water and water related ecosystem. Pollution and waste are to be avoided and minimized at the source as more cost effective

than remediation, enterprises, who use chemical fertilizer, and they will be encouraged to adopt clean production principles and best practices. In Myanmar, the Environmental Conservation Law (ECL) was enacted in 2012. The ECL section 34, provides for the polluter pays principle and requires polluters to pay compensation for environmental damage caused by their activities.

It needs to introduce Cleaner Production in agriculture, for example, farmers need to apply multi-strategy on environmental conservation to processes, products and services to improve the use of resource efficiently, minimize waste, polluted water and emissions and conserve the healthy nature and human environment. Polluter pay principle should be applied in the over use of chemical fertilizer at rental land for tissue banana, water melon, honey due melon, tomato production at the floating garden agricultural system of the Inle lake (Myanmar). Local voices include **"**introduction of environment pricing based on the "polluter pays" principle". In Kachin State, the tissue-culture banana is being grown in Myitkyina, Waingmaw, Moemauk, Shwegu and Bahmaw Townships. According to the latest record from social organizations, there are about 150,000 acres of tissue-culture banana plantations in Kachin State. The impact of the over dose of chemical fertilizer at banana, water melon need to be addressed. Soil friability is caused by the use of chemical fertilizer. It take long time to recover. If it occurs, it is difficult to restore. In Kachin state and Sagaing region, soil friability effect is found at tissue banana cultivation, because they use huge amount of chemical fertilizer. Kachin state, Department of Agriculture discussed that Chinese came to Myanmar, and rent land for five years for tissue culture banana cultivation. Chemical fertilizer and pesticide are imported from China. Myanmar workers have job opportunity. Department of Agriculture organized to issue official registration of chemical fertilizer and pesticide, imported from China. Department of Agriculture check, monitoring and evaluation on chemical fertilizer and pesticide, moreover department of agriculture adopt good agricultural practice. So, environment could be controlled more than past. Chinese rent land from farmer with Ks 300000/acre- Ks to Ks 400000/acre- to grow water melon and honeydew melon in Sagaing region. Farmer get rental fee more income than the income from agriculture by themselves. So, farmers search for Chinese to rent their

land. Chinese cover land with thin plastic to control weeds. They mix with chemical fertilizer and water and pour into drain in water melon and honey dew melon plantation. After one to three years, productivity drop. After three years, banana productivity drop. Plastic is also used at banana inflorescence. Minister from Kachin state recommended to do assessment on tissue banana plantation, research paper had submitted. In accordance with the instruction from government, tissue banana cultivation is controlled not to expand. Plastic sheet were used to cover the land to control weed, and they were left in rental land, and plastic pollute soil.

Lack of environmental justice, economic justice is also a threat on environment, in using chemical fertilizer at rental land to cultivate tissue banana, water melon, and honey dew melon. The Ministry shall, under the guidance of the Committee, maintain a comprehensive monitoring system and implement by itself or in co-ordination with relevant Government departments and organizations in the use of agro-chemicals which cause to impact on the environment significantly (Environmental conservation Law, section 13(a))

2.2.1.2 GDP vs Pollution

Gross domestic product is a measurement that seeks to capture a country's economic output. Countries with larger GDPs will have a greater amount of goods and services generated within them, and will generally have a higher standard of living. For this reason, many citizens and political leaders see GDP growth as an important measure of national success, often referring to GDP growth and economic growth interchangeably. Economic growth can lead to increased pollution, it is not always the case. According to a recent study by the World Bank, global GDP per capita increased by half between 1990 and 2016, while global trends for air pollution (as measured by levels of PM2.5) followed a similar upward trajectory. However, this does not mean that economic growth is always accompanied by environmental degradation. For instance, Norway’s economic growth has been matched with significant reductions in levels of PM2.5. Another study conducted in China found that economic growth increases environmental pollution emissions, which intensifies as well as inhibits economic growth. So, impact of GDP depends on various factors such as regional status, policies, and regulations.

GDP of Some ASEAN country 2020-2021

	Country	GDP in USD Dollars
1.	Indonesia	$ 3,328 billions USD
2.	Thailand	$ 1,261 billions USD
3.	Vietnam	$ 1,047 billions USD
4.	Philippines	$ 988 billions USD
5.	Malaysia	$ 328 billions USD
6.	Myanmar	$ 65 billions USD
7.	Cambodia	$ 27 billions USD
8.	Lao PDR	$ 19 billions USD

2.2.1.3 **Emission Guideline, Effluent Level**

National Environmental Quality Emission Guidelines (2015) provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety or the environment. Industry-specific guidelines summarized hereinafter shall be applied by all projects, where applicable, to ensure that effluent emissions conform to good industry practice. This guideline applies to large-scale commercial plantation crops, including banana, citrus, sugarcane, olives, palm oil, coffee, and cacao. Crop production covers soil preparation, sowing or planting, crop husbandry, harvest, and post-harvest operations. The guideline does not include the processing of raw materials into semi-finished or finished products. Myanmar got the lesson learnt from tissue banana, water melon, honey dew melon at rental land to Chinese in Kachin State and Sagaing region. Participants discussed to mitigate the impact of the over dose of chemical fertilizer at banana, water melon, honey dew melon. Large-scale commercial

plantation crops need to ensure that effluent emissions conform to following prescribed Effluent Level;

Parameter	Unit	Maximum Concentration
Arsenic	mg/l	0.1
Biological oxygen demand	mg/l	30
Cadmium	mg/l	0.1
Chemical oxygen demand	mg/l	125
Heavy metals (total)	mg/l	10
Lead	mg/l	0.1
Mercury	mg/l	0.01
pH	S.U.[a]	6-9
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total organochlorine pesticides	mg/l	0.1
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

[a] Standard unit

2.2.1.4 Weakness in the over use of chemical fertilizer, pesticide and mitigation measure

Farmers have to use chemical fertilizer to produce food for the people, and changes in consumption patterns of the people. Farmers have to use chemical fertilizer due to erosion of fertile top soil by wind or water, soil degradation, soil health problem, soil fertility issues, nutrient deficiency, expansion and intensification of irrigated agriculture are the causes to use chemical fertilizer in the agricultural lands. Farmers have to use pesticide due to the increase in the population of pests and disease, climate change, monoculture farming, biodiversity loss, acreage of agricultural land, crop yield, need to protect the crop from pest and disease, insecticide resistance in the agricultural crop, and decrease in the population of natural predators and parasites that keep pests in check.

Mitigation measures refer to the reduction of the impact of over use of chemical fertilizer, pesticide, harmful or the reduction of its harmful effects. Mitigation measures are to be taken to reduce the harmful effects of hazards

that remain in potential or to manage harmful incidents that have already occurred in agricultural land. Mitigation measures include policies concerning food and agriculture, and land use that will reduce eutrophication, dead zone, nitrate poisoning, surface water pollution, ground water pollution, non-point source pollution, etc. Threat mitigation measures are strategies used to reduce threats or risks to soil, water, biodiversity, soil microorganism, etc. These strategies can be used to identify, assess, evaluate and monitor risks and any accompanying consequences. There are different types of threats that require different mitigation measures. For example, insider threat mitigation involves defining, detecting and identifying, assessing and managing the threat. Another example is risk mitigation strategies which can help mitigate risks associated with the use of chemical fertilizer and pesticide.

Mitigation measures to reduce the impact of the over use of chemical fertilizer are carrying out soil test before using chemical fertilizer, finding out the nutrient deficiency in the agricultural land, and choosing right kind and right amount of chemical fertilizer to be applied, reducing the amount of the use of chemical fertilizer to avoid the over use of chemical fertilizer, producing compost, organic fertilizer from food waste, kitchen waste, leaves, twigs from home garden, cow dung, animal waste, practicing zero burning, good agricultural practice, conservation agriculture, application of agroecology which can reduce impact on environment, and mix use of organic fertilizer and chemical fertilizer.

Mitigation measures to reduce the impact of the pesticide are;

1. Ban some of the older, cheaper pesticides which can remain in the soil and water for years.
2. Law enforcement ;2016 Myanmar Pesticide
3. Ban (55) kinds of pesticide in Myanmar in accordance with the notification 2/2022
4. Registers pesticides after stringent, science-based evaluation that ensures any risks are acceptable
5. Re-evaluates the pesticides currently on the market on a 15 year cycle to ensure the products meet current scientific standards
6. Promotes sustainable pest management
7. Conducts ecological risk assessments to determine whether changes to the use or proposed use of a pesticide are necessary. Before allowing pesticide products to be sold on the market, they

ensure that the pesticide will not pose any unreasonable risks to plants, wildlife, or the environment.

8. Evaluate every active substance for safety before it reaches the market in a product. Substances must be proven safe for people's health, including their residues in food and effects on animal health and the environment.
9. Adopt the following suggested strategies :

    1) Reduce risk of pesticide transport to surface or ground water
    2) Decrease amount of pesticide used
    3) Reduce the persistence or mobility of the active ingredients

10. Apply BMPs (Best Management Practices) that reduce runoff or soil erosion or increase soil organic matter content, help reduce pesticide transport as well. BMPs include:

    1) riparian buffers
    2) crop rotation
    3) contour farming
    4) strip cropping
    5) reduced tillage or zero tillage systems (herbicide use usually increases with reduced tillage which may off set the pesticide-related benefits of the reduction in runoff associated with this practice)

11. Apply proper pesticide storage practices; Locking pesticides inside a fire resistant, spill proof storage system is the best way to prevent accidental spills. It is also very cheap compared to the consequences that can be very expensive to clean up such as accidents, spills, or fires.
12. Prevent pesticide contamination by selecting the appropriate pesticides, proper pesticide mixing, and loading procedures. Preparation of seedbeds and planting allows crops to emerge quickly, potentially reducing early season disease and insect damage that reduces the amount of pesticides needed.

13. Properly dispose the pesticide containers because contaminated containers exposed to rain can leak pesticides into the environment.
14. Apply biological pest control

2.2.1.5 Lesson learnt from Inlay lake

According to a study on Integrated Water Resources Management in Myanmar, Inlay Lake can be characterized as the nutrient concentration, show mesotrophic to semi-eutrophic conditions. Mesotrophic refers to a body of water that has a moderate amount of dissolved nutrients. It is an intermediate level of productivity in terms of aquatic animal and plant life and shows emerging signs of water quality problems. Eutrophication is the process by which an entire body of water, or parts of it, becomes progressively enriched with minerals and nutrients, particularly nitrogen and phosphorus. Water bodies with moderate nutrient levels are termed mesotrophic. Inlay lake, one of the ASEAN heritage park, UNESCO's man and biosphere reserve, also have water pollution. Inlay lake is the largest hydroponics farming zone in the world. The sediment of floating island cannot provide enough nutrients to grow the tomato for such large area. Farmers have to rely on lots of chemical fertilizers and pesticides to ensure their production and income. The overdose of chemical fertilizer and pesticide in the hydroponics farming zone causes the serious eutrophication on the lake, destroys the local ecology and makes less fishing catch figure. Studies of Inle Lake's surface water quality indicate that the water is not safe for consumption. The lake's dissolved oxygen ranges are lower than those necessary for fisheries and aquatic life, while nitrite, nitrate and phosphate ranges are unusually high. According to the study on the "Assessment of Water Quality of Inle Lake and Four Main Streams Flowing into Inle Lake, in Myanmar, "the results of Phosphors ranges 3.3 to 6.8 mg/l at 8 stations. But second- and third-time results are less than 0.2 mg/l First time result of Arsenic at station 3 and 8 are 0.05mg/l over the standard limit and second and third results of all station is below the limit. Second time and third result of Manganese at station 4 and 8 are 0.46 and 0.42mg/l and

first and third results of station 6 are 0.5 mg/l over the standard limit. Other stations are below the limit. In this study, the results of nitrate nitrogen are between 0.02mg/L and 11 mg/l in lake and less than 2.6 mg/L at the main stream stations. Total Coliform is primary indicator of suitability for consumption of drinking water. The result of most of station in lake are greater than 1100 MPL/100ML except station2. The study area is one of the most valuable existences in Myanmar and it is therefore important to monitor and manage the water quality. From field surveys and water quality results, the levels of arsenic, manganese and phosphorus were above the permissible limit at some stations. According to the water level measuring records, the water depths of the lake are lowering over time and it increases the turbidity of the water. This raises the main point to consider the question on how to control sedimentation in the lake. Another observation is that most villages had sanitary waste water systems (bio-tech), but some villages had poor sanitary waste water systems. At the most stations in lake, total coliform count was found more than 1100 MPN/100 mL. The immediate attention should also be paid on the problems of the construction and management of floating gardens if the open lake area and water quality are to be preserved. Due to many factors the water quality of Inle Lake is changing and it should be checked seasonally and spatially. Concluding, the continuous monitoring of the Inle Lake is required in the district to protect the water quality in the future from any possible contamination due to population growth, increasing industrialization and agricultural practices, etc. Water quality of Inle lake are one of the primary issues to be considered in the long-term integrated water management system for the Inle basin.

2.2.1.6 Best management practice at Indawgyi wildlife sanctuary,

According to a “Study on the Water Quality of Indawgyi Lake Affected by Surroundings”, it was concluded that the Indawgyi lake was urgently needed to sustain the long-life existence and its water qualities due to the findings of some physicochemical, biological, toxic and pathogenic affects produced by the surroundings. It need to apply “the best management practice of Flora Fauna International, who is trying to substitute organic fertilizer at Indawgyi lake, wildlife sanctuary, Myanmar, to prevent from eutrophication and dead

zone. The main threats to Indawgyi Lake is pollution caused by gold mining and the lack of waste management and sanitation, as well as the recent introduction of chemical fertilizers and pesticides in the paddy fields surrounding the lake".

Flora and Fauna International (FFI) has been working with local community groups as well as relevant government departments in the Indawgyi Lake basin to protect critically important wetlands and surrounding watershed forests. They aim to conserve Indawgyi biodiversity and related wetland and watershed forests. They promote collaborative management and ecosystem services approaches to achieve effective biodiversity conservation, improved livelihoods, sustainable natural resource use and improved sanitation. Natural resources and livelihoods are secured for the local population in Indawgyi Biosphere Reserve, based on clear access rights to forests and fisheries and sustainable land and forest management. FFI is supporting sustainable community livelihoods through the establishment of community forestry and agroforestry, provision of fuel-efficient stoves and the introduction of organic farming practices. Since 2012, more than 25 community forestry groups have been established and at least 50% of all households use firewood-saving stoves. FFI also supports a small grants programme for local fishing communities to initiate alternative livelihoods and community-based ecotourism. According to FFI's website, they are working with local communities to introduce organic farming practices as part of their sustainable livelihoods program. Additionally, FFI is providing technical advice to the lake management authorities on how to work alongside these grassroots organizations and tackle the many mounting threats to Indawgyi's natural resources.

2.2.1.7 **Arsenic content in rice from Irrawaddy region**,

Arsenic is a toxic trace element that can be found naturally in the environment. It is divided into two groups, organic and inorganic arsenic, with inorganic arsenic being more toxic. Rice may accumulate a significant amount of inorganic arsenic from the environment for a number of reasons:

Arsenic is present in water, soil, and rocks, but its levels may be higher in some areas than others. Paddy rice is particularly susceptible to arsenic contamination because it is grown in flooded fields (paddy fields) that require high quantities of irrigation water. In many areas, this irrigation water may contain high levels of arsenic. Arsenic may accumulate in the soil of paddy fields, worsening the problem. In some parts of the world, farming chemicals that were previously used in rice fields contain arsenic.

Arsenic contamination of groundwater is a form of groundwater pollution which is often due to naturally occurring high concentrations of arsenic in deeper levels of groundwater. It is a high-profile problem due to the use of deep tube wells for water supply, Mining, industrial work, energy production and farming can also cause high levels of arsenic in nearby areas. Arsenic is a naturally occurring element that can be found in soil and water. Rice is known to accumulate arsenic more than other cereals because it is grown in flooded fields that require high quantities of irrigation water. In many areas, this irrigation water is contaminated with arsenic. Arsenic may also accumulate in the soil of paddy fields, worsening the problem.

According to a study conducted by the United States Department of Agriculture (USDA), the inorganic arsenic content in rice grain is a significant public health concern. Irrigation management practices, such as alternate wetting and drying (AWD), as well as genotypic differences between cultivars, have been shown to influence arsenic accumulation in rice grain.

Inorganic arsenic (iAs) is of particular concern because it has increased toxicity as compared to organic As. A 2-year field study using a Lemont × TeQing backcross introgression line (TIL) mapping population examined the impact of genotype and AWD severity on iAs grain concentrations. The "Safe"-AWD [35–40% soil volumetric water content (VWC)] treatment did not reduce grain iAs levels, whereas the more severe AWD30 (25–30% VWC) consistently reduced iAs concentrations across all genotypes. The TILs displayed a range of iAs concentrations by genotype, from less than 10 to up to 46 μg kg –1 under AWD30 and from 28 to 104 μg kg –1 under Safe-AWD. TIL grain iAs concentrations for flood treatments across both years ranged from 26 to 127 μg kg –1.

When rice is grown in soil contaminated with arsenic, it absorbs the element through its roots and accumulates it in the grain. The outer bran layer surrounding the endosperm of rice grains contains more arsenic than white rice . This means that brown rice (unmilled or unpolished rice that retains its bran) contains more arsenic than white rice. However, this milling process removes arsenic from white rice but also removes 75-90% of its nutrients .To reduce the amount of

arsenic present in rice, washing and cooking rice with plenty of clean water can help. This method works for both white and brown rice, with one study showing it has the potential to remove up to 57% of the toxic element. To reduce the arsenic in your rice, first give it a good rinse. Place the grains in a fine mesh strainer and pour water over them until it runs clear. Cook the rice in excess water, at a ratio of one cup of rice to six cups of water, and drain any extra leftover once the grains are tender.

2.2.1.8 Eutrophication And Dead Zone

Concentration of Chemical fertilizer in water can cause eutrophication and dead zone. Some algae like blue green algae produce toxic. Mass formation of Algae bloom is found near Maw Tin Soon, Ayeyarwaddy region, and Ann, Arkan state. Three types of algae, Brown, blue, green algae.60% of algae produce toxin, which have effect on kidney, liver. Yezin dam become higher content of nitrogen and potassium, and eutrophication can occur.

Over the years, human pressure on the lake has increased considerably, causing problems mainly related to waste discharge from households and touristic accommodations, and to the use of chemical products for cultivation on and around the lake. The Global Community Service Foundation is committed to that goal. They are helping the Intha people establish environmentally friendly methods of gardening and decrease the amount of chemical and human pollutants in the lake. The overdose of chemical fertilizer and pesticide in the hydroponics farming zone causes the serious eutrophication on the lake, destroys the local ecology and makes less fishing catch figure. The impact of over use of chemical fertilizer were degradation of soil and productivity, soil friability effect, surface water pollution, ground water pollution, decrease in the population of earthworms, soil microorganism, blue baby syndrome.

Dead zones are low-oxygen, or hypoxic, areas in the world's oceans and lakes. Because most organisms need oxygen to live, few organisms can survive in hypoxic conditions. That is why these areas are called dead zones. Dead zones occur because of a process called eutrophication, which happens when a body of water gets too many nutrients, such as phosphorus and nitrogen. At normal levels, these nutrients feed the growth of an organism called cyanobacteria, or

blue-green algae. With too many nutrients, however, cyanobacteria grows out of control, which can be harmful. Human activities are the main cause of these excess nutrients being washed into the ocean. For this reason, dead zones are often located near inhabited coastlines.

In Myanmar, some shrimp and fish breeding ponds, Taung tha man inn (wetland near Mandalay, had ever suffer from low dissolved oxygen, due to over feeding or disposal of waste, and fish had ever died with suffocation. Suffocation, dead zones and low dissolved oxygen are some of the most common causes of fish kills in ponds. Most dissolved oxygen is produced by algae and aquatic plants through photosynthesis. A lesser but also important source of oxygen in water is diffusion from the atmosphere, which is enhanced by wind-induced surface water turbulence. During the night, oxygen is consumed for respiration by plants and animals, and by bacteria during decomposition of organic material. When more oxygen is consumed than is produced, oxygen levels can be depleted, which can lead to fish kills. Ponds suitable for supporting fish should have a minimum pre-dawn oxygen level that is close to optimal levels required by the fish. Warmwater fish require oxygen levels of 5 ppm (parts per million) and cold water require levels of around 6.5 ppm to maintain good health.

2.2.1.9 Law enforcement, rule of law vs lenient law enforcement,

The rule of law is a fundamental principle that ensures that all individuals and entities are subject to the law, regardless of their status or position. It is a cornerstone of democratic societies and helps to ensure that justice is served fairly and impartially.

The laws relating to environment are Environmental Conservation Law(2102), Pesticide law(1990), Myanmar Fertilizer Law (No. 7/2002), Consumer Protection Law(2019), Yangon City Development Committee Law, (2018), etc.

When it comes to law enforcement, there is often a tradeoff between strict adherence to the rule of law and lenient law enforcement. While lenient law enforcement may be more flexible and adaptable, it can also lead to abuses of power and corruption. On the other hand, strict adherence to the rule of law can

help to ensure that justice is served fairly and impartially, but it can also be inflexible and slow to adapt to changing circumstances .

In Myanmar, the Pesticide Law was enacted in 1990 as state law, which established the general system on pesticide registration and business licensing [3]. The law defines "pest" as insects, arachnids, and organisms causing plant diseases that interfere with or destroy crops, food, human beings, animals and other things. It also includes destructive interfering rodents, moles, snails and weeds. The Pesticide Law requires all foreign and domestic companies looking to have their agricultural or household pest control products imported into Myanmar to provide the products' complete formulas and lists of active ingredients to the Pesticide Registration Board (PRB) and apply for a pesticide registration certificate.

In conclusion, while lenient law enforcement may be more flexible and adaptable, it can also lead to abuses of power and corruption. Strict adherence to the rule of law can help ensure that justice is served fairly and impartially. The Pesticide Law in Myanmar provides a general system on pesticide registration and business licensing. All foreign and domestic companies looking to import pest control products into Myanmar must apply for a pesticide registration certificate from the PRB.

2.2.1.10 Water quality test,

Sagaing Region Environmental Conservation Department discussed that monthly water quality test is done at the cities along the Chindwin river, which is a largest tributary rive of Irrawaddy river. Temperature, pH, Oxidation-reduction potential-ORP, Dissolved oxygen (DO) **(**a measure of how much oxygen is dissolved in the water - the amount of oxygen available to living aquatic organisms), TDS-(TDS stands for total dissolved solids**.** Some of the substances in water that might contribute to TDS include organic and inorganic salts, minerals (dissolved calcium, magnesium, potassium, etc.), water treatment chemicals, and heavy metals), and turbidity. Forest Research Institute- Yezin has water lab.

2.2.1.11 Soil test

The issue we discussed in meeting is that the farmers from Myanmar use chemical fertilizer without making soil test before applying chemical fertilizer

in their agricultural land. Farmers do not know nutrient deficiency in their agricultural land. Use of chemical fertilizer without making soil test can cause environmental impact, such as water pollution, eutrophication, dead zone, nitrate leaching, hard pan, under ground water pollution, and so on.

2.2.1.12 Ecosystem engineers, Earthworm, soil health and Over use of chemical fertilizer, pesticide

A farmer warned in meeting concerning with soil degradation, reduce in population number of soil microorganism, earthworm, increase in number of insects, pathogen, pests, snail which destroy rice. According to the discussion of a rice farmer from Hmawbi township, Yangon region, Myanmar, the excessive use of chemical fertilizers, and pesticide, reduce the population of all the microorganisms available naturally in the soil and which are highly essential for maintaining the soil heath. Chemical fertilizer can kill earthworms, ecosystem engineer, and soil microorganisms. Over use of chemical fertilizer can affect the health of humans, livestock and local biodiversity, including people. To address this issue, promote earthworm culture or vermiculture. Vermiculture is the culture of earthworms. It is a beneficial way of improving the fertility of the plant and soil. Vermiculture mainly focuses on the breeding of worms so as to increase their population. Vermicompost is then prepared to promote the growth and development of crops.

2.2.2 Summary of the discussions and recommendations on the impact of pesticide.

2.2.2.1 Use of young labor in spraying pesticide in agricultural land,

All child needs relevant right and protection for their health in use of pesticide according to the Law on the Rights of the Child, 2019.

Need to establish national policies for the elimination of child labor as Myanmar had signed up to the International Conventions on minimum age.

Young labor do not take care in handling hazardous waste, disposal of pesticide in nearest water body.

Need to conduct “Pesticide Safety Education Programs (PSEPs) for the education and training of certified pesticide applicators”

Young labor does not understand the prescription in Chinese and Thai language mentioned in container.

Pesticide registrants need to translate their product labels into Myanmar language. written on container. Ban import of pesticide which does not have labels written in local language.

Carelessness of handling pesticide,

Conduct training to wear Personal Protective Equipment -PPE.

A farmer recommended to use drone for spraying pesticide and to replace human including child labor. However, the problem is current political situation, unstable situation, civil war in Myanmar prevent the use of drone officially.

Apply proper pesticide storage practices; Locking pesticides inside a fire resistant, spill proof storage system is the best way to prevent accidental spills. It is also very cheap compared to the consequences that can be very expensive to clean up such as accidents, spills, or fires.

2.2.2.2 Import and selling of banned pesticide illegally,

Check at border trade area, market, promote law enforcement and rule of law. Cooperation with custom, agriculturalist, environmentalist, informer to control illegal import and selling of banned pesticide. Ban some of the older, cheaper pesticides which can remain in the soil and water for many years. Promote rule of law, Law enforcement with 2016 Myanmar Pesticide Law enforcement. Unknown language used in pesticide label, safety method in handling pesticide written in unknown language are relating with the impact of pesticide at Inlay lake, economic injustice, environmental injustice, death of fresh water fish, especially at paddy field of Bago region and Ayeyarwaddy region, and use of pesticide in rice fish cultivation system. Registers pesticides after stringent, science-based evaluation that ensures any risks are acceptable. Re-evaluates the pesticides currently on the market on a 15-year cycle to ensure the products meet current scientific standards. label of pesticide.

2.2.2.3 Promotes sustainable pest management

Sustainable pest management is required to address issue on "Ignorance of the pre-harvest interval after pesticide application due to weak economic justice, harvesting crop with one day after the use of pesticide, food poisoning due to ignorance of the pre-harvest interval after pesticide application, use of pesticide to preserve crop before the crop arrive to market, economic justice in food and vegetable production, effect of pesticide, recovery period/ duration/ of pesticides, safety period after the use of pesticide, food consumer right, Casualties in using pesticide at agricultural land, rubber plantation, etc. According to the lesson learnt from water pollution at Inlay lake due to the excessive usage of Aldrin, a kind of organochlorine pesticide and DDT, it is learnt that sustainable pest management is required. The Sustainable Pest Management (SPM) practice should be adopted to accelerate the transition away from high-risk pesticides toward adoption of safer, sustainable pest control practices. It needs to develop and adopt sustainable pest management as "a process of continual improvement that integrates an array of practices and products aimed at creating healthy, resilient ecosystems, farms, communities, cities, landscapes, homes, and gardens."

Conducts ecological risk assessments to determine whether changes to the use or proposed use of a pesticide are necessary. Before allowing pesticide products to be sold on the market, they ensure that the pesticide will not pose any unreasonable risks to plants, wildlife, or the environment.
Evaluate every active substance for safety before it reaches the market in a product. Substances must be proven safe for people's health, including their residues in food and effects on animal health and the environment.
Adopt the following suggested strategies :

1. reducing risk of pesticide transport to surface or ground water
2. decreasing amount of pesticide used
3. reducing the persistence or mobility of the active ingredients

2.2.2.4 **Pesticide Poisoning in Myanmar**,

Toxic to humans and can have both acute and chronic health effects, depending on the quantity and the ways in which a person is exposed,

Organophosphates and carbamates which affect the nervous system. Others may irritate the skin or eyes, some pesticides may be carcinogens (cancer causing). Others may affect the hormone or endocrine system in the body. Prevent pesticide contamination by selecting the appropriate pesticides, proper pesticide mixing, and loading procedures. Preparation of seedbeds and planting allows crops to emerge quickly, potentially reducing early season disease and insect damage that reduces the amount of pesticides needed. It needs to dispose the pesticide container properly because contaminated containers exposed to rain can leak pesticides into the environment.

2.2.2.5 Apply BMPs (Best Management Practices) to reduce pesticide transport

BMPs reduce runoff or soil erosion or increase soil organic matter content, help reduce pesticide transport as well. BMPs include:

A. riparian buffers
B. crop rotation
C. contour farming
D. strip cropping
E. reduced tillage or zero tillage systems (herbicide use usually increases with reduced tillage which may off set the pesticide-related benefits of the reduction in runoff associated with this practice)

2.2.2.6 Biological pest control

Apply biological pest control such as wasp, snail eating birds, snake to control mouse, etc. It is suspicious, and need impact assessment on the “over harvesting eel from agricultural land and out break of rice crop destroying snail”
Apply organic pesticide such as neem, papaya, tobacco leaf (*Nicotina tabacum* leaves), papaya leaf, which should be used to substitute chemical pesticide, biological control (snake and mouse, snail and snail eating birds, wasp used to control insects,

2.2.3 Summary of the discussion on Plastic waste and hazardous waste disposal

2.2.3.1 Plastic waste Crisis in Myanmar

Disposal of waste in Chindwin River, tributary of Irrawaddy river, could not controlled, people could not follow rule. Waste and Chindwin River could not be separated.

If the government provided required garbage bin for every households, when the plastic were start to widely used last 45 years ago, Myanmar people might had gained a good habit to litter into a garbage bin. For **10,889,348** households in Myanmar, for a basic 20-galon trash bin, the typical cost starts at $ 10, if each households use three garbage bin for waste separation, Myanmar will need 326,680,440 US$ to buy garbage bin. Using budget for unnecessary sector, and no budget allotment for required sector all over the world made us accustomed to strew litter on ground, open dump. The population density of Myanmar is 83 people per square kilometer(83 people per 247 acre), and high solid waste management cost is also difficult to address plastic crisis. Lack of environmental justice for the practice of open dumping of waste, insufficient collection coverage and cleanliness are to be solved. Laziness or carelessness, presence of litter already in the area, lack of access to trash receptacles are issues to be changed. Lenient law enforcement, lenient law, for example Myanmar environmental conservation law section 36, and environmental conservation rule 69(B) are to changed. Accustomed to burn their waste or dispose it in nearby waterways, lack of environmental ethics, lack of waste disposal etiquette, lack of environmental justice, lack of awareness about the negative impact of littering on the environment, lack of proper waste management systems, and lack of access to recycling facilities, and weak law enforcement, such as Yangon City Development Committee Law, (2018)

2.2.3.2 Root Cause of Plastic Crisis

Drivers of Plastic Waste Disposal in road side, public places, park, side drain, gully, stream, and river, Environmental Ethics, Waste disposal etiquette, lack of municipal solid waste dump site, disposal of municipal solid waste in side drain, gully, stream, river, lack of drainage nets, trach traps, bubble barriers,

the interceptors to prevent plastic entering river and ocean, lack of circular economic system to beat plastic waste, lack of stakeholder engagement in addressing plastic crisis, no restrictions on the use of plastic bags, lack of ban on single-use plastic plates, lack of taxation on the use of plastic bag are the drivers to control plastic issue and plastic crisis, Municipal solid waste and plastic waste, Small scale plastic incinerator should be used in villages, More than 100 villages, which are keeping their village clean. Need to enhance, increase, Yangon city development committee has city development law, however, it need jury, law court, lawyer, Develop zero waste town, zero waste city, Disposal of waste by type of waste, such as organic waste, food waste, leaves, vegetable, plastic, glass, clinical waste, pesticide container plastic etc, Impact of recycling the plastic container which were used for pesticide. Rivers, stream, cemetery become waste dump due to the lack of waste dump site. Disposal of waste from industry, Need to conduct water pollution survey for the Disposal of liquid waste, dye from textile industry, and horticultural land beside the Dokhtawaddy river for the death of cows after drinking water from river, No plastic use day at super market such as city mart, No thank you for giving plastic bag at market to refuse use of plastic. Plastic free zone, Use of basket when we go to market, Disposal of plastic waste in stream are discussed, Promote Awareness raising program on plastic waste disposal at school, and promote environmental ethics at school. Waste problem is directly related with lack of ethics.

Lack of the waste segregation system, lack of garbage bin in every households, and insufficient waste collection from each households and insufficient garbage truck is the root cause of plastic issue, and this plastic issue become plastic crisis. Another root cause is budget allocation for municipal solid waste management not only in city but also in rural area, because 70 % of the people are living in rural area. Community actors raised awareness on the importance of the disposal of decomposable waste/ biodegradable waste, Organic waste, non-biodegradable waste such as plastic waste, separate garbage bin at schools. However, these bins were kept in store of the school, and when the authorized person come, they are displayed as a showcase.

2.2.3.4 Disposal of plastic container after tree planting season at forest plantation.

Plastic bag, remaining at forest plantation area, after transplanting seedling which were raised in plastic container is also issue to be addressed by forest department. Deputy director from forest department pointed out the problem of the disposal of plastic containers after tree planting season at forest plantation, plastic bags were hanged on the stack beside seedling. Assistant director from forest department discussed that plastic bags were discarded in the forest plantation in the past, but 60% of plastic bags were collected after tree planting from 2023.

2.2.3.5 Addressing plastic crisis

Participants discussed the activities to address plastic crisis such as ; to enhance extension program on separation of waste type at each household, to support and cooperate with Thant Myanmar and Pact Myanmar in their extension services, awareness raising for waste separation extension activities, to provide waste separation bin for plastic, organic waste(food waste, , glass) free of charges, to reduce and stop single use plastic, which is harmful to nature, human, water pollution, beauty of country, etc, to produce reusable plastics (Low Density Polyethylene- LDPE), to prohibit disposal of plastic in side drain, stream, river, to substitute Bioplastic , ideal eco alternative, which can be produced from sugarcane, seaweed, and corn. Bioplastic can decompose within 80 days.

Raising, plastic producer should take responsibility, set target to reduce within three years,

Awareness raising program, awareness talk at school, distributing pamphlets, waste picking campaign are to be done like in Kachin state.

2.2.3.6 Discussion from Kachin State

Kachin state is located at northern part of Myanmar, and Irrawaddy river start from Kachin State. Myit Kyi Na is the capital city of Kachin state, and waste disposal into Irrawaddy River was broadcasted from social media. So, FREDA invited responsible person from City Development Committee of Myitkyina, and asked how the city development committee is trying to make their city clean. Plastic waste pick up program is regularly done with the cooperation of environmental conservation department, forest department, and city development committee. Responsible person from Kachin state city development committee replied that their

waste dump site is chosen away from Irrawaddy river, and the plastic waste from their dump site can not be carried away with water into Irrawaddy river.

2.2.3.7 Discussion from Sagaing Region

Disposal of waste in Chindwin river could not controlled, could no follow rule. Waste and Chindwin river could not be separated. Sagaing region forest department discussed that waste collection and disposing can only be done at city, uptown area. However, village area does not have waste collection and disposing is not available, 70 percent of the Myanmar people are living in rural area. Waste management system should promoted also in village and rural area. Environmental ethics is required for every citizens. Import of raw material should be controlled. Raise Tax on import of plastic.

Sagaing region City Development Committee discussed that Monywa city produce 554 tons of municipal solid waste daily, (56) group collect municipal solid waste from 281 ward in Monywa city. Plastic content is second highest in municipal solid waste. Waste dump site locate at the outside of Monywa city. Excabate dump site is covered with soil, if it become full. Monywa is trying to produce electricity and fertilizer from waste, with the cooperation of Japanese company Fujita. However, cost of waste to energy is higher about three times than other hydro electric power, due to the mixture of organic waste, food waste, kitchen waste with plastic. Monywa City Development Committee is demonstrating to the people on waste separation system, with the cooperation of Environmental Conservation Department- ECD.

2.2.3.8 Observation and discussion at Mandalay Region

In Mandalay region, Bagan Nyaung Oo is the ancient city of Myanmar. Many people come and visit this archeological site, and they discard plastic waste every where, including among pagoda. The people from Bagan Myothit used to discard their waste into Nyarinzara streem, a tributary of Irrawaddy river. When heavy rainfall, these waste were carried by water and blocked a

bridge, located in Lawkanandar wildlife sanctuary, and running water eroded the bank of stream and the bridge collapsed. In rainy season, municipal solid waste including plastic waste block the main drainage pipe near Tharapa gate, and flood occur all over the archeological site of Bagan. Ancient pagoda in this site can be damaged by flood. So I asked to the staff from Bagan Nyaung district Environmental Conservation Department how it should be addressed this issue. After discussing with Bagan Nyaung city development committee, he replied that they will construct waste incineration plant to destroy municipal solid waste in the future.

One of the participants from Mandalay region discussed that "it's important to conduct a water pollution survey in the Dokhtawaddy river to determine the extent of the pollution and its impact on the environment and human health." The survey should include testing for heavy metals, pesticides, and other chemicals that are commonly used in textile industries and horticultural land. The survey should also include testing for bacteria and other pathogens that can cause illness in humans and animals.

2.2.3.9 Field observation at Magwe region and discussion on plastic waste disposal

The authorities and peoples from Magwe region seems that they can manage plastic waste issue. Most of the department compounds are clean, no plastic waste were seen. Moreover, it is heard from retired director of dry zone greening department, that "there are many model villages trying to become plastic waste free village and clean villages". However, it was observed that plastic waste were discarded into a gully at the road side from Magwe to Yenanchaung.

2.2.3.10 Field observation at Bago region and discussion

It was observed that the waste are being disposed into the river bank of Ayeyarwaddy river at Pyay township, Bago region, and plastic waste were seen at the road side of Pyay. The challenging issues at the cities along the Ayeyarwaddy river is "municipal solid waste dump sites are located at watershed area of Irrawaddy river", and the plastic waste can be carried into Irrawaddy river by heavy rain. The people are accustomed to disposal of waste into river bank traditionally. Deputy director from Forest Department, who is responsible for monitoring and evaluation at Myanmar Reforestation

and Restoration Program, said that the plastic bags were discarded in forest plantation after tree planting, and they need to be collected and reuse. Assistant Director from Ayeyarwaddy region discussed that the plastic bags were discarded in the forest plantation up to last year, however, forest department collected after tree planting, starting from this year, and he estimated 60 percent could be collected.

2.2.3.11 Field observation and Discussion from Ayeyarwaddy Region

It was observed that waste disposal and collection system along the Yangon-Pathein road is better than other roads, and the road from Yangon to Pathein is more clean than other roads. We discussed the management practice of Ayeyarwaddy region city development committee. The city development committee fix warning signboards "not to litter on the ground and requested to litter in garbage bin along the road side." A staff from general administration department from Ayeyarwaddy region discussed that regional government is interested in cleaning, and sanitation, and the city development committee staff have to make clean before the field trip of authorities. Moreover, city development committee from Ayeyarwaddy region is developing the action plan based on Myanmar National Waste Management Strategy and Master Plan. However, it was found that, "the first shared survey conducted by FFI revealed that 119 tons of plastic waste are washed into the ocean every day. This puts the Ayeyarwaddy as one of the most polluted rivers on the planet. The most responsible regions are the Delta Region with 32 tons followed by Yangon with 29 tons of plastic per day. Therefore, waste from the urban areas is still dominating but according to May Thet Htwe from Thant Myanmar it is the rural areas who lack any waste collection system and are in need of support from government and development sector to build systematic waste collection systems.

2.2.3.12 Observation and discussion at Yangon Region

FFI and Thant Myanmar found that 29 tons of plastic enter per day into rivers from Yangon Region. Yangon was very beautiful before the people use plastic. It is a green city. Many green trees and green land can be seen from airplane before they land to Yangon airport. During 1962 to 1984, the buses used small paper tickets. The passenger used to discard paper tickets on the ground. In those days, people used tree leaves, banana leaves for wrapping vegetables or food when they went shopping. The peoples used to

discard wrapping material on the ground. This habit was just an issue, because they discarded biodegradable waste on the ground, however, this habit makes plastic crisis later. When the plastic was began to used, the people did not noticed that the plastic will become crisis in the future. Moreover, garbage bins were not sufficiently provided on the roads. In the cinema, the republic of the union of Myanmar flag appears on the screen of cinema, and audience have to stand up and salute the flag, and they can sit down. The audience who does not stand up and salute flag may be fined. It is laudable discipline; however, it is not laudable that the habit of the audience, who eat snacks and discard food waste and plastic pack on the floor of cinema. Chewing betel nut and spat out blood-red juice from mouth to clean floor, corner of building and disposal of betel nut wrapping single used plastic make Myanmar very ugly. Spreading food waste and plastic food container waste, after eating snacks and food in the parks, zoo, cinema, office, school is not a good habit, however it can be seen everywhere. Before 1990, municipal solid waste dump site, located at the beside of railways line near Yangon, was valuable, because decomposed waste from this dump site can be used as organic fertilizer. However, after 1990, municipal solid waste contain plastic, and it became dangerous. A large fire outbreak took place in the Htein Bin Municipal solid waste Dumpsite in Hline Thar Yar Township in April 2018, and smoke polluted air in Yangon region. The fire raged for nearly 3 weeks affecting many people in the vicinity. If food waste and organic material are segregated from non-biodegradable waste before disposal, we hope to produce organic fertilizer, and farmers will reduce use of chemical fertilizer, and water contamination will be reduced. City development committee, government organization should take responsibility to collect municipal solid waste by separating type of waste (organic waste- biodegradable waste, inorganic waste- non biodegradable waste) . People, consumer of plastic needs to dispose plastic and organic waste separately by sorting, however, people dispose municipal solid waste without separating into biodegradable waste and non-biodegradable waste. Moreover, city development committee do not provide separate garbage bin for organic waste and plastic waste. Consequently, plastic waste ware not suitable for reuse, and it is just suitable for dumping and incineration. Plastic producer should take responsible to clean plastic waste; however, plastic producer does not take responsibility up to now. Promote circular economy to conserve resource and to minimize waste with the participation of

producer, consumer, and city development committee, who is responsible for waste management. Promote cooperation among community-based organization, government organization, NGOs, Civil Society Organization to beat plastic, and to address plastic waste crisis in Myanmar. Promote rule of law, law enforcement for plastic waste disposal, by adopting fine, ethics of social punishment. People need to abide by the rule and regulation in waste disposal. Promote environmental ethic in disposal of waste. Enhance the participation of plastic producer for the responsible production, importing, selling. City development Committee is responsible to implement Myanmar National Waste management strategy and master plan for 2018-2030. If Myanmar citizen live in Singapore, he will not dispose garbage at public place, however, when he return to Myanmar, he dispose waste at public places, because of the weakness of law enforcement in Myanmar. So, law enforcement is required to become green city and smart city. Municipal solid waste disposal into river should be controlled by law.

2.2.3.13 Field observation at Mawlamyaing, Mon state

Plastic waste were seen along the river bank of Mawlamyaing, Mon State. Mawlamyaing is located beside the Thanlwin river and bay of Bengel. Coastal bank of Mawlamyaing is crowed with peoples feeding seagulls birds and night bazaar. Many plastic waste are discarded into river. Municipal solid waste are carried with water into Thanlwin river and bay of Bengal. These plastic waste are destroying the beauty of the coastal line of Mon state. Responsible person from Mawlamyaing city development committee discussed keeping clean along the bank of Thanlwin river, Mawlamyaing township, and he pointed out the need of garbage bins and waste collection vehicle in Mon state.

2.2.3.14 Drivers of Plastic Waste Disposal in road side, public places, park, side drain, gully, stream, and river,

Lack of Environmental Ethics, Waste disposal etiquette, lack of municipal solid waste dump site, disposal of municipal solid waste in side drain, gully, stream, river, lack of drainage nets, trach traps, bubble barriers, the interceptors to prevent plastic entering river and ocean, lack of circular economic system to beat plastic waste, lack of stakeholder engagement in addressing plastic crisis, no restrictions

on the use of plastic bags, lack of ban on single-use plastic plates, lack of taxation on the use of plastic bag are the drivers to control plastic issue and plastic crisis,

2.2.3.15 Response to waste

(1) **Incineration;** Municipal solid waste and plastic waste, Small scale plastic incinerator should be used in villages,

(2) **Plastic free model village;** More than 100 villages, which are keeping their village clean in Myanmar. Need to enhance, increase,

(3) **Law Enforcement**; Yangon city development committee has city development law, however, it need jury, law court, lawyer, Develop zero waste town, zero waste city,

(4) **Waste segregation;** Disposal of waste by type of waste, such as organic waste, food waste, leaves, vegetable, plastic, glass, clinical waste, pesticide container plastic etc, Impact of recycling the plastic container which were used for pesticide.

(5) **Waste Dump Site;** Rivers, stream, cemetery become waste dump due to the lack of waste dump site. Disposal of waste from industry,

(6) **Reducing the use of plastic;** No plastic use day at super market such as city mart, No thank you for giving plastic bag at market to refuse use of plastic. Plastic free zone, Use of basket when we go to market,

(7) **Promote Awareness** raising program to reduce disposal of plastic waste in stream are discussed, on plastic waste disposal at school, and promote environmental ethics at school. Because waste problem is directly related with lack of ethics.

Activity 2: Desk research

The following finding of the desk research were submitted in first progress report,

6. Desk research finding on "Developing and piloting a new tool for measuring waterborne diseases in Mekong, Ayeyarwady, and other rivers to identify hot

spots for disease outbreaks, which results in policy recommendations on improved water management" is submitted as Attachment 14

7. Documentary research finding on "Impact of the disposal of Black water, solid waste and liquid waste into stream, rivers", is submitted as Attachment 15
8. Desk research findings on "Selection of hotspot/ target area to give awareness raising on water related ecosystem, waste disposal, environmental justice, mitigation measure at targeted city/region located at the bank of Aye Yar Waddy river, and field observation, data collection Field observation, Data collection, questionnaire survey at selected sites on Waste disposal, gold mining at stream and river" Attachment 24
9. Desk research finding on "Environmental benefit and Environmental justices" report is submitted with attachment 16

Activity 3. FREDA formulated work plan, to implement the "Awareness raising on water related ecosystem, watershed management, Waste disposal, environmental management" in January and February, 2023 at the following six places,

1. Myit Kyi Nar, Kachin State, located beside the Irrawaddy River/ (Mawlamyaing township, Mon state)(done on 2nd, May, 2023)
2. Homemalin, Sagaing Region located beside the Chindwin River/ Yangon, Summit Parkview hotel on 6th June, 2023 (Planned to do at Yangon, Yangon region, on 6th June, 2023)
3. Mandalay, located beside the Irrawaddy River (Done on 15th May, 2023)
4. Magway, located beside the Irrawaddy River (Done on 11th May, 2023)
5. Pyay, located beside the Irrawaddy River (Done on 9th May, 2023)
6. Pathein, Located at The westernmost distributary of the Irrawaddy delta, the Pathein (Bassein) River.(Done on 24th April, 2023)

Six awareness raising program were done in person, at six places. The target of participants is 20 participants at each awareness raising program, and 120 participants for 6 townships. 156 participants attended at six townships.

Sr	Date	Location	Result		
			Participants	Male	Female
1	April 24, 2023	Myanma Koe Hotel, Pathein Township, Ayeyarwaddy Region	20	11	9
2	May 2, 2023	Environmental Conservation	22	17	5

Sr	Date	Location	Result		
			Participants	Male	Female
		Department Office, Mawlamyaing Township, Mon State			
3	May 9, 2023	Forestry Department, Pyay Township, Bago Region	27	17	10
4	May 11, 2023	Environmental Conservation Department Office, Magwe Township, Magwe Region	30	18	12
5	May 15, 2023	Environmental Conservation Department Office, Mandalay Township, Mandalay Region	31	19	12
6	June 6, 2023	Summit Park View Hotel, Pinya Hall, Dagon township, Yangon region.	26	17	9
	Total	In total, all six awareness raising program (in person) were done	156	99	57

However, Myit Kyi Nar, and Homemalin are not safe due to the current situation of Myanmar. Environmental conservation department, Ministry of natural resources and environmental conservation recommended to conduct at other two places such as Mawlamyaing township, Mon state, which located beside Thanlwin river, and Yangon city, Yangon region, which located at beside Yangon river.

List of participants, who attended the in person awareness raising program at Pathein, Mawlamyaing, Pyay, Magwe, Mandalay, and Yangon is shown in Annex II

Out puts.

1. Six awareness raising programs have been completed at Pathein, Mawlamyaing, Pyay, Magwe, Mandalay, and Yangon.
2. Six awareness raising program were done in person, at six places. 156 participants including 99 male and 57 female attended at six townships.
3. 61 hard copies of power point presentation were distributed to participants with the cooperation of FREDA and director of Magwe and Mandalay region environmental conservation departments.
4. 81 hard copy of answers for questionnaire raised to participants were received after completion of awareness program on 15th May, 2023.
5. The following (11)ground truth observations were done to get information on plastic waste disposal, and sedimentation in rivers.
    A. Yangon- Pathein road
    B. Yangon- Mawlamyaing road.
    C. River bank of Mawlamyaing along Thanlwin river.
    D. Waste disposal at Kyeikhtiyo wildlife sanctuary
    E. Waste disposal along the road from Yangon to Pyay.
    F. Waste disposal at Nat Hmaw elephant camp, Pyay
    G. Sedimentation near the bridges at Irrawaddy river(Pyay, Magwe, Minbu)
    H. Sedimentation along the river bank of Irrawaddy river at Bagan-Nyaung Oo
    I. Plastic waste disposal at the road side of Kyaukpadaung- Mandalay, Meikthila township, (near Thekone toll gate, Yangon- Mandalay highway road)
    J. Control of Plastic waste disposal in the canal around Mandalay Palace.
    K. Plastic waste disposal at Taungthaman- inn wetland, near U Pain bridge, Mandalay.
6. FREDA noticed that the systematic plastic collection system while the field observation from Yangon to Pathein. Ayeyarwaddy region development committee fixed warning signboard to dispose waste at garbage bag along the road side.

7. FREDA noticed that the plastic waste disposal along the Thanlwin river at Mawlamyaing, Mon state, and Ayeyarwaddy river in Pyay township at Bago region.
8. FREDA noticed that the plastic waste at water course in Mandalay region, and Magwe region, which can be carried to the river with running water. In general, plastic waste are destroying the natural beauty of river.
9. Moreover, many sand bars were seen in Ayeyarwady river. Last ten years ago there was not sand bar near Lawkanandar pagoda, in Bagan-Nyaung Oo, ancient city of Myanmar. However, sand bar were seen there now. Consultants assumed that sand come from road construction, mining and so on. Sand bars were seen near bridges which connect east and west bank. It is assumed that the construction of bridges have the impact on the flow of river water and accumulation of sediments in the river. Eroded soil from bare land accumulated in stream and flow into river. Many streams full of sand were seen in Mandalay region and Magwe region. These tributary feeds sand into the river.
10. Discussion and recommendation were
    1) Implementation of Myanmar National Waste Management strategy and master plan(2018-2030)
    2) Interest of decision makers on waste management and sanitation in Ayeyarwaddy region.
    3) Waste disposal, collection along the Yangon- Pathein road
    4) Keeping clean along the bank of Thanlwin river, Mawlamyaing township.
    5) Need of waste collection vehicle in Mon state
    6) Clean water supply in Mawlamyaing, which is surrounded by salty river.
    7) Land use of watershed area of the dam which supply water for Mawlamyaing.(Rubber plantation and army office and quarters)
    8) Waste disposal into Ayeyarwaddy river at Pyay township, Bago region
    9) Plastic waste disposal problem at the road side of Pyay city,
    10) Sedimentation and sand bars in Ayeyarwaddy river near Pyay bridge, Ayeyarwaddy river.
    11) Plastic bag, remaining at forest plantation area, after transplanting seedling which were raised in plastic container.

12) Development vs Conservation

13) Possible cooperation with ECD and FREDA for Future awareness raising program at Magwe

14) Awareness raising program being conducted by environmental conservation department, Department of Agriculture, City Development Committee, and Environmental conservation rule 74

15) Publication of books from Magwe ECD director office for awareness raising, concerning with,

   A. The Environmental Conservation Law (2012)
   B. The environmental conservation rule(2014)
   C. National Environmental Quality(Emission) Guideline, 29th December, 2015
   D. Environmental Impact Assessment Procedure(2019)
   E. Basic Environmental Subject for Teacher's manual (Level I to V
   F. Basic Environmental Subject (Summary)
   G. Environmental Conservation Extension book for staff for school and villages
   H. Myanmar National Waste Management Strategy and Master Plan(2018-2030) 2020

16) Standard of chemical content in water from crop production, annual crop production, livestock production

17) Pamphlet distributed by Mandalay Region Environmental Conservation Department

   A. Awareness raising on waste disposal.
   B. Plastic pollution
   C. Fresh water conservation
   D. Clean and green schools
   E. Ecosystem restoration, world environment day, 2021
   F. Plastic waste problem
   G. Conserve environment(Only one earth)
   H. World Ozone Day
   I. World environment day 2022(Only one earth)
   J. International Day of clean air for blue skies.

K. Climate change.
L. Plastic waste in ocean
M. Awareness raising on waste disposal, impact of waste disposal without ethic, discipline
N. Ozone, CFC, HCFCs, impact of ozone depletion.
O. Air pollution pamphlet for International day of clean air for blue skies , the air we share.
P. World ozone day, 2019" reduce the use of HCFCs"
Q. World ozone day 2020 September 16
R. Facts about world ozone conservation day.
S. White pollution

Activity 4: Need Assessment

Issues, threats and problem were identified as follow;

Issue/threat/ problem

Sr	Issue/threat/ problem
1	Use of young labor in spraying pesticide in agriculture.
2	Young labor do not take care in handling hazardous waste, disposal of pesticide in nearest water body.
3	Young labor does not understand the prescription in Chinese and Thai language mentioned in container
4	Import and selling of banned and prohibited pesticide illegally
5	Casualties in using pesticide at agricultural land, rubber plantation, food poisoning due to ignorance of the pre-harvest interval after pesticide application. Water pollution at Inlay lake due to the excessive usage of Aldrin, a kind of organochlorine pesticide and DDT Toxic to humans and can have both acute and chronic health effects, depending on the quantity and the ways in which a person is exposed. Organophosphates and carbamates, affect the nervous system. Others may irritate the skin or eyes.

	Some pesticides may be carcinogens (cancer causing). Others may affect the hormone or endocrine system in the body.
6	Ignorance of the pre-harvest interval after pesticide application due to weak economic justice,
7	Open defecation Water pollution at Inlay lake, Indawgyi lake, and villages along the river, Waterborne disease (diarrhea, dysentery, viral hepatitis, typhoid, paratyphoid, cholera).
8	Over usage of chemical fertilizer at tissue banana plantation, water melon, and honey due melon at rental land in Kachin state and Sagaing region, and rice field in Myanmar, Hydroponics/ floating garden at Inlay lake, Indawgyi lake, and other dams and reservoirs. Animal wastes, fertilizers and sewage, which are washed by rain or irrigation into the water bodies through surface runoff. loss of soil productivity eutrophication. dead zone underground water pollution nitrate poisoning, blue baby syndrome soil friability effect, hard pan. extensive mats of floating plants. examples of the plants include algal blooms, nile cabbage and water hyacinths,
9	Higher content of arsenic in rice, and rice field, agricultural land after using pesticide, which use arsenic for pesticide
10	Burning plastic waste in residence area, air pollution from plastic waste burning
11	Disposal of plastic waste at public area, road side, park, the road between front line building and back line building, river, stream, side drain,
12	Careless Disposal of plastic waste on road, market, shop, bazaar Lack of environmental justice, Lack of waste disposal etiquette

13	Hazardous waste disposal from industry
14	Deforestation at water related ecosystem, catchment area, watershed area of dam, reservoir, lake
15	Soil erosion, Sedimentation and siltation at rivers, stream, lakes, ponds; Riverbank erosion
16	Water Pollution caused by Rare earths Mining
17	Water Pollution caused by gold mining
18	Landslide, soil erosion at Jade mine
19	Bridge construction, sedimentation Sediment accumulation is one of the impacts that can occur during bridge construction. Sediment accumulation can cause siltation and turbidity in water bodies.

A needs assessment is a systematic process for determining and addressing needs, or "gaps", between current conditions and desired conditions or "wants".

Needs assessment is part of planning. It can be used to clarify problems and identify appropriate solutions. Needs assessments require sufficient data. Needs assessments can help improve policy or program decisions, individuals, education, training, organizations, communities, or products.

There are three types of need in a needs assessment; perceived need, expressed need and relative need.

1. Perceived needs are defined by what people think about their needs, each standard changes with each respondent.
2. Expressed needs are defined by the number of people who have sought help and focuses on circumstances where feelings are translated into action. A major weakness of expressed needs assumes that all people with needs seek help.
3. Relative needs are concerned with equity and must consider differences in population and social pathology.

Program manager and consultant conducted need assessment by holding online consultation. Need assessment were done for environmental justices in waste disposal, use of chemical fertilizer, pesticide, conservation of water related ecosystem, soil erosion, open defecation, bridge construction at online consultation meeting. Program manager ask strategic question to participants, who attended online meeting. The participants and consultant give needs to address issues and threat. Needs are the requirements that must be met in order to achieve a goal or objective. Appropriate solution is the best way to address a problem or issue. Mitigation measures are actions taken to reduce the likelihood of an event occurring or to reduce its impact if it does occur. Required management actions are the steps that must be taken to manage a situation or issue. For example, in risk management, risk mitigation refers to the process of planning and developing methods and options to reduce threats—or risks—to project objectives. Responsible person have to implement risk mitigation strategies to identify, monitor and evaluate risks and consequences inherent to ensure clean water and sanitation.

Needs, appropriate solution, mitigation measures and required management actions were recommended as follow,

Sr	**Issue/threat/ problem**	**Need, appropriate solutions, Mitigation Measures**
1	Use of young labor in spraying pesticide in agriculture.	1. All children need relevant rights and protection for their health in use of pesticide according to the Law on the Rights of the Child, 2019. 2. Need to establish national policies for the elimination of child labor as Myanmar had signed up to the International Conventions on minimum age
2	Young labor do not take care in handling hazardous waste, disposal of pesticide in nearest water body.	Need to conduct "Pesticide Safety Education Programs (PSEPs) for the education and training of certified pesticide applicators"

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
3	Young labor does not understand the prescription in Chinese and Thai language mentioned in container	Pesticide registrants need to translate their product labels into Myanmar language. written on container. Ban import of pesticide which does not have labels written in local language.
4	Import and selling of banned pesticide illegally	Check at border trade area, market, promote law enforcement and rule of law. Cooperation with custom, agriculturalist, environmentalist, informer to control illegal import and selling of banned pesticide.
5	Casualties in using pesticide at agricultural land, rubber plantation, food poisoning due to ignorance of the pre-harvest interval after pesticide application. Water pollution at Inlay lake due to the excessive usage of Aldrin, a kind of organochlorine pesticide and DDT Toxic to humans and can have both acute and chronic health effects, depending on the quantity and the ways in which a person is exposed. Organophosphates and carbamates, affect the nervous system. Others may irritate the skin or eyes. Some pesticides may be carcinogens (cancer causing). Others may affect the hormone or endocrine system in the body.	**3** Ban some of the older, cheaper pesticides which can remain in the soil and water for years. **4** Conduct training to wear Personal Protective Equipment -PPE **5** Promote rule of law, Law enforcement with 2016 Myanmar Pesticide Law enforcement **6** Ban (55) kinds of pesticide in Myanmar in accordance with the notification 2/2022 **7** Registers pesticides after stringent, science-based evaluation that ensures any risks are acceptable **8** Re-evaluates the pesticides currently on the market on a 15 year cycle to ensure

<table>
<tr><th>Sr</th><th>Issue/threat/ problem</th><th>Need, appropriate solutions, Mitigation Measures</th></tr>
<tr>
<td></td>
<td>Pesticide Poisoning in Myanmar at 2020
<table>
<tr><th>Type of Pesticide</th><th>Pesticide Poisoning</th><th>Death</th></tr>
<tr><td>Insecticide</td><td>123</td><td>6</td></tr>
<tr><td>Weedicide</td><td>87</td><td>24</td></tr>
<tr><td>Rodenticide</td><td>29</td><td>-</td></tr>
<tr><td>Insecticide</td><td>7</td><td>1</td></tr>
<tr><td>Bactericide</td><td>1</td><td>-</td></tr>
<tr><td>unknown</td><td>9</td><td>2</td></tr>
</table>
Source: Occupational health division, Public Health Department, Ministry of Health and Sport, Myanmar</td>
<td>the products meet current scientific standards
9 Promotes sustainable pest management
10 Conducts ecological risk assessments to determine whether changes to the use or proposed use of a pesticide are necessary. Before allowing pesticide products to be sold on the market, they ensure that the pesticide will not pose any unreasonable risks to plants, wildlife, or the environment.
11 Evaluate every active substance for safety before it reaches the market in a product. Substances must be proven safe for people’s health, including their residues in food and effects on animal health and the environment.
12 Adopt the following suggested strategies :
4. reducing risk of pesticide transport to surface or ground water
5. decreasing amount of pesticide used</td>
</tr>
</table>

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		6. reducing the persistence or mobility of the active ingredients 15. Apply BMPs (Best Management Practices) that reduce runoff or soil erosion or increase soil organic matter content, help reduce pesticide transport as well. BMPs include: **(8)** riparian buffers **(9)** crop rotation **(10)** contour farming **(11)** strip cropping **(12)** reduced tillage or zero tillage systems (herbicide use usually increases with reduced tillage which may off set the pesticide-related benefits of the reduction in runoff associated with this practice) 16. Apply proper pesticide storage practices; Locking pesticides inside a fire resistant, spill proof storage system is the best way to prevent accidental spills. It is also very cheap compared to the consequences that can be very expensive to clean up

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		such as accidents, spills, or fires. 17. Prevent pesticide contamination by selecting the appropriate pesticides, proper pesticide mixing, and loading procedures. Preparation of seedbeds and planting allows crops to emerge quickly, potentially reducing early season disease and insect damage that reduces the amount of pesticides needed. 18. Properly dispose the pesticide containers because contaminated containers exposed to rain can leak pesticides into the environment. 19. Apply biological pest control such as wasp, snail eating birds, snake to control mouse, etc 20. Apply organic pesticide such as neem, papaya, tobacco leaf
6	Ignorance of the pre-harvest interval after pesticide application due to weak economic justice,	1. Read the label concerning the pre-harvest interval (PHI), which is the wait time between a pesticide

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		application and when a crop can be harvested. 2. State/ mention the label will "how long the crop must remain in the garden or field after spraying. 3. Sell, produce after the PHI, when the pesticide broken down in the plant, or on its surface. Sun, rain, and warm temperatures may affect how quickly this happens. 4. Follow the PHI, which can reduces your risk from using pesticides on food. The time listed on the label has been tested to minimize pesticide residue. 5. Do not consume if fruit or vegetable is not listed on the label. 6. Promote economic justice, because harvesting a crop before the PHI is illegal.
7	1. Open defecation 2. Water pollution at Inlay lake, Indawgyi lake, and villages along the river, 3. Waterborne disease (diarrhea, dysentery, viral hepatitis, typhoid, paratyphoid, cholera).	1. End open defecation ('Open defecation free'- ODF) behavior change to promote the use of toilets. 2. Conduct sewage treatment (or domestic wastewater treatment, municipal wastewater treatment)

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		3. Decompose before they can be released safely into the environment. 4. Destroy potential pathogens by the heat produced by naturally occurring thermophilic microorganisms, by heating the compost to over 60 °C (140 °F), 5. Apply the best management practice of sewage, which includes collection and transport for release into the environment, after a treatment level that is compatible with the local requirements for discharge into water bodies, onto soil or for reuse applications. 6. Use of composting toilets and vermifilter toilets. 7. Use handy pod for floating community. The Pod uses microbes and fungi to break down the organic sludge into gases such as carbon dioxide, ammonia, and hydrogen. While some microbes in the waste survive the first step of filtration, they are then washed into a pod filled with water hyacinth. The hyacinth roots collect bacteria, leaving the water surrounding it safe enough to play and swim in, but not drink. 8. Apply Water Purification Methods: A. Iodine Treatment

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		B. Solar Purification C. Boiling D. Distillation E. Chlorination F. Reverse Osmosis G. Ultra-Violet Light 9. Use Electronic Health Management Information Systems (eHMIS) 10. Participate in the use of "From Paper Based- To Electronic Health Information (DHIS2), tool for measuring waterborne diseases for early warning. 11. Conduct Waterborne Disease Risk Assessment Program 12. Conduct Drinking Water Monitoring 13. Apply one health approach
8	Over usage of chemical fertilizer at tissue banana plantation, water melon, and honey due melon at rental land in Kachin state and Sagaing region, and rice field in Myanmar, Hydroponics/ floating garden at Inlay lake, Indawgyi lake, and other dams and reservoirs. Animal wastes, fertilizers and sewage, which are washed by rain or irrigation into the water bodies through surface runoff. 1. loss of soil productivity 2. eutrophication. 3. dead zone	1. Conduct soil test in agricultural land, before applying chemical fertilizer. Soil test is required to know what kind of nutrient is deficient, and to decide what kind of chemical is required to be applied. Applied just only the required chemical fertilizer and required amount to avoid water pollution and impact on earthworms, ecosystem engineers, fish,

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
	4. underground water pollution 5. nitrate poisoning, blue baby syndrome 6. soil friability effect, hard pan. 7. extensive mats of floating plants. examples of the plants include algal blooms, nile cabbage and water hyacinths,	crab, etc. Apply fertilizers in the proper amount, at the right time of year and with the right method to reduce leaching and runoff. 2. Conduct Awareness raising on dosage, soil fertility test, use of bamboo charcoal to absorb chemical in agricultural land. 3. Raise the awareness of farmers on the topic of agricultural pollution. 4. Reduce the use of chemical fertilizers, and promote use of organic fertilizer. 5. Apply Environment-Friendly Fertilizers -EFFs, available in the form of coated fertilizers, which can be utilized as an environment-friendly product. 6. Conduct the Agricultural wastewater treatment . 7. Improve manure management 8. Prevent excessive nutrients from reaching the water. 9. Protect fertile top soil from erosion by wind and water. Protect fertile topsoil from erosion by wind and water by using the following technique;

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		• Plant grass and shrubs. Bare soil is easily swept away by wind and water, the two main causes of erosion. Planting grass and shrubs can help hold the soil in place. • Add mulch or rocks. Mulch or rocks can help protect the soil from erosion by wind and water. • Use mulch matting to hold vegetation on slopes. Mulch matting can help hold vegetation in place on slopes. • Put down fiber logs. Fiber logs can help hold soil in place on slopes. • Build retaining walls. Retaining walls can help prevent soil erosion on steep slopes. • Improve drainage. Poor drainage can lead to soil erosion by water. Improving drainage can help prevent this. • Reduce watering if possible. Overwatering can lead to soil erosion by water. • Avoid soil compaction. Soil compaction can make it easier for wind and water to erode the soil.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		10. Conduct water quality test and soil test with the cooperation of lab from Forest Research Institute, Yezin. 11. Conduct crop insurance, awareness raising, contract farming, ESIA, HIA at farm land. 12. Promote sustainable farming system, Good Agricultural Practice, 13. Adopt agroecology such as biological control, conservative agroforestry, and permaculture crop diversification. Agroecology can help build healthy soil, prevent erosion, minimize air and water pollution, store carbon on farms, and increase resilience to extreme weather. 14. Consider to adopt "Zero burning". to produce organic fertilizer, compost, peat and humus. 15. Conduct awareness raising on the use of an alternate to chemical fertilizer, such as manures, compost or bone meal, tree leaves, lomi dirt, weeds, egg shells, coffee grounds, fish, corn gluten meal, crustacean shells, comfrey tea, and worm poo tea. Bio-fertilizers are also a safe

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		alternative to chemical fertilizers that minimize ecological disturbance and increase crop yield up to 15-25% and fix nitrogen up to 40-50 Kg[2]. 16. Promote compost making with kitchen waste, food waste, organic waste, by using lomi dirt. 17. Use microbial fertilizer in agricultural production. It is a non-poisonous and harmless product that contains many biological active microbes cultured and produced by specific Microbe Strain. These specific microorganisms can promote the growth of plants by increasing plant nutrition supplies. Microbial fertilizers are a powerful biological tool for sustainable agriculture and an effective alternative to chemical fertilizers with an ability to maintain soil microflora. They are used to increase crop yield in an eco-friendly way while relying on sustainable agriculture principles. 18. Consider to apply "Polluter pay principle" for chemical fertilizer producer. The polluter pays principle is an environmental policy principle that makes the party responsible for producing

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		pollution responsible for paying for the damage done to the natural environment. The principle has been used to put the costs of pollution prevention on the polluter. It is regarded as a regional custom because of the strong support it has received in most Organization for Economic Co-operation and Development (OECD) and European Union countries. In Myanmar, the Environmental Conservation Law (ECL) was enacted in 2012. The ECL provides for the polluter pays principle and requires polluters to pay compensation for environmental damage caused by their activities. 19. Consider the prohibiting the export of ecosystem engineers such as earthworms, leech, slug to ensure soil health. Promote vermiculture and use of vermicompost awareness training. 20. Keep animals and their waste out of streams. Keeps nitrogen and phosphorus out of the water and protects stream banks[1].

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		21. Establish protection zones along surface watercourses, within farms and in buffer zones around farms, to reduce pollution migration to water bodies. 22. Apply efficient irrigation schemes to reduce water return flows and therefore can greatly reduce the migration of fertilizers and pesticides to water bodies. 23. Promote law enforcement, rule of law to control pollution caused by chemical fertilizer, pesticide, mercury, cyanide used in gold mining.
7	Higher content of arsenic in rice, and rice field, agricultural land after using pesticide, which use arsenic for pesticide	1.Reduce Arsenic content in rice and by washing and cooking the rice with clean water that is low in arsenic. Before rice cooking, soak in water for several hours to dilute arsenic in rice. 2. Apply " Parboiling Absorption cooking method to reduce arsenic levels in rice. 3. Eat a variety of age appropriate healthy foods to limit exposure to arsenic. Reduce rice consumption to about one time per week, rotate in other grains, and aim for a healthy, balanced diet to help your body defend itself from harm.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		4. Drain excess water from rice field. One such strategy is to maintain soil under aerobic conditions which can decrease arsenic concentration in rice grain and straw by 10–20 fold compared with continuously flooded rice[2]. 5.Ban pesticide which have arsenic.
8	Burning plastic waste in residence area, air pollution from plastic waste burning	Promote environmental ethics, Promote rule of law. Awareness raising on air pollution.
9	Disposal of plastic waste at public area, road side, park, the road between front line building and back line building, river, stream, side drain,	1. Implement the National Environmental Policy, 2. Implement the National Waste Management Strategy And Master Plan For Myanmar (2018-2030)[12] 3. TAXING plastic as an awareness tool. 4. Support from government and development sector to build systematic waste collection systems. 5. Apply public-private partnership in developing solid waste collection and disposal. 6. Reduce use of plastic at source, 7. Ban single-use plastic 8. Raise awareness on environmental justice, waste disposal etiquette rules 9. Fix warning signboard.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		10. Invent and produce prohibition signboard use of enamel, porcelain tiles, steel plate, which can last longer period, which can be fixed at the wall of kitchen, near the door, along the bridge, road side, coastal area, lamp post. They can withstand sun and rain for ever compare to vinyl, wood, painting signboard. 11. Make organic products as package 12. Forcing producers to use recycled plastics in their products 13. Tax exemptions for business, which is switching to environmentally friendly practices. 14. Provide facility for the collection, transfer and disposal of solid waste to city development committee. 15. Conduct EIA, EMP for municipal solid waste dump site. Avoid choosing municipal solid waste dump site at waterway, gully, stream, river. Conduct location of municipal dump site with the use of GPS to check whether waste can arrive to river 16. Avoid buying bottled water or hot drinks in disposable cups,

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		17. Use your own shopping bags 18. Separate your recyclables and make use of recycling facilities 19. Choose glass or cans over plastic 20. Avoid using cling film and foil 21. Store your rubbish securely 22. When you buy new clothes, choose natural materials, such as cotton, linen, bamboo and hemp, avoid new clothes, which is made of materials that contain plastic, such as polyester and nylon. 23. Pledge to join our Plastics Challenge 24. Speak to local restaurants, shops, or other businesses about environmentally-friendly packaging and bagging options 25. Adopt "Waste to Energy solution" that includes a sanitary landfill with methane gas extraction and a waste incinerator generating electricity. 26. Try to adopt "Japan's ecofriendly philosophy", by being mindful in use and dispose of things. For example, avoid buying things

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		that don't need or that have excessive packaging, try to reuse or recycle things that can be used again, such as paper, plastic, or glass, try to conserve energy and water by turning off lights and faucets when not in use. 27. Promote engagement of City development Committee, who is responsible to implement Myanmar National Waste management strategy and master plan for 2018-2030. 28. Promote stakeholder engagement in implementing the "National Waste Management Strategy and Master Plan For Myanmar (2018-2030)" to achieve the following goals A to F, and their respective target, and the proposed activities. 29. Teach etiquette, environmental ethics, environmental justice, social justice, economic justice, environmental benefit, ecosystem services starting from schools targeting to youths, for example (cough etiquette, plastic waste litter etiquette, customary code of

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		polite behavior in society, regulations for hazardous waste management, code of conduct that regulate a person's behavior in society, etc.). Environmental ethics is required for every citizens. 30. Promote proper waste management at home. 31. Support from government and development sector to build systematic waste collection systems. Supply three garbage/ trash bin at each household, and recognize the use of red, yellow and green trash bins. Practice proper waste management such as waste segregation and 3R. Create garbage/trash bins using old containers and label to observe waste segregation. 32. Demonstrate family's contribution to take care of the environment. 33. Conduct training to understand the concepts related to waste management: waste/garbage, waste disposal, waste segregation, biodegradable, non-biodegradable, reuse, reduce, recycle. Conduct training for house keepers, chefs, restaurants, for waste sorting system to create a more sustainable and healthier world.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		34. Raise the awareness on the benefits of waste sorting include: 35. Reducing environmental pollution 36. Saving land resources 37. Utilizing renewable resources 38. Improving public health 39. Avoiding pollution caused by landfill or incineration 40. Turning waste into treasure. 41. Prohibit open dumping, practice of disposing of waste in an unregulated manner. Open dumping is an illegal and inappropriate manner of waste disposal where piles of waste materials or garbage get accumulated or are left at a certain site or location where they are not meant to be. Open dumps can be very hazardous to the environment as toxic materials are released into the air and water. This in turn, gives rise to major health and safety concerns. The land sites that are most often prone to open dumping are road sides, secluded areas, and ditches. Due to such dumping, the location becomes a breeding ground for mosquitoes, harboring diseases, inviting animals, and emitting unpleasant odors. No treatment systems

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		or liners are involved in an open dump. It also affects the quality of soil and water, and poses a great risk to public health[1]. 42. Apply landfill that controls and monitors waste disposal to prevent pollution and health risks. Landfills are bigger than dump areas and involve leachate collection and other treatment systems as well as liners. Landfill is a carefully engineered structure that is designed to safely contain and manage waste. When waste is deposited in a landfill, it is placed in layers and compacted to reduce its volume. A landfill is regulated by the government and must strictly follow certain laws and processing regulations for waste treatment. The system consists of a large pit in the ground, with a thick lining of plastic over which you will find a compacted clay liner. The bottom of the pit also has a liner that helps in preventing the liquid waste (that comes out from the solid waste mostly if rainwater is soaked in the landfill) from leaking through, as it could contaminate the water supply.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		This liquid waste that gets collected is called leachate 43. Install drainage nets, trach traps, bubble barriers, the interceptors to prevent plastic entering river and ocean 44.
10	Careless Disposal of plastic waste on road, market, shop, bazaar Lack of environmental justice, Lack of waste disposal etiquette	Train child to dispose garbage, plastic waste into garbage bin. Promote responsibility of super market, convenient store, mini store, market to collect plastic waste on road. 1. Do litter pick regularly Choose a location that you feel is most affected by litter. Gather the necessary materials, such as trash bags, a pick-up stick, and a safety vest. Sort the litter you find for recycling. Make sure to get permission from the landowner to do a litter pick. Choose a date and time for your litter pick. Advertise in good time to attract a good crowd.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
11	Hazardous waste disposal from industry	Promote rule of law, Environmental Conservation Law enforcement, conduct EIA, SIA, HIA etc, formulate environmental management plan, issue guideline, instruction to industry. 1. Apply Grievance Redress Mechanism (GRM), which is a formalized way to accept, assess, and resolve community feedback or complaints. It should offer an accessible point for complaints to be received and a predictable process and timeline for communities to obtain a response. GRM can take the form of a simple Excel spreadsheet to a more complicated web-based system that collects data from SMS, phone, and other uptake channels. Grievance Redressal is a management- and governance-related process used commonly. It should be mandated in Government agencies and departments that are directly involved with serving citizens and organizations. The

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		grievance redress mechanism of an organization is the gauge to measure its efficiency and effectiveness as it provides important feedback on the working of the administration. Governments organization have duty for redressing public grievances. 2. Introduce Community Monitoring and Reporting System (CMRS) in environmental conservation, which is a participatory approach that involves local communities in collecting and reporting data on environmental issues, such as deforestation, biodiversity loss, water quality, etc. CMRS can help improve environmental conservation by increasing awareness, accountability, transparency and empowerment of the stakeholders. 3. Introduce SMART patrolling in point source pollution and non point source pollution control. SMART patrolling is a system that uses **Spatial Monitoring and Reporting**

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		Tool (SMART) to collect, store, communicate and evaluate data. Point source pollution is any contaminant that enters the environment from an easily identified and confined place, such as a discharge pipe or a smokestack[3]. Non point source pollution is caused by rainfall or snowmelt moving over and through the ground, picking up and carrying away natural and human-made pollutants, such as sediment, nutrients, chemicals and pathogens. SMART patrolling can help monitor the sources and impacts of both point and non point source pollution on wildlife habitats and biodiversity. SMART patrolling can help identify the best practices or activities to reduce or control the loading of pollutants from non point sources, such as riparian buffers, storm water management, erosion control, etc. SMART patrolling can help enforce the regulations and standards for point source pollution, such as permits,

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		inspections, fines, etc. SMART patrolling can help communicate and evaluate the data on pollution control efforts and outcomes to stakeholders, managers and policymakers. 4. Consider to apply "The **Open Standards for the Practice of Conservation (CS)". Open standards** are a set of principles and practices that help conservationists design, manage, and monitor their projects effectively. They are based on evidence-based conservation, adaptive management, and other decision-support approaches.
12	Deforestation at water related ecosystem, catchment area, watershed area of dam, reservoir, lake	1. Restore the water related ecosystem. 2. Promote stakeholder engagement in watershed management. 3. Raise awareness to the producers on "EU Regulation on deforestation-free products", which is an integrated approach to respond deforestation to monitor and reduce forest

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		loss and degradation. It is a new law that aims to prevent the import or export of certain commodities and products that are associated with deforestation and forest degradation**.** The Regulation applies to seven agricultural commodities: cattle, cocoa, coffee, oil palm, rubber, soy, and wood**.** Operators or traders who deal with these products must prove that the products do not originate from recently deforested land or have contributed to forest degradation**.** They must also follow a mandatory due diligence procedure coupled with strict traceability**.** The Regulation also sets up a risk benchmarking system for countries and/or regions, which assigns them a level of risk related to deforestation and forest degradation (low, standard or high). The risk category determines the level of specific obligations for operators and member states' authorities to carry

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		out inspections and controls. The Regulation will enter into force on 1 January 2024. 4. Introduce private investment in nature-based solutions (NbS). The UN State of Finance for Nature 2021 report is a publication by the United Nations Environment Programme (UNEP) that tracks global trends in public and private investment in nature-based solutions (NbS), aiming to improve data quality and identify opportunities for governments, businesses and financiers[1]. The report calls for **tripling** investments in NbS by 2030 and to increase four-fold by 2050 from the current level of USD 133 billion per year to meet the biodiversity, climate and land restoration targets. The report also reveals a USD 4.1 trillion financing gap in NbS between 2020 and 2050. 5. Implement Myanmar **Reforestation and Rehabilitation Program,**

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		which is a 10-year program launched by the Ministry of Natural Resources and Environmental Conservation (MONREC) in 2017 to restore degraded forest landscapes and reduce deforestation in Myanmar. 6. Implement the activities to achieve the following objectives of MRRP; • To increase forest cover from 42.92% to 45% by 2026-27 • To enhance the quality and resilience of forest ecosystems • To improve livelihoods and income opportunities for local communities • To strengthen institutional capacity and coordination for forest management
11	**Soil erosion, Sedimentation and siltation at rivers, stream, lakes, ponds;** Riverbank erosion	1. Implement The Myanmar Climate Change Policy, Forest Policy, National Environment Policy. 2. Conduct river bank erosion prevention along Ayeyarwady river,

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		3. Adopt the Target 6.6, "Protect and restore water-related ecosystems" to address the sedimentation, siltation and flood in water related ecosystems, we need to [8] 4. Address the drivers of deforestation 5. Avoid soil erosion by planting all over the year 6. Plant trees or grasses along the edges of fields 7. Adjust the intensity of tillage of a field 8. Apply crop rotation, which is the practice of growing different crops in a sequence on the same land. It can help control soil erosion by improving the soil structure and reducing the amount of soil that is exposed to water and wind. It can also support reduced or no-till farming, which ensures even better protection against erosion[3]. Crop rotation can also increase yields, conserve soil moisture, and reduce fertilizer and pesticide needs. 9. Protect cover crops, which are plants that are grown to protect and enrich the soil from erosion and nutrient

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		loss. They can help reduce soil movement from water and wind erosion by holding the soil with their roots and shielding it with their leaves[1]. Some examples of cover crops are rye, clover, mustard, and pea. 10. Apply conservation tillage, a **farming practice that leaves the previous season's crop residue on the land to prevent soil erosion and runoff.** Conservation tillage may dramatically reduce land degradation and improve the water retention of fields. 11. Protect water course buffer to reduce river and stream bank erosion by prohibiting clearing vegetation away from the river bank. Protect streams by allowing native trees, shrubs and vegetation to grow. 12. Conserve forest, cutting trees can cause soil erosion because trees **hold the soil firmly** with their roots and **protect the soil** from the impact of raindrops. When trees are removed, the soil becomes **loose and exposed** to water

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		runoff, which can wash away the top layer of soil. This can reduce soil fertility, crop yields and water quality. 13. Plant new trees at water course buffer, which can help **control soil erosion** by stabilizing the shoreline, trapping sediment and pollutants, and slowing runoff flows. 14. Grow vetiver grass, which is a tropical grass that can prevent soil erosion by forming a dense web of roots that binds soil and penetrates vertically to 15 feet[1]. It has been used in many countries for erosion control, especially in coastal areas. It can also improve crop yield by conserving water and nutrients. 15. Adopt ploughing along the contour, which is a method of farming that follows the shape of the land and creates ridges that slow down water runoff and prevent soil erosion. It can reduce soil erosion by up to 50 percent and improve soil quality and moisture. **Ploughing across the slope** can reduce soil erosion by

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		creating strips of different crops. It also **reduces fertilizer loss, increases moisture infiltration and enhances soil quality.** 16. **Avoid ploughing up and down the slope**. This can increase the risk of soil erosion by water runoff. 17. **Construct b**unds and check dams for soil erosion control that reduce the velocity and erosive power of water runoff. Bunds are embankments constructed across the land slope, while check dams are small structures built within channels or ditches. Both methods help to retain water and sediment in the watershed. 18. **Avoid over grazing. Because,** when too many animals eat the plants in an area, leaving the soil bare and exposed to erosion by wind and water. To avoid overgrazing, you can reduce the number of animals, rotate them to different pastures, or plant more vegetation to cover the soil.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		19. **Do t**erracing farming. Terracing is a method of farming that involves creating **flat platforms** on slopes to prevent soil erosion and runoff. Terraces **break the slope** and reduce the force of water due to gravity[12]. Terraces also provide **channels** for water to flow through designated outlets. Terracing is one way to control soil erosion, but there are other methods as well. 20. Do mulching. Mulching is a practice of placing materials such as grass, hay, wood chips, etc. on the soil surface to prevent erosion. Mulch protects the soil by absorbing raindrops, retaining water and slowing runoff. It can also improve soil conditions and help with vegetation establishment. 21. Apply the following measures to control soil erosion on road construction: • Covering exposed soils with vegetation • Minimizing disturbed area

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		• Dividing the project into sections • Stabilizing soil with additives or mechanical methods • Protecting slopes from runoff water • Controlling runoff water with ditches, berms, silt fences, etc. • Protecting storm inlets from sediment
12	**Water Pollution caused by Rare earths Mining** Rare earth mining can cause water pollution. Scientists say under-regulated rare earths projects can produce wastewater and tailings ponds that leak acids, heavy metals and radioactive elements into groundwater[1]. Securing just one ton of rare earth elements produces 2,000 tons of toxic waste, and has devastated large regions of China. In 2012, British newspaper The Guardian described a toxic lake created in conjunction with rare earth mining as "a murky expanse of water, in which no fish or algae can survive. The shore is …"[2]	1. Apply low-cost approaches that remove rare earths from waste coal ash. Scientists have developed an environmentally friendly method for recovering rare earth elements (REE) from coal fly ash[12]. They use citric acid to hold the rare earth metals in solution and found that in less than a day, an extraction process running at 158°F (70°C) and pressure at 1,100 psi (about 70 times ordinary atmospheric pressure), could remove and recover 42% of the rare-earth metals in the coal ash[3]. This low-waste approach produces a solution rich in rare-earth elements, with

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		limited impurities, and could be used to recycle precious materials from the abundance of coal fly ash held in storage ponds[12].
13	Water Pollution caused by mining gold mining	Gold mining can have devastating effects on nearby water resources. Toxic mine waste contains as many as three dozen dangerous chemicals including: arsenic lead mercury petroleum byproducts acids cyanide. Gold mining is one of the most destructive industries in the world. It can displace communities, contaminate drinking water, hurt workers, and destroy pristine environments. It pollutes water and land with mercury and cyanide, endangering the health of people and ecosystems. Producing gold for one wedding ring alone generates 20 tons of waste. However, there are ways to mitigate the impact of gold mining. Mine closure and a number of activities to mitigate the impacts of mining are an integral part of all metal mine planning and mineral development from the discovery phase through to closure[2]. These activities include reclamation, soil treatment, water treatment,

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		preventing acid rock drainage and controlling gas emissions.
	Landslide, soil erosion at Jade mine	Some ways to reduce the impact of mining landslides are: 1) Modifying slope geometry, using chemical agents or installing structures to reinforce slope material. 2) Diverting debris pathways and rerouting surface and underwater drainage. 3) Restricting or removing populations from areas with a history of landslides. 4) Installing early warning systems based on the monitoring of ground conditions. 5) Reclaiming soil, treating water, preventing acid rock drainage and controlling gas emissions. 6) Using passive wetland systems, in-situ treatment zones or electric currents to treat metal-bearing water. 7) Covering the land with impermeable membranes to prevent water infiltration in the landslide. 8) Directing surface water sources away from the landslides.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		9) Draining ground water streams away from the landslides. 10) Minimizing irrigation on the surface of the soil. 11) Avoiding inadequate slope grading, poor drainage, and the disturbance of old landslides when building roads and structures.
14	Bridge construction, sedimentation ➢ Sediment accumulation is one of the impacts that can occur during bridge construction. ➢ Sediment accumulation can cause siltation and turbidity in water bodies.	1. According to the investigation of the reduction of sediment deposition and river flow resistance around dimpled surface piers, the results showed that scouring extents of a dimpled surface pier are larger than those of a cylindrical pier under different working conditions. This difference helped reducing sludge sedimentation at the bottom of the river in the former. The ratio of the maximum sedimentation height to the pier diameter, ratio of the sedimentation area, and cross-sectional area of the dimpled surface pier are all smaller than those of a cylindrical pier at different flow velocities, indicating that dimpled surface piers have a lower silting probability.

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
15	Partnership	Participate in International River Foundation, to get lesson learnt, best management practice, etc
16	Yangon city of 8 million people produces more than 2,300 tons of garbage per day, 400 tons of which is plastic waste. It needs garbage truck.	A garbage truck can carry 10 tons per day depending on the distance to dump site. So 230 garbage truck are needed for Yangon city.
17	Promoting Political support for clean water and sanitation	Political support for clean water and sanitation need to be promoted by using advocacy through parliamentary, parliamentary committee, public campaign to raise awareness, media, influencers, research, evidence based Promoting political support for clean water and sanitation can be done in several ways. 1. One way is to raise awareness about the importance of clean water and sanitation. This can be done through campaigns, social media, and other forms of media. 2. Another way is to encourage political leaders to prioritize clean water and sanitation in their policies and budgets. This can be done through advocacy and lobbying efforts by civil society organizations. Elected parliament representatives

Sr	Issue/threat/ problem	Need, appropriate solutions, Mitigation Measures
		submit the needs to parliament, parliament committee 3. Ensure that there is adequate funding for clean water and sanitation projects. This can be done through international aid and development programs, as well as through national budgets. 4. Ensure that there is strong political commitment and leadership at all levels to improve sanitation and end open defecation.

1.1 Implementation Challenges

A. Permission from Government Organization

FREDA need to apply the permission to organize the awareness raising program from the following government organizations,

1. Minister office, Ministry of natural resources and environmental conservation. (Nay Pyi Taw)
2. Director General's office, Environmental Conservation Department (Nay Pyi Taw)
3. State and region government office (Yangon region, Mandalay region, Magwe region, Bago region, Ayeyarwaddy region, Mon state)
4. Director's office of Environmental Conservation Department from state and region (Yangon region, Mandalay region, Magwe region, Bago region, Ayeyarwaddy region, Mon state)
5. Director's office of Forest Department from state and region (Yangon region, Mandalay region, Magwe region, Bago region, Ayeyarwaddy region, Mon state)
6. General Administration department, Township city development committee if the venue is at a hotel (Pathein township, Ayeyarwaddy region)
7. Police station

B. Required documents to show at Myanmar Investment and Commercial Bank- MICB

FREDA need to explain and show the following official letters for debit and credit

1. Permission to implement the project from Ministry of natural resources and environmental conservation, Environmental Conservation Department
2. Business license issued by Union Registration Committee for Non government organization in accordance with the new Registration Law for NGO, CSO, CBO(2022)

C. Required documents to get the business license from Union registration committee for NGO

Non- government License permission of FREDA had expired on 31st December, 2022. According to the new law for NGO, INGO, CBO, FREDA have to apply new business license from Union Registration Committee for NGO starting from step one. FREDA need to submit documents such as

1. Affirmative letter from Ministry of natural resources and environmental conservation
2. Affirmative letters from police station for executive committee members

FREDA has not had new business license until May 2023.

D. Budget allotment to conduct awareness raising program at six locations.

Over estimated cost, under estimated cost, and unexpected cost can deviate to follow the estimated budget. FREDA tried to implement the activities successfully within the budget allotment. According to the Fix Amount Award Agreement (FAA), signed by Christy Owen, Country Director, (Pact Inc) and U Sann Lwin, Chairman of FREDA on 5th January, 2023, any amount greater than the Pact award amount unless authorized in writing by Pact. So, FREDA had managed the cost of activities to be completed within the Pact award amount.

E. FREDA tried the best for accountability and auditability for every activity and payment to build the trust from the donor and auditor. However, commercial receipt is not available from everywhere. Acknowledgement receipt is mostly used for payments.
F. Change in cost of venue rental, car rental, hotel fees, day of night halt at hotel, car repairing cost,
G. After addressing the above-mentioned challenges and issues, adaptive management approach was used to finish the five-awareness raising program at five locations within April and Mid May. For example, Yangon to Mandalay round trip by flight was changed and done Yangon- Pyay- Magwe- Mandalay- Yangon, by using car.
H. MICB was economic sanction

According to the news, the United States is adding **Myanmar Foreign Trade Bank (MFTB)** and **Myanmar Investment and Commercial Bank (MICB)** to the list of economic sanctions. The MFTB and MICB are state-

owned financial institutions in Myanmar that primarily function as foreign currency exchanges and enable the conversion of kyat to U.S. dollars and euros and the reverse. Pact Thailand could not send project expenditure to FREDA. Pact Thailand have to send to CB bank to continue the activities.

I. Typing error of beneficiary name and account number. FREDA made mistake in typing beneficiary name and account number, as a consequence, the money sent to CB bank were returned to Thailand and Pact Thailand had to transfer again. The lesson we learnt is that we need to check account number, beneficiary name mentioned at bank, etc.

2. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

Government, regional organizations, NGOs, private sector, academia, civil society, other donors, etc.

FREDA applied permission to Director General office of Environmental Conservation Department to conduct the six awareness raising on the impact of chemical fertilizer, pesticide, waste disposal, water related ecosystem conservation, environmental conservation, implementation of National Waste Management Strategy and Master Plan for Myanmar(2018-2030). Environmental conservation department gave instruction to also inform regional government, general administration department, state and region environmental conservation department, police station including the documents such as agenda, venue, invited participants, date and etc. Moreover, invited participants must be from the legally registered or approved by government organization. Some CSO, NGO, INGO, CBO do not have the business license issued by township, district, state, region registration committee. It takes time to get agreement and permission to implement the project from government organization.

1. Myit Kyi Nar, Kachin State, located beside the Irrawaddy River
2. Homemalin, Sagaing Region located beside the Chindwin River
3. Mandalay, located beside the Irrawaddy River
4. Magway, located beside the Irrawaddy River
5. Pyay, located beside the Irrawaddy River
6. Pathein, Located at The westernmost distributary of the Irrawaddy delta, the Pathein (Bassein) River.

So, FREDA apply permission from Mandalay, Magwe, Bago, Ayeyarwaddy, Mon and Yangon regional government, forest department and environmental conservation department. Official from Environmental Conservation Department from Mandalay, Magwe, Pyay, Ayeyarwaddy, and Mon participate in selecting participants and inviting participants. Environmental conservation department of Mandalay, Magwe, Pyay, and Mon allow to use their meeting room for awareness raising room, and they help to prepare the coffee break, lunch and so on. Environmental conservation department of Magwe region paid the cost of coffee, snack and lunch for all participants. So we can invite 10 more participants. Minister of Natural resources from Magwe region accept to meet FREDA team at his office and gave encouragement for awareness raising program, and discussed for future awareness raising program.

Management and Administrative Issues
Such as project staff changes, software and procurement issues, etc. Please also list all upcoming procurement actions (if any).

Consultant for agriculture can not join the trip to Pathein, Mawlamyaing, Pyay, Magwe, and Mandalay. So, secretary of FREDA was replaced for agricultural consultant. Moreover, chairman of FREDA can not join to Pyay, Magwe and Mandalay trip. So Director from Magwe and Mandalay was replaced for chairman to give presentation.

3. LESSON LEARNED

Please provide a few examples of highlights of project learning. These can either be successes or failures, but show how adaptive learning is used in the program to improve implementation.

If applicable, please provide at least one example of gender, sustainability, and local capacity development.

It is learnt that FREDA should apply permission directly to Union Minister, Ministry of Natural Resource and Environmental Conservation, according to the suggestion from director general's office of environmental conservation department, after checking the application of FREDA for several weeks.

It is learnt that FREDA should had applied permission from regional government at the same time.

It is learnt that, FREDA should have estimated cost of getting approval at the budget estimation.

It is learnt that, FREDA should had formulated for the cost of stakeholder identification, communication with stakeholders, and community with the guidance from general administration department.

It is learnt that FREDA should had tried to get information on the number of legally recognized INGO, CSO, NGO, CBO at each state and region level, district level, township level and union level.

Moreover, FREDA should had got registration certificate from Union registration committee, since FREDA's registration certificate had expired on 31st, December, 2022.

FREDA need to check invoice thoroughly not to make mistake in data entry of account numbers, beneficiary name, FREDA

4. PLANNED ACTIVITIES FOR NEXT PROGRESS REPORT INCLUDING UPCOMING EVENTS

Monthly online consultation meeting was planned to conduct for twelve times from October, 2022 to August, 2023, and targeted with 360 participants. All targeted 12 times was successfully conducted, and 342 participants attended, including 172 males, and 170 females. In person meeting target participants number is 120. (156 participants attended including 99 males and 57 females.

In total, for online meeting and in person meeting, 480 participants targeted, and 498 participants attended including 271 male and 227 females.

Sr	Meeting type	Target participants number	Actual attended number	Attended male	Attended Female
1	Online meeting	360	342	172	170
2	In Person meeting	120	156	99	57
	Total	480	498	271	227

7. MONITORING OUTPUTS AND INDICATORS

Monitoring outputs and indicators are important to measure progress toward project goals and objectives. The required indicator, i.e. policy recommendation, ops-ed, or policy piece, should be clearly identified here.

Up to 15th August 2023, out puts and indicators can be seen as follow

1. Water related Ecosystem" network was created with the participants who attended online meeting and in person meeting.
2. Community voices and civil society's role were strengthened.
3. Recommendations were provided for environmental justices at water related ecosystem in Myanmar.
4. Participated in "Regional networks".
5. Lessons from LMC is learned.
6. Awareness on SDG 6 and related targets will be raised at the cities beside the Irrawaddy river
7. Best management practices were used to develop required policy.
8. Recommendations were given to develop policy.

8. PROJECT IMPLEMENTATION PLAN

The implementation plan as submitted in the first deliverable should be reaffirm here. If there is a need to adjust the implementation plan, it should be address here along with timeline adjustment.

FREDA had implemented all activities successfully. Adaptive management approach was applied in implementing the activities.

ANNEX A: SUCCESS STORY TEMPLATE

Partners are requested to submit at least one (1) success story (with a picture) per quarter; however, partners are welcome to submit more than one story each quarter.

Please provide the following data:

*** Headline (Maximum 300 characters):** A good headline or title is simple, jargon free, and has impact; it summarizes the story in a nutshell; include action verbs that bring the story to life.

u want your country become rich, please dispose just in garbage bin.

Success Stories/Lessons Learned Template
One Story Per Template

*** Program Element:** Awareness raising on water contamination in Myanmar , Threats and issue on clean water

* **Key Issues:** Irrawaddy River is polluted with plastic, Inlay lake is polluted with chemical fertilizer, and pesticide, Irrawaddy river had accumulated with sediments which come from watershed area. Open defecation is major cause of water borne disease. Infrastructure development such as bridge construction, road construction cause sedimentation in the Irrawaddy river.

Body Copy (maximum 5,000 characters): The first paragraphs should showcase the challenge encountered and the context of the foreign assistance program. Presenting a conflict or sharing a first person account are two good ways to grab the reader's attention. Continue by describing what actions were taken and finally describing the end result. What changed for the person or community? What was learned? How did this make a difference in the community or to the country overall? If this story is relating to a "best practice", what were the innovations in planning, implementation or partnering that made it different? If this story is about an evaluation, what program adjustments were made?

We explored problems concerning with clean water and sanitation, we identified knowledge gaps, we reviewed the literature on water and water related ecosystem, and we found relevant data, statistics, and DPSIR framework to address the threat and issues by doing desk research, online consultation meeting and in person meeting. Threats, issues were analyzed by using drivers, pressure, state, impact, response framework. Need assessments was done by asking questions while consultation meeting with stakeholders from online meeting and in person meeting. Questionnaire survey was done by using strategic questions. SWOT analysis was also done to identify Myanmar's strengths to provide clean water and sanitation**,** weaknesses in trying to get clean water**,** opportunities **to** be taken to get clean water, and prepare to mitigate threats. It provides new insights, such as where Myanmar need to improve to ensure clean water and sanitation. This may help us to get stakeholder participation, and achieve more success overall. SWOT analysis can maximize our strengths, reduce our weaknesses, take advantage of opportunities, and prepare for the threats. Stakeholders were identified to get their engagement in trying to get clean water and sanitation. Conceptual

model was developed to get goal. As a result, one op-ed article appeared, the title is " Clean water and sanitation"

Title: Sanitation

When I was young, I set for high school examination in 1975. The examination include essay writing. The title of essay was "Keep your city clean". I wrote the essay starting with a conversation with a foreigner. The foreigner has a small piece of waste in his hand and he want to discard from him. He asked me where the garbage bin was. He could not find garbage bin anywhere. I also could not find too, and I had to pointed the ground. In those days, most of the waste were biodegradable waste. They can decompose easily. Leaves of the tree and plants are used for packing food. Even though they are discarded everywhere, including side drain, stream and river, they can decompose. So, people of Myanmar did not notice the municipal solid waste problem. So, the people living along the river, and stream easily disposed the waste into the river.

Most significant change in the world was the wide use of plastic. Myanmar people discard plastic waste habitually everywhere, in public area, park, road side, side drain, stream and river. As a result, Irrawaddy River become ninth most polluted river in the world. During the monthly consultation meeting, I heard the voices of community that the fisherman catch plastic in their fishing net. Most of the market, bazaar dispose plastic waste on the bank of river, side drain, gully, and stream. Most of the municipal solid waste dump site are located in gully, and stream. These plastic wastes are carried with water into the river in rainy season. Even the new capital city of Myanmar, namely Naypyitaw, most of the office, resident dispose waste into the gully and stream. Naypyitaw look very clean on the wide road, however, gully and stream behind the office and building were full of plastic waste. I had been there from 2006 to 2009 and 2013 to 2019, until I retired from forest research institute, municipal solid waste collection system is not enough. So, I had to throw garbage bag from my room to the gully behind the building. In summer, they are burned with fire, and the sky become full of haze, smoke. Most of the people suffer from respiratory problem such as cough. Monthly online meeting participants discussed that they had to dispose garbage beside the river, and they were washed away into river. The problem is lack of sufficient garbage bin along the road in cities. Seventy percent of people are living in rural area and they also do not have waste collection system.

It might be due to the essay written by me at high school exam concerning with the lack of garbage bin in cities, more garbage bin can be seen more and more. However, it still needs to increase the number of garbage bin. Moreover, use of modernized car which have glass door. These glass doors prevent the people not to throw garbage from car. But some care such as light truck does not have glass door. They are open type. The passenger who use open type car can throw their waste from car easily. The use of closed type with glass door car can reduce careless waste disposal from car. I would like to recommend to change mind

set of peoples, that the plastic waste on road, at recreational center such as zoo, park, wildlife sanctuary is not good looking and destroying the beauty of Myanmar. Expenditure for cleaning plastic waste over there is a burden to the economic growth of the country. If people dispose plastic waste just only in the garbage bin, the economy of the state can become grow, and the country can become rich. So, if you want your country become rich, please dispose just in garbage bin.

Clean Water

First of all, let me introduce myself. I am Mya Win, from Myanmar. I always lived near Irrawaddy River. I travelled by two-story-ship with my friends, when we were forestry final year, along the Irrawaddy River, from Katha to Mandalay, in January, 1984. In those days, we can drink any water without fear, and the Irrawaddy River was navigable with ship in summer. Thirty years after travelling from Katha to Mandalay, I saw that the Irrawaddy River is full of sand banks and a small boat can navigate in the river. Moreover, after the death of our child, brothers, sisters, and friends with water borne disease, we lived in fears to drink untreated water. After we had heard the bad news, we do not dare to eat fish, which might be contaminated with chemical such as mercury, cyanide and other kinds of heavy metal which come from rare earth and gold mining area, located at the starting point of headwaters of Irrawaddy River. After we had seen plastic waste are disposed into Irrawaddy River, we felt an environmental injustice. After we had heard about the salt which might contain nano plastic, we live in fear to eat delicious food. After we heard that rice, our staple food contains arsenic, we live in fear to have breakfast, lunch and dinner with rice. After we had heard that the vegetable is contaminated with pesticide residue, we have to consider to stop vegetarianism. But we cannot live without food and water. We have no resistant to suffer hunger and thirsty, even though water pollution and environmental degradation are challenging us. We are fighting together to get clean water by using the opportunity from Mekong-U.S. Partnership, and Pact Thailand.

Irrawaddy River is being threatened by plastic, chemical contaminant from mining, chemical nutrient from agricultural lands which use excess amount of chemical fertilizer, and pesticide. Last 44 years ago, I had ever been to Inlay Lake, and I remembered that the lake water was so clean, and I could saw sand and fish clearly beneath the water. The water quality of Inlay Lake had changed within 44 years. The overdose of chemical fertilizer and pesticide in the hydroponics farming zone causes the serious eutrophication on the Inlay Lake, destroys the local ecology and makes less fishing catch figure. In 1993, I attended a knowledge sharing workshop at Yezin, Agricultural Research Department, scientist from Singapore came and share about tissue banana. Participants from forest department and environmental conservation department of Sagaing region and Kachin state told us the impacts of the over use of chemical fertilizer and pesticide at tissue banana, water melon, and honey dew melon. Over use of chemical fertilizer and pesticide caused serious impacts on soil and living organism of soil such as earthworms. After three years, the productivity dropped. When I went to Indonesia to attend 7th ASEAN Heritage Park seminar, I met with a villager from a village around Indawgyi lake, Sagaing region, Myanmar, and he wears a

shirt advertising to promote Good Agricultural Practice- GAP. They are trying to reduce use of chemical fertilizer and pesticide on their agricultural land. I searched their villages and agricultural lands at google map and found that their agricultural lands are located at the watershed area of Indawgyi lake. I learnt from a villager that GAP is important to adopt at the watershed area of a lake. We organized an awareness raising at Yangon, and invited a farmer who grow rice at hundred acre of rice field. After the agricultural consultant had given her presentation, we invited the farmer to give discussion on the over use of chemical fertilizer and pesticide. He discussed that the farmers use chemical fertilizer without making soil test, over dose might had impacted on soil health. Population of leech and earthworm decreased. When he was young, he found many leeches, and he afraid off leech, because it sucks blood. He said that leech became rare, he cannot find leech in his rice field. Leech eat rice destroying snail. Leech were exported to China. As a result, the rice destroying snail population has increased. At the next meeting, agriculturalist from Department of Agriculture discussed that there are snail eating birds, and after that, I saw a bed news on Facebook, that the "snail eating birds are being killed by hunters, and the author warn that the people should abstain from hunting snail eating birds. We learnt that monoculture, planting rice in wide area, loss of biodiversity and climate change create favorable condition for insects and pest growth and outbreak. Last 20 years ago, I met with a farmer at model forest area, he said that he had ever choose a kind of rice which can produce rice within short period, however, other farmers did not plant. When his rice field is full of rice grain or rice caryopsis, other rice field did not have caryopsis, and as a result, all of the mouse came to his rice field and ate all rice grain rice from his rice field. Moreover, farmers said that the population of mouse has been increasing since the snake were exported to China. I had ever listen to the story of teak (*Tectona grandis*) plantation owners. Most of the teak plantation owners planted pure teak plantation and they faced with teak defoliator at their teak plantation. One teak plantation owner told us that he did not planted monoculture, he used polyculture, by mix planting with papaya *Carica papaya* and teak. In his polyculture teak plantation, defoliator outbreak is not found. In Katha township, teak bee hole borer **(***Xyleutes ceramica***)** spread at pure teak plantation. When I was forestry university student, my class mate and me went there practical training on thinning. Thinning is cultural operation, to cut teak tree at congested teak plantation, when teak canopy begins to touch each other and the light can not penetrate to the ground, and other soil covering plant can not grow and soil erosion can occur. The lesson we learnt is that the polyculture or mixed plantation is better than monoculture or pure plantation, because mixed plantation conserve biodiversity than monoculture or pure plantation.

Our project on "Advancing cooperation between Lower Mekong Countries to support governance, transparency and local voices, concerning with water and water related ecosystem." conducted awareness raising on plastic waste disposal. As you all know plastic is destroying the beauty of Myanmar. We can see plastic waste everywhere, on the road, in the park, at cinema, in the side drain, and in the river. A new survey on plastic pollution

in Myanmar conducted by Fauna and Flora International (FFI) in collaboration with Thant Myanmar reveals that 119 tons of plastic waste enter the Ayeyarwady River every day, and Myanmar's coastlines are heavily affected by micro plastics. After searching root cause by using driver, pressure, state, impact, response framework for all threat on water, we found our mistake. If we had been trained to apply a good habit in waste segregation, and if every households had been provided with three garbage bins for waste segregation, our country would have produced organic fruit, vegetable, and rice from our agricultural lands, and our country would have become a clean and beautiful country, and our river would have become plastic free river. If all households were provided with three garbage bins we would change our behavior, and we would produce organic fertilizer from our food waste, kitchen waste such as vegetables, egg shell, leaves and twigs from garden, and we might not have to use chemical fertilizer. According to an article on greensutra.in, waste segregation at source can reduce up to 250 tons of dump from entering into landfills.

A new survey on plastic pollution in Myanmar conducted by Fauna and Flora International (FFI) in collaboration with Thant Myanmar reveals that 119 tons of plastic waste enter the Ayeyarwady River every day, and Myanmar's coastlines are heavily affected by micro plastics.

The issue in Myanmar is "the plastic waste is not clean enough to recycle, moreover, the municipal solid waste is mixing with organic waste up to 70%. It is noted that incineration and anaerobic digestion represent two existing types of MSW waste-to-energy facilities in the United States. Both require prior separation of recyclables to achieve optimal resource recovery and can produce electricity, heat, or both. However, high operating costs and high-level of competition from alternative sources make the production of heat and power from MSW economically challenging.

In a consultation meeting at Yangon, a retired director general from Environmental Conservation Department, explained that "If Myanmar want to produce energy from waste or if Myanmar want to apply circular economy or recycle plastic waste, the first step is to adopt waste segregation habit, second step is to provide three trach bin for each households, and third step is to provide city development committee with required number of garbage truck to carry from home to dump site, and agricultural consult and plastic waste consultant recommended to promote compost making, organic fertilizer production from food waste, kitchen waste, organic waste from garden and so on.

Moreover, people have the responsibility not to dispose plastic waste and hazardous waste into side drain, gully, stream and river, because fisherman got only plastic in their fishing net instead of fish. City development committee is responsible to collect waste in separate system such as organic waste, plastic waste, biodegradable waste, non-biodegradable waste and so on. Thant Myanmar shouted that plastic producer have the responsibility to address plastic crisis in Myanmar, because they got profit from producing plastic, importing raw plastic from abroad.

According to the provisional census results, there were 10,889,348 households in Myanmar. For a basic 20-galon trash bin, the typical cost starts at $ 10, if each households use three trash bins for waste segregation, Myanmar will need 326,680,440 US$ to buy trash bin. If the government provide required trash bin for every household, Myanmar people will adopt a good habit to litter into a trash bin, and they will adopt waste segregation habit, and we can produce organic fertilizer, we can change waste to energy, we can apply circular economy.

On the 11th and 12th online consultation meeting, we discussed the importance of political support. The most import thing is political support. When we study the history, we can find king who could rule his country for long period, because, this king gave three garbage bin free of charge to his people, and trained his people to adopt good practice in waste disposal, waste segregation. His country become zero waste country, and a beautiful country. We may notice to know a king from a country, he did not train his people in waste segregation by providing three garbage bins. Moreover, he did not provide sufficient garbage bin. As a result, many plastics waste scattered on the road, behind the houses, in the parks, in the side drain, and in the river in his country. The more the plastic waste scattered in his country, the more the problem he faced with. You may believe it or not.
On the 12th online consultation meeting, I raised a question to the staff from forest department how the Forest Department is trying to reduce plastic waste problem at Myanmar Reforestation and Restoration Program- MRRP to restore degraded and depleted forest in Myanmar. Because, deputy director who is responsible for monitoring MRRP, forest plantation answered my question at Pyay trip, "After tree planting, plastic bags, which were used for seedling production, were left on bamboo stick beside the seedling in the field or disposed near the seedling". Some plastic bags were seen in the forest plantation in Tanintharyi region. A staff from forest department, answered my question, that the plastic bags were left in the field without collecting for recycle. Official from forest department explained that, from this year, plastic bags were collected after tree planting, and he estimated 60% could be picked up. It might be the response to the voice of our project, or it might be the response to the theme of 2023 world Environment Day " Beat Plastic Pollution"

In conclusion, I would like to say to get clean water and sanitation;
Firstly "Conserve soil, protect fertile top soil, and prevent soil erosion. If the fertile soil had eroded you would have to use chemical fertilizer, which is not good for your health".
Secondly, "Conserve biodiversity, apply polyculture, because if biodiversity lost, many pests, insect would increase and you will have to use more and more pesticide. Pesticide will eradicate not only pest but also human.
Thirdly, "Conserve the forest, because only the forest can give us clean water."

Fourthly, “Stop open defecation, because open defecation is major cause of water borne disease, and food borne disease.”
Fifthly, “Beat plastic before it destroys us”

Last, but not least, “Promote stakeholder engagement, Promote Partnership, Promote people participation, to get clean water and sanitation”

Keeping our environment clean and beautiful

Since the wide spread use of plastic, our houses, our schools, our campuses, our cities, our land, our country and our world are dirty, and spoiled by the sight of cluttered plastic waste. The plastic waste is scattered on the roadside, market, parks, mountains, forest land, agricultural land, and they accumulate in waterways, side drains, gullies, streams, rivers and oceans. Plastic waste destroys the beauty of our homes, roads, markets, land, and all over the environment. A cluttered and dirty home can make us feel overwhelmed and stressed out. It is miserable to see plastic waste in public recreation places, schools, offices, in the back lanes of a row of houses or buildings, and vacant house compounds. Plastic waste is thrown from windows of each house to the back lane of a row of houses or buildings, and it became dirty with plastic waste. Vacant house compounds become open dump sites and both rural and urban areas have pills of colorful plastic waste. It is easy to litter everywhere, however, it is difficult to pick up plastic waste, and it is expensive to clean. If the plastic waste cannot be managed, it will be carried into side drains, causing floods in cities, and finally arriving in the sea and ocean. This then causes microplastics to be present in the water which comes from single use plastic water bottles, beer containers, sea food containers, plastic tea bags, and ready meals containers, etc. **Microplastics** damage aquatic creatures, such as whales, turtles, water birds and wildlife on land such as elephants. Some studies have shown that microplastics can cause damage to human cells, including both allergic reactions and cell death, and microplastics could provoke immune and stress responses and induce reproductive and developmental toxicity. Burning plastic waste can release toxic smoke that contains harmful chemicals such as carbon monoxide, hydrogen-chloride, cyanide, dioxin and furan, formaldehyde, arsenic, and other toxic substances. The smoke from burning plastic waste can cause air pollution that can harm human health and the environment. Burning plastic waste increases the risk of heart disease, aggravates respiratory ailments such as asthma and emphysema, causes rashes, nausea or headaches, damages the nervous system, and releases toxic

gases into the atmosphere. Such pollutants contribute to the development of asthma, cancer, endocrine disruption, and the global burden of disease.

Myanmar has the strength to address the plastic crisis, through the existing policy, law, rules, guidelines, strategy and the master plan. For example, Myanmar's 1994 National Environment Policy, 1997 Myanmar Agenda 21, environmental responsibilities in the 2008 Constitution of the Republic of the Union of Myanmar, the 2009 National Sustainable Development Strategy, 2015, Myanmar National Water Policy, 2015 National Comprehensive Development Plan, 2018 Myanmar Sustainable Development Plan, the National Environmental Policy of Myanmar (2019), Myanmar Sustainable Development Plan (2018 – 2030), Environmental Conservation law(2012), Environmental Conservation rule(2014), National Environmental Quality (Emission) Guidelines(2015), Environmental Impact Assessment Procedure(2019), *Myanmar's National Waste Management Strategy and Master Plan* (NWMSMP) (2018-2030), Consumer Protection Law(2019), Yangon City Development Committee Law, (2018), Myanmar National Hazardous Waste Management Master Plan (Final Draft), Procedure on Transboundary Movement of Hazardous Wastes and Other Wastes (Final Draft). Already in place is the revised procedure according to the COP14 decisions to follow the plastic waste amendments, Hazardous Waste Management Rules (4th Draft), Myanmar Agriculture Policy(2016) statement to conduct sanitary and phytosanitary (SPS) measures, develop and adopt Good Agriculture Practices-GAP, Good Animal Husbandry Practices- GAHP and Good Aquaculture Practices-GAqP. Myanmar ratified the Basel Convention on 6 January 2015 and the Convention entered into force for Myanmar on 6 April 2015.

In Myanmar, according to the *UN-Water* SDG 6 Data *Portal Snapshot indicators, they found that* "39% of the population in Myanmar cannot use a safely managed sanitation service." A new survey on plastic pollution in Myanmar conducted by Fauna and Flora International (FFI) in collaboration with Thant Myanmar reveals that 119 tons of plastic waste enter the Ayeyarwady River every day. Ayeyarwady river is threatened by plastic waste, it is under the ten most polluted rivers in the world and the Bay of Bengal is highly contaminated with micro plastics.

Myanmar has the opportunity to address the water pollution issues and plastic crisis, with the cooperation of The Mekong-U.S. Partnership, Lower Mekong Initiative, Mekong-Republic of Korea Cooperation Fund (MKCF), Japan-Mekong Cooperation, World Wildlife Fund – Freshwater, International River foundation, **Mekong River Commission (MRC),** Mekong-Lancang Cooperation, Water Education Foundation, National Geographic - Water Conservation, United Nations – Water, and etc.

Drivers of plastic waste disposal include lack of waste segregation system, lack of provision of three garbage bins for each household, lack of circular economy,

lack of environmental justice, waste disposal etiquette, population density of Myanmar, weak law enforcement, citizens being accustomed to strew litter on ground, open dump, citizens being accustomed to burn their waste or dispose of it in nearby waterways, lack of awareness on the cost of picking up scattered waste, or cleaning cost is more higher than the cost to litter in a garbage bin, etc.

The response to plastic crisis is to give training on waste segregation practice, promoting environmental justice and waste disposal etiquette, law enforcement, the provision of three garbage bins to each household, and waste collection all over Myanmar. Moreover, the policy implications may be required to decide how much money to spend on waste management and how to raise the money we have decided to spend for waste management, (for example Prioritizing budget allocation for development and increasing city development budget for clean water and sanitation, or promoting responsible production and consumption, etc.)"

If we can change our behavior starting from our kitchen, or schools, we can produce compost or organic fertilizer from our food waste, kitchen waste and leaves, twigs from tree from our garden, parks, and forest. If we can produce compost or organic fertilizer by adopting zero burning, we can reduce greenhouse gas emission, prevent global warming, and we can substitute the use of chemical fertilizer, which has various impact on environment and human health. Moreover, we can reduce the organic waste content in municipal solid waste. Reducing organic waste in municipal solid waste may reduce the cost of waste-to-energy plants compared to other forms of electric power, and plastic waste may be made recyclable more effectively.

In conclusion, it is hope that Myanmar's environment will become clean and beautiful if all stakeholders engaged in implementing the "Myanmar's National Waste Management Strategy and Master Plan (NWMSMP) (2018-2030).

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Success story of Awareness raising program at five townships which locate beside the rivers.

FREDA got the announcements to propose a project on water and water related ecosystem in 2022 May. At first, FREDA would like to propose the project to supply clean water to the villages at Ayeyarwady delta, because that area is surrounded by saline water. People does not get fresh water in summer. They can get fresh water in rainy season. At first, we propose to construct rain water harvesting tank, saline water to fresh water converting equipment's and water purification machines. After receiving comments from donors, FREDA changed the strategy to address water pollution problem by raising awareness of people who live along the Irrawaddy river FREDA estimated travelling cost to Mandalay, Homemalin and Myitkyina by air. The rest of the city along the Irrawaddy river, Pathein, Magway and Pyay is estimate with car. However, after the estimation had done, the situation of Myanmar changes day by day. Civil war in Kachin State and Sagaing region make decision maker to recommend to change the location from Myitkyina and Homemalin to Malamyaing and Yangon. After trying to get permission from government authorities for six month, FREDA got new instruction to apply approval to state and region. So, FREDA applied permission from six state and region government at the first week of April.

Moreover, new instruction was that, when FREDA invite participants from local community, community based organization, they must be legitimate organization or recognized organization. It might be, that they have worry FREDA cooperate with those who are opposite to government. Anyway, FREDA is non political organization, just to conserve environment & ecosystem, FREDA requested state and region environmental conservation department to choose and invite participants, who can share the knowledge gained in awareness raising program. So, state & region ECD invite participants for FREDA, four departments allow their meeting room to held the awareness raising program Magwe region ECD broadcast the event from zoom to townships in her region. Magwe region give many assistance, cooperation such as venue, morning & afternoon tea breaks, lunch and producing hard copy of power point presentation for all participant from her budget. FREDA can give the cost of refreshments, lunch as daily allowance or income replace cost for 30 participants.

When we hold awareness raising program at the Maynma Koe hotel in Pathein, FREDA have to apply City Development Committee, that FREDA commit not to give hate speech, which can effect the stability of the city.

One threat occurred before our trip to five location is that "the COVID 19" positive patients was found more and more day by day. FREDA worried that the state and regional government might postpone the program until the COVID 19 become reduce. However, state and regional government allowed to hole the awareness raising program.

The other challenges are weather, high temperature up to 43°C. When FREDA went to Pathin, Mawlamyaing and Pyay by car, it was very hot. Chairman of FREDA got weak due to high temperature and he could not joined to Pyay, Magwe and Mandalay Trip.
The next challenge we faced with was Mocha storm which enter to Myanmar on 14th May, 2023 from the west coast, Arkan state. So, the program postponed to15th May, 2023.
The next challenge was to need repairing the car we used along the trip. Electric wiring, battery, aircon and break system had to be repaired.
But, we are lucky, because the car usually need to repair near the workshop, not very far from the workshops, other wise we will face with difficulties on highway road. So, up to 15th May, 2023 we successfully returned to Yangon from trip.

List of participants, who attended online meeting

Sr.	Name	Designation	Organization	Email	Phone	Sex	Age	Date
1	Dr. San Thwin	Auditor, FREDA	FREDA	santhwin@gmail.com	09-975949106	Male	58	28-11-2022
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65	Nang Khay Kham/		Pang Kaught Woe village		09-960016052	Female	29	25-1-2023
66	Nang Num Khay		Norng Dao village		9982088973	Female	17	25-1-2023
67	Nang Kwan Kham		Norng Dao village		09-252195208	Female	29	25-1-2023
68	Nang Han Oo		Pang Lon	shcdo.jobs@gmail.com	9256740211	Female	23	25-1-2023
69	Ma Aye Yu Ngwe		Pwint Lann		9773216748	Female	27	25-1-2023
70	Ma Pwint Shwe ye Aung		Pway La		9755087299	Female	23	25-1-2023
71	Ma Chang Mg		Shout Pin		09-972689630	Female	20	25-1-2023
72	Mg Shan Lay		Kyar Kone		9750947631	Female	25	25-1-2023
73	Ma Nin Thiry Phwe		Kyar Kone		9268711133	Female	27	25-1-2023
74	U Aye Min	Senior Computer Operator	ACTMANG Project	ayeminn2009@gmail.com	09-792100502	Male	38	25-1-2023

75	U Tun Tun	Assistant Engineer(ADRA)			09-771832525	Male	43	27-2-2023
76	Saw Pho Gyay or Blu Don Soe	Officer-WASH			09-780644628	Male	26	27-2-2023
77	Daw Win Win Thant	Pharmacist			09-252982929	Female	36	27-2-2023
78	Nang Mon Khon Phaw Awr	M&E Officer			9691019595	Female	32	27-2-2023
79	Daw Tin Tin Myo	Project Assistant		tintin.myo@adramyanmar.org		Female	42	27-2-2023
80	U Htway Hla	Community Empowerment Facilitator – LWF (Ann-Rakhine)			09-252240412	Male	42	27-2-2023
81	Daw Tin Tin Win	Women Group Leader - LWF (Ann-Rakhine)				Female	28	27-2-2023
82	Daw Moe Thidar	Village Health Volunteer -LWF (Ann-Rakhine)			09-699778329	Female	23	27-2-2023
83	U Salai Win Maung	Community Empowerment Facilitator – LWF (Ann-Rakhine)		maungsalaiwin@gmail.com	09-446810582	Male	25	27-2-2023
84	Ma Eali	Community Empowerment Facilitator – LWF (Ann-Rakhine)			9692953387	Female	22	27-2-2023
85	Daw Mar Mar Aye	Community Empowerment Facilitator – LWF (Ann-Rakhine)		mar.maraye@lutheranworld.org	09-252240412	Female	48	27-2-2023
86	U Thura Aung	Field Officer- Sawnyee Development Foundation		Thuraaung8914@gmail.com	09-25045290	Male	33	27-2-2023
87	U Kyaw Thura	Bamaw- Tagun Education Private High School			09-681417311	Male	42	27-2-2023
88	Daw Hnin Oo Yi	Teacher			9404562706	Female	28	27-2-2023
89	Nang Thi Thi Htun	Leader(Moe Nyin, Kachin State)		nangthithihtun.mohnyin@gmail.com	09-256042907	Female	43	27-2-2023
90	U Wunna Htay	Freelance		wunnahtay442@gmail.com	09-448539100	Male	45	27-2-2023

91	Daw Myat Su Wai	CF – Secretary		tamanmyat@gmail.com	09-761411900	Female		27-2-2023
92	U Bo Lay	Kachin State Disabled Persons organization		errorboy54@gmail.com	09-405544388	Male		27-2-2023
93	Khun Aung Chan Thar	Joint- Secretary (LWF-Mon)			09-791273062	Male	26	27-2-2023
94	Nan Mar Mar Zin	Vice-Chairman (LWF-Mon)				Female	26	27-2-2023
95	Khun Zaw Haty	Member (LWF- Mon)		Khunzawhtay049@gmail.com	09-688683771	Male	29	27-2-2023
96	Naw Phaw Law Eh She	Project Assistant-(SP)		nawphawlawehseh@gmail.com		Female	31	27-2-2023
97	U Ko Chit	Bamaw		htunhtunbw12345@gmail.com	09-250404634	Male	48	27-2-2023
98	U Maung Maung Oo	Green Network - Mandalay		Assic9@gmail.com	09-962024423	Male	56	27-2-2023
99	Daw Nwe Nwe Zin	Engineer-YCDC		Nwenwezin.25@gmail.com	09-798201179	Female	32	27-2-2023
100	Daw Wah Wah Khine	FREDA		Khine.wahwah@gmail.com	09-445542373	Female	49	27-2-2023
101	Daw Thidar Htay	Freelance		Thtay9619@gmail.com	09-693610831	Female	40	27-2-2023
102	U Aunt Htoo Aung	DSO Yangon- ECD		ygnecdia1@gmail.com	09-977825665	Male	25	29-3-2023
103	U Chan Nyein Htet	DSO Yangon- ECD		ygnecdia1@gmail.com	09-977825665	Male	30	29-3-2023
104	U Tun Oo	DSO Ayeyarwady ECD		ayeyarwaddyecd511@gmail.com	09-799842292	Male	56	29-3-2023
105	U Win Aung	retired Staff Officer		winaung.for.86@gmail.com	09-254269388	Male	63	29-3-2023
106	U Thadoe Maw	Retired Range Officer		mawthadoe@gmail.com	09-254269388	Male	65	29-3-2023
107	U Khant Zaw Htet	Range Officer - Ayeyarwady diroffice		ayeyarwaddydiroffice@forest.gov.mm	09-794072880	Male	26	29-3-2023
108	U Wai Yan Kyaw	Range Officer - Thingangyun FD			09-43164003	Male	29	29-3-2023
109	U Myat Thein Htut	Range Officer - Thingangyun FD			09-43164003	Male	34	29-3-2023
110	U Maung Maung Gyi	Range Officer - Thingangyun FD			09-43164003	Male	47	29-3-2023
111	U Thet Maung Maung	Mon, FD (Assistant Director)		monforest960@gmail.com	09-967931065	Male	50	29-3-2023

112	U Soe Win Aye	AD-FD, Tachileik District		soeaye70@gmail.com	9779795061	Male	58	29-3-2023
113	U Chan Myae Soe	AD - ECD, Tachileik District		chanmyaesoe49.36@gmail.com	09-881461146	Male	36	29-3-2023
114	U Sann Lwin Oo	Project Trainer Ma Hor Tha Dar Legal Age Association)		Kosanlwin001957@gmail.com	09-775512315	Male	66	29-3-2023
115	Daw Khin Htet Htet Myo	Trainer		khhmyo@gmail.com	09-775512315	Female	50	29-3-2023
116	Daw Swe Zin Aung	Chairman - SeineLeiAyeyar		swezinaung1991@gmail.com	09-261119255	Female	32	29-3-2023
117	Daw Ohn Mar Kyi	SeineLeiAyeyar		seinleiayear341@gmail.com	09-261119255	Female	44	29-3-2023
118	Daw Thiri Khaing	CBO		thirikhaing.tk1998@gmail.com	09-788038746	Female	25	29-3-2023
119	U Aye Min Soe	Youth leader		sminkaren554@gmail.com	9793913580	Male	26	29-3-2023
120	Daw Phyo Zarnyi Aung	Farmer		phyozarnyiaung007@gmail.com	09-43116826	Female	26	29-3-2023
121	U Wai Phyo Aung	Freelance Environmentalist		Waiphyoaung.yekyi@gmail.com	09-794627488	Male	30	29-3-2023
122	Daw Myat Noe Khaing	CBO		khaingmyatnoe025@gmail.com	9982051757	Female	20	29-3-2023
123	U Zung Ting	Pestalozzi Children's Foundation		zung.ting6@gmail.com	09-43142041	Male	53	29-3-2023
124	U Wai Min Chit	Pestalozzi Children's Foundation		zung.ting6@gmail.com	09-43142041	Male	43	29-3-2023
125	U Mg Mg Htay	Secretary - MFA		mmforestassociation@gmail.com	09-455038282	Male	65	29-3-2023
126	Daw Aye Myat Mon Kyaw	Young Water Professional		amandakyawsoe@gmail.com	09-5195563	Female	30	29-3-2023
127	U Hein Htet Aung	Freelance Environmentalist		heinhtetaung2011fd@gmail.com	943116826	Male	32	29-3-2023
128	Daw May Tharaphyu	EHS Myanmar		myanmarehs@gmail.com	09-976027252	Female	24	29-3-2023
129	U Kaung Htet Swan	EHS Myanmar		kaunghtetswan.mm@gmail.com	09-5123207	Male	29	29-3-2023
130	U Yan Naing	CBI				Male		29-3-2023
131	U Myo Aung	Toe Tet Paing Consultancy Co., Ltd		myoaung08@gmail.com	09-5099485	Male	60	29-3-2023

132	U Hein Htet Zaw	Assistant Program Office- Swedish Red Cross			09-899101774	Male	21	29-3-2023
133	U Soun Htwe	Secretary, Actmang		Sounhtwe941@gmail.com	09-5382263	Male	62	21-4-2023
134	Dr.San Thwin	Auditor, FREDA		santhwin@gmail.com	Au	Female	59	21-4-2023
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136	Daw Wah Wah Khine	Treasurer, FREDA		khine.wahwah@gmail.com	09-445442373	Female	47	21-4-2023
137	U Min Lwin	PA-2, Actmang Project		uminlwin1966@gmail.com	09-799714269	Male	57	21-4-2023
138	U Aye Min	SCO, Actmang Project		ayeminn2009@gmail.com	09-792100502	Male	38	21-4-2023
139	Daw Win Win Than	Accountant, Actmang Project			09-794588795	Female	39	21-4-2023
140	U Ank Htoo Aung	Deputy Staff Officer, YGN ECD		Ankhtooaung1@gmail.com	09-950809846	Male	25	21-4-2023
141	Daw Shwe Ye Wint War Soe	Staff Officer, YGN ECD		shweyeewintwarsoe@gmail.com	09-764555989	Female	30	21-4-2023
142	Daw Thazin Tun	Staff Officer, Magway ECD		thazintun.ecd@gmail.com	09-792490167	Female	27	21-4-2023
143	Daw Khin Tint Tint Aung	Staff Officer, Magway ECD		tintecd@gmail.com	09-401595088	Female	31	21-4-2023
144	Daw Cho Cho	Staff Officer, Magway ECD		wrud.chocho@gmail.com	09-420735427	Female	44	21-4-2023
145	U Htin Aung Kyaw	Deputy Director, Magway ECD		htinaungkyaw2002@gmail.com	09-428123845	Female	47	21-4-2023
146	U Thet Maung Maung	Assistant Director, Mon FD		thetmgmg.yz@gmail.com	09-967931065	Male	50	21-4-2023
147	U Aung Myo Thein	Deputy Staff Officer, Mon ECD		aungmyo179.am@gmail.com	09-793799742	Male		21-4-2023
148	Daw Hnin Htet Htet Soe	Assistant Director, Ayeyarwady ECD		mintha.7@gmail.com	09-448052318	Female	38	21-4-2023
149	U Min Zaw Oo	Deputy Staff Officer, Bago ECD		minzawoo.pdg@gmail.com	09-952355780	Male	27	21-4-2023
150	U Zaw Win Oo	Assistant Director, Mandalay FD		zawwinoo.fd@gmail.com	09-2039826	Male	48	21-4-2023
151	U Kyaw Thuya	Assistant Director, Kachin FD			9256079949	Male	44	21-4-2023

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154	Daw Thin Thin Su	Deputy Staff Officer, YGN Northern District, ECD			09-799699855	Female	29	21-4-2023
155	Daw Nan Khin Su Mon	Staff Officer, East ECD			09-257339181	Female	30	21-4-2023
156	Daw Than Than Su	Deputy Staff Officer, East ECD			09-776118005	Female	29	21-4-2023
157	Daw Aye Mya Thant	Staff Officer, Bago FD		ayemaythant2020@gmail.com	09-770082840	Female	33	21-4-2023
158	U Khan Seng	Deputy Staff Officer, Kachin ECD		sunshine1990nc@gmail.com	09-799789427	Male	24	21-4-2023
159	Daw Hnin Yamon Soe	Deputy Staff Officer, Sagaing ECD		hninyamonsoe136@gmail.com	09-950496797	Female	27	21-4-2023
160	Daw May Thet Zaw	Deputy Staff Officer, Sagaing ECD		maythetmoocs@gmail.com	09-400540654	Female	30	21-4-2023
161	Daw Myo Myo Htet	Deputy Staff Officer, Sagaing ECD		myomyohtet781@gmail.com	09-259038809	Female	27	21-4-2023
162	Daw Khin San Aung	Deputy Staff Officer, Sagaing ECD			09-264148634	Female	26	21-4-2023
163	Daw Pan Ei Phyu	Assistant Director, MDY ECD		panneiphyu.mdy86@gmail.com	09-797585367	Female	37	21-4-2023
164	U Kyaw Zay Ya	Staff Officer, Magway ECD		kyawzayya24@gmail.com	09-899036267	Male	44	21-4-2023
165	U Thae Min Aung	Staff Officer, Magway ECD		Thaeminaung598@gmail.com	09-420700920	Female	41	21-4-2023
166	U Htay Lin Aung	Staff Officer	Sagaing-FD	htaylinaung.fd13@gmail.com	09-259530244	Male	31	29-5-2023
167	U Thein Swe Myint	DAO	Sagaing	-	09-400434638	Male	46	29-5-2023
168	U Kyaw Soe Lwin	DAO-မြို့နယ်စည်ပင်	Sagaing	-	09-696513531	Male	44	29-5-2023
169	U Nay Myo Htike	Assistant Lecturer	MFS	naymyohtike2006@gmail.com	09-400029080	Male	41	29-5-2023
170	U Set Naing Htoo	Lecturer	MFS	setnainghtu609@gmail.com	09-958078801	Male	28	29-5-2023
171	U Zaw Moe Hein	Assistant Lecturer	MFS	zawmoeheinhein.for@gmail.com	09-891674599	Male	32	29-5-2023

172	U Win Tun Naing	Assistant Lecturer	MFS	-		Male	45	29-5-2023
173	U Phyo Wai Aung	Assistant Lecturer	MFS	phyowaiaung.uof2014@gmail.com		Male	31	29-5-2023
174	U Aung Wai Yan Oo	DSO	Kachin-ECD	aungwaiyanoo551@gmail.com	09-787200197	Male	24	29-5-2023
175	U Myo Aung Kyaw	Assistant Director	Kachin-ECD	myowinsumin@gmail.com	09-450031806	Male	44	29-5-2023
176	U Myo Zaw Hein	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-790926716	Male	25	29-5-2023
177	U Kham Seng	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-799789427	Male	25	29-5-2023
178	Daw Swe Swe Lin	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	29-5-2023
179	U Sein Paul	Deputy Assistant Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-981968865	Male	25	29-5-2023
180	Daw Myat Myat Myint Zu	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-781913502	Female	25	29-5-2023
181	Daw Maw Maw Thien	ပြည်နယ်စည်ပင်	Kachin	mawmawthein22@gmail.com	09-2400354	Female	52	29-5-2023
182	Daw Than Than Htwe	Deputy Assistant Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	29-5-2023
183	Daw Khaing May Soe Thaung	Ranger	Kachin-FD	khaingmay94@gmail.com	09-894968464	Female	29	29-5-2023
184	U Aung Min Soe	Staff Officer	Kachin-ECD	aungminsoeecd18@gmail.co	09-423324884	Male	38	29-5-2023
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186	U Wai Yan Aung	DSO	Kachin-ECD	kcn.ecd2022@gmail.com	09-404166129	Male	26	29-5-2023
187	U Myo Theint Kyaw	DSO	Kachin-ECD	kcn.ecd2022@gmail.com	09-787200197	Male	28	29-5-2023
188	Daw Aye Aye Aung	DASO	Kachin-ECD	jimikook786@gmail.com	09-783974128	Male	25	29-5-2023
189	U Aung Lwin Oo	Director	Agri-Kachin	aunglwin0035@gmail.com	09-259076874	Male	57	29-5-2023
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191	Daw San Dar Phyu	DASO	Kachin-ECD	sandarphyue061834@gmail.co	09-262982226	Female	27	29-5-2023
192	Daw Yin Min Oo	DASO	Kachin-ECD	yinminoo241880@gmail.co	09-793774312	Female	24	29-5-2023

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197	Daw Pyae Pyae	Researcher	Water Lab, Forest Research Institute	pyaepyae181163@gmail.com	9449571655	Female	24	29-5-2023
198	Daw Thin Su Tin	Researcher	Water Lab, Forest Research Institute	thinsutin.uof@gmail.com	9428196587	Female	33	29-5-2023
199	U Soe Minn Lat	Factory Manager	Aqua Pura Public Co.,Ltd	Soeminlatt.sml77@gmail.comv	9400413746	Male	46	29-5-2023
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202	U Soun Htwe	EC	FREDA	sounhtwe941@gmail.com	09-5382263	Male	62	29-5-2023
203	U Sein Lwin	Director	DWIR-Kachin State	dwir.kachinstate@gmail.com	09-256025495	Male	47	29-5-2023
204	Daw Than Than Htwe	Deputy Assistant Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	14.7.2023
205	U Aung Wai Yan Oo	DSO	Kachin-ECD	aungwaiyanoo551@gmail.com	09-787200197	Male	24	14.7.2023
206	Daw Sint Myat Thaw Tar	DSO	Kachin-ECD		09-787200197	Female	24	14.7.2023
207	Daw Yin Min Oo	DASO	Kachin-ECD	yinminoo241880@gmail.co	09-793774312	Female	24	14.7.2023
208	Daw Swe Swe Lin	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	14.7.2023
209	Daw San Dar Phyu	DASO	Kachin-ECD	sandarphyue061834@gmail.co	09-262982226	Female	27	14.7.2023
210	U Kham Seng	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-799789427	Male	25	14.7.2023
211	U Hein Htet Ko	Deputy Staff Officer	Kachin-ECD	heinhtetko19962016@gmail.com	09-777086878	Male	27	14.7.2023
212	U Than Sein Win	DSO	Kachin-ECD	kcn.ecd2022@gmail.com	09-682210929	Male	28	14.7.2023
213	U Sein Paul	Deputy Assistant Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-981968865	Male	25	14.7.2023
214	U Myo Aung Kyaw	Assistant Director	Kachin-ECD	myowinsumin@gmail.com	09-450031806	Male	44	14.7.2023
215	Daw Aye Aye Aung	Deputy Assistant Staff Officer	Kachin-ECD	jimikook786@gmail.com	09-783974128	Female	25	14.7.2023
216	Daw Khin Myo Set	Staff Officer	Sagaing-ECD	khinmyoset35@gmail.com		Female	39	14.7.2023
217	Daw Thet Thet Soe	Deputy Staff Officer	Sagaing-ECD	dawthetthetsoe26491@gmail.com				14.7.2023
218	Daw Khaing Sandi Thein	Deputy Staff Officer	Magway-ECD	sofiqueen35@gmail.com	09-261856638	Female		14.7.2023

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220	Daw Eaindary Khin	Deputy Staff Officer	Magway ECD	ms.eaindarykhin1999@gmail.com	09-261856638	Female		14.7.2023
221	U Soe Thu	Deputy Staff Officer	Magway ECD	kosoethu778877@gmail.com	09-459652238	Male		14.7.2023
222	Daw Dardar Lin Maung	Deputy Staff Officer	Magway ECD	dardarlinmaungddlm@gmail.com	09-969979271	Female		14.7.2023
223	Daw Chit Ngon Phoo	Deputy Staff Officer	Magway ECD	chitngonphooecd@gmail.com	09-966962696	Female		14.7.2023
224	U Aye Chan Ko Ko	Deputy Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com	09-691430153	Male	29	14.7.2023
225	Daw Khaing2 May Zin	Deputy Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com		Female	25	14.7.2023
226	U Kaung Htet	Assistant Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com		Male	30	14.7.2023
227	Daw Hnin Htet Pwint	Assistant Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com		Female		14.7.2023
228	U Nyan Lin Htet	Deputy Assistant Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com		Male		14.7.2023
229	Daw Toe Toe Sint	Deputy Assistant Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com		Female		14.7.2023
230	U Win Ko	Staff Officer	Mon ECD	wynnko28@gmail.com	09-750835399	Male	40	14.7.2023
231	U Thet Naing	Deputy Staff Officer	Mon ECD	mawlamyinettownshipecd@gmail.com	09-255720335	Male	49	14.7.2023
232	U Aung Myo Thein	Deputy Staff Officer	Mon ECD	aungmyo179.am@gmail.com	09-793799742	Male	28	14.7.2023
233	Daw Pan Ei Phyu	Deputy Staff Officer	Mon ECD	paneiphyu.ecd@gmail.com	09-973941998	Female	28	14.7.2023
234	Daw Pan Ei Phyu	Assistant Director	MDY ECD	panneiphyu.mdy86@gmail.com	09-797585367	Female	37	14.7.2023
235	Daw Yadanar Oo	Deputy Staff Officer	MDY ECD	yadanar33333@gmail.com	09-767507039	Female	24	14.7.2023
236	Daw Ei Thazin Aung	Deputy Staff Officer	MDY ECD	aeithazinaung1119@gmail.com	09-693171388	Female	24	14.7.2023
237	Daw Than Than Lwin	Assistant Director	Department of Agriculutre	thawthawlwin123@gmail.com	09-401595115	Female	60	14.7.2023
238	Daw Sandar Kyi	Deputy Assistant Staff Officer	Department of Agriculture	sandark215@gmail.com	09-423697507	Female	29	14.7.2023
239	U Ohn Lwin			<ohnpyone@gmail.com>	09-979446700	Male		14.7.2023
240	Dr.Kaung Htet Swan	EHS Myanmar		kaunghtetswan.mm@gmail.com	09-5123207	Male	29	14.7.2023
241	Daw Than Than Htwe	Deputy Assistant Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	21.7.2023
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244	Daw Swe Swe Lin	Deputy Staff Officer	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	21.7.2023
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250	Daw Khaing2 May Zin	Deputy Staff Officer	Aya ECD	ayarwaddyecd511@gmail.com		Female	25	21.7.2023
251	Daw Pan Ei Phyu	Assistant Director	MDY ECD	panneiphyu.mdy86@gmail.com	09-797585367	Female	37	21.7.2023

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258	Daw Pan Ei Phyu	Deputy Staff Officer	Mon ECD	paneiphyu.ecd@gmail.com	09-973941998	Female	28	21.7.2023
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260	Daw Khaing Sandi Thein	Deputy Staff Officer	Magway ECD	sofiqueen35@gmail.com	09-261856638	Female	26	21.7.2023
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268	Daw Khin Myo Set	Staff Officer	Sagaing-ECD	khinmyoset35@gmail.com	09-777550868	Female	39	26.7.2023
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289	Daw Thet Thet Soe	Deputy Staff Officer	Sagaing ECD	dawthethetsoe26491@gmail.com	09-791885618	Female	30	11.8.2023
290	U Soe Min Thu	Range Officer	Sagaing FD	soeminthupmn@gmail.com	09-420425544	Male	32	11.8.2023
291	Daw Myat Noe Wai	Staff Officer	Nyaung OO ECD	myatnoewai.info@gmail.com	09-402684877	Famale	28	11.8.2023
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324	Daw Myat Noe Wai	Staff Officer	Nyaung OO ECD	myatnoewai.info@gmail.com	09-402684877	Famale	28	14.8.2023
325	Daw Khaing Khaing May Zin	Deputy Staff Officer	Aya ECD	khatphoowai2298@gmail.com	09-794804088	Female	25	14.8.2023
326	U Min Swe	Assistant Director	Aya FD	minswe67@gmail.com	09-2036518	Male	56	14.8.2023
327	Daw Tin Nwait Yi	Staff Officer	MDY ECD	dawtinnwaityi1991@gmail.com	09-880402521	Female	32	14.8.2023
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329	Daw Su Myat Hnin	Staff Officer	Magway-FD	sumyatthnin1990@gmail.com	09-974709000	Female	33	14.8.2023
330	Daw Hnin Wyut Yi	Staff Officer	Bago FD	hninwyutyi.91@gmail.com	09-750056427	Female	33	14.8.2023
331	U Thant Zin Kyaw	Staff Officer	Yangon FD	thantsinkyaw6789@gmail.com	09-259934334	Male	37	14.8.2023
332	Daw Swe Swe Lin	DASO	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	14.8.2023
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334	Daw Than Than Htwe	DASO	Kachin-ECD	kcn.ecd2022@gmail.com	09-254470466	Female	27	14.8.2023
335	U Aung Wai Yan Oo	DASO-EIA	Kachin-ECD	aungwaiyanoo551@gmail.com	09-787200197	Male	25	14.8.2023
336	Daw Aye Aye Aung	DASO-EIA	Kachin-ECD	kcn.ecd2022@gmail.com	9783974128	Female	25	14.8.2023
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List of participants, who attended the in person awareness raising program at Pathein, Mawlamyaing, Pyay, Magwe, Mandalay and Yangon

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59	Daw Sandar Aye Nyein		FD-Pyay	-	09-423748530	Female	45	Pyay, Bago Region	9/5/2023
60	Daw Thet Thet Mar		FD-Pyay	-	09-794770836	Female	41	Pyay, Bago Region	9/5/2023
61	Daw Su Myat Moe		FD-Pyay	-	09-797708992	Female	20	Pyay, Bago Region	9/5/2023
62	U Chan Hein Aung		FD-Pyay	-	09-764491253	Male	23	Pyay, Bago Region	9/5/2023
63	U Myint San OO		TDA-Pyay	-	09-687767984	Male	57	Pyay, Bago Region	9/5/2023
64	U Phyo Lay		Resuce-Shwe Yaung Ahlin Tan	-		Male		Pyay, Bago Region	9/5/2023
65	U Soe Naing	Contact Person	Resuce-Shwe Yaung Ahlin Tan	-	09-444900210	Male	26	Pyay, Bago Region	9/5/2023
66	U Zwe Pyae Toe	Member	Resuce-Shwe Yaung Ahlin Tan	-	09-673660246	Male	19	Pyay, Bago Region	9/5/2023
67	U Tin Mg Win	Assistant Director	FD-Pyay	tmwin.96@gmail.com	09-423667460	Male	53	Pyay, Bago Region	9/5/2023
68	U Khaing Tun	Assistant Director	ECD	khaingtun07@gmail.com	09-44403239	Male	41	Pyay, Bago Region	9/5/2023
69	U Pyae Phyo Maung		FD	-		Male	18	Pyay, Bago Region	9/5/2023
70	Daw Nwe Nwe Win	Deputy Director	Directorate of Industrial Supervision and Inspection-DISI	nwenwewin.172@gmail.com	09-43038294	Female	44	Magwe Region	11/5/2023
71	U Wai Phyo Kyaw	Deputy Director	Department of Agriculture	deparzayarwaiphokyaw@gmail.com	09-450022190	Male	52	Magwe Region	11/5/2023
72	Daw Ei Phyu Nyein	Helper	Department of Fisheries	dofmagway35@gmail.com	09-444267632	Female	21	Magwe Region	11/5/2023
73	U Naing Swan Htet	Assistant Supervisor	Directorate of Water Resources and Improvement of River System- DWIR	naingswanhter1993@gmail.com	09-253596409	Male	30	Magwe Region	11/5/2023
74	U Aung Ko Ko	Staff Officer	Magway City Development Committee	-	09-43150700	Male	50	Magwe Region	11/5/2023

75	Daw Hnin Hnin Htwe	Assistant Director	Minbu City Development Committee		09-401619956	Female	56	Magwe Region	11/5/2023
76	Daw Saw Myat Mon	Assistant Engineer	Magway City Development Committee		09-426396516	Female	53	Magwe Region	11/5/2023
77	U Kyaw Swar Win	Secretary	Thadarshin		09-5330572	Male	43	Magwe Region	11/5/2023
78	U Win Zaw	U.D.C	Myanmar Timber Enterprise	winzawtts@gmail.comn	09-446789895	Male	39	Magwe Region	11/5/2023
79	U Si Thu Aung		Gayunarshin Association		09-966704850	Male	18	Magwe Region	11/5/2023
80	U Phyo Wai Lin		Gayunarshin Association		09-423370698	Male	24	Magwe Region	11/5/2023
81	U Thet Paing Soe	Staff Officer	DZGD	htetpaingsoekothet@gmail.com	09-798845792	Male	35	Magwe Region	11/5/2023
82	U Aung Bone Wai	Deputy Officer	ECD		09-792303184	Male	26	Magwe Region	11/5/2023
83	U Myo Tin Oo	Junior Clerk	General Administration Department		09-401593983	Male	31	Magwe Region	11/5/2023
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85	Daw Khin Swe Htun	Junior CLerk	General Administraion Department	khinswetun7777777@gmail.com	09-753283281	Female	24	Magwe Region	11/5/2023
86	Daw Yadanar Phoo Way	Accountant-4	General Adminstration Department	phoowai997@gmail.com	09-259035396	Female	25	Magwe Region	11/5/2023
87	Daw Zun Wai Khaing	Junior Clerk	General Administarion Department		09-780894748	Female	27	Magwe Region	11/5/2023
88	Daw Wai Oo Khin	Junior Clerk	General Administraion Department		09-695632087	Female	25	Magwe Region	11/5/2023
89	Daw Yun Phu Phu Thar	Deputy Staff Officer	Environmental Conservation Department		09-798382762	Female	26	Magwe Region	11/5/2023

90	Daw Chit Nung Phoo	Deputy Staff Officer	Environmental Conservation Department		09-966962696	Female	25	Magwe Region	11/5/2023
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93	U Hein Thu Htet		KS.Rescue		09-950000292	Male	24	Magwe Region	11/5/2023
94	U Phyo Thiha	Deputy Staff Officer	Environmental Conservation Department	phyo29thiha@gmail.com	09-440225321	Male	53	Magwe Region	11/5/2023
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97	U Ye Lin Aung	Lumber record-5	Milling and marketing, Myanmar Timber Enterprise)		09-40151905	Male	39	Magwe Region	11/5/2023
98	U Myo Aung	Assistant Director	Forest Department	aung.myoaung2000@gmail.com	09-440229339	Male	49	Magwe Region	11/5/2023
99	U Mg Mg Than	Assistant Director	Irrigration Department	thanm9430@gmail.com	09-440227242	Male	57	Magwe Region	11/5/2023
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101	U Zaw Zaw Linn	DOM	Mining	zzlynn20040@gmail.com	09-791116457	Male	45	Mandalay Region	15-5-2023
102	U Thein Htike Oo	DD	DRD		09-285338899	Male	45	Mandalay Region	15-5-2023
103	U Thaw Naing Oo	Director	Dry Zone Greening Department	thawnaing0015@gmail.com	09-2046014	Male	46	Mandalay Region	15-5-2023
104	U Thant Zin Oo	SAE	MCDC		09-797297931	Male	28	Mandalay Region	15-5-2023
105	U Maung Maung Oo	Head Leader	Natural Green Association	assic9@gmail.com	09-2024423	Male	56	Mandalay Region	15-5-2023

106	U Ye Htet Aung	Chief Officer	Irrigration Department	yehtetaung992@gmail.com	09-797168418	Male	30	Mandalay Region	15-5-2023
107	U Win Swe Oo	Ranger	Forest Department	winsweoo.fd@gmail.com	09-777750548	Male	41	Mandalay Region	15-5-2023
108	Daw Yamin New	Deputy Director	Mandalay Agri Development Affair	mrala.lawtax@gmail.com	09-2023654	Female	57	Mandalay Region	15-5-2023
109	Daw Khin Nyei Htwe	Assistant Director	Mandalay Region Agriculture	khnyeinhtwe.mdy@gmail.com	09-402677192	Female	46	Mandalay Region	15-5-2023
110	U Tay Zar Aung	AD	Mandalay Amarapura		09-448046411	Male	38	Mandalay Region	15-5-2023
111	U Kyaw Soe Naing	V.P	MRCCI	ksnkangtmut@gmail.com	09-786806150	Male	55	Mandalay Region	15-5-2023
112	Daw Cho Mar Oo	MWAF(MDY)			09-798673548	Female	58	Mandalay Region	15-5-2023
113	Dr.Cho Mar Htwe	Staff Officer	DOA, LUD, MDY LAB	cmhtwe@gmail,com	09-2064556	Female	32	Mandalay Region	15-5-2023
114	U Ye Tun	Director	Environmental Conservaiton Department	yehtun999ecd@gmail.com	09-448533733	Male	50	Mandalay Region	15-5-2023
115	Daw May Thandar Linn	DSO	ECD, Aung Myar Thar San	maythandarlinn.yau2k17@gmail.com	09-458041784	Female	27	Mandalay Region	15-5-2023
116	Daw May Nwet Soe	DSO	ECD, Aung Myar Thar San	maynwetsoeyau@gmail.com	09-427898469	Female	27	Mandalay Region	15-5-2023
117	U Aung Than Naing	DSO	PCD	aungthannaingmetllergy@gmail.com	09-774605987	Male	27	Mandalay Region	15-5-2023
118	U Dana Kyaw	DSO	ECD(EIA)	denakyaw18@gmail.com	09-767870404	Male	24	Mandalay Region	15-5-2023
119	U Thant Zin Hein	DSO	ECD(PCD)	thantzin.tz747@gmail.com	09-441858758	Male	25	Mandalay Region	15-5-2023
120	Daw Yee Mon Khaing	DSO	ECD(Admin)	yemonkhaing343@gmail,com	09-441390375	Female	26	Mandalay Region	15-5-2023
121	Daw Aei Thazin Aung	DSO	ECD(PCD)MDY	aeithazinaung1119@gmail.com	09-693171388	Female	25	Mandalay Region	15-5-2023
122	U Lin Zaw Min	Advisor	GCA	linzawmin.mpa42@gmail.com	09-2004077	Male	50	Mandalay Region	15-5-2023
123	U Kyaw Kyaw Lin	Advisor	GCA	kyawkyawlinmpa44@gmail.com	09-5504396	Male	45	Mandalay Region	15-5-2023
124	U Min Han	Secretary	GCA	uminhanpol2020@gmail.com	09-402535625	Male	47	Mandalay Region	15-5-2023
125	U Zaw Tun Aung	DD	ECD	mdyecd20215@gmail.com		Male	48	Mandalay Region	15-5-2023

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127	Daw Htet Wi Shoon	DSO	ECD	htetwaishoon30@gmail.com	09-457292940	Female	24	Mandalay Region	15-5-2023
128	Daw Yu Myat Khaing	DSO	ECD	yumyatkhaing511198@gmail.com	09-421841564	Female	25	Mandalay Region	15-5-2023
129	U Linn Khant Bo	DSO	ECD	linnkhantbo17399@gmail.com	09-444415360	Male	24	Mandalay Region	15-5-2023
130	Dr.Khin Lay Swe	Rtd. Pro-rector Yezin Agricultural University	Director, GGG Co.Ltd., Pathein Gyi Township< Mandalay region	khinlays2010@gmail.com	09-2051028	Female	73	Mandalay Region	15-5-2023
131	U Sein Htun Linn	DDG(Rtd.)	EDD-MONREC	linn.seinhtoon@gmail.com	09-4305618	Male	63	Yangon Region	6/6/2023
132	U Kyaw San Naing	Director	ECD	kyawsannaing.env@gmail.com	09-420704775	Male	56	Yangon Region	6/6/2023
133	U Tin Thein	Director(Rtd.), Farmer	Private farmland		9795584988	Male	67	Yangon Region	6/6/2023
134	U Bywe Kyone	DD	YCDC-UEUD		09-5502767	Male	59	Yangon Region	6/6/2023
135	Daw Thet Su Mon	Engineer-2	YCDC-UEUD		09-441893369	Female	29	Yangon Region	6/6/2023
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143	Daw Hnin Wai		Thant Myanmar	hninwaiwainwe@gmail.com	09-967293558	Female	30	Yangon Region	6/6/2023
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146	U Tun Myint	Hittaing	Resecue	tunmyat@gmail.com	09-420734455	Male	42	Yangon Region	6/6/2023
147	U Lu Maw	Myint myo	Resecue		09-681006067	Male	36	Yangon Region	6/6/2023
148	U Zaw Latt	Wun Yan	Resecue		09-795586445	Male	40	Yangon Region	6/6/2023
149	Daw Myat Su Paing		Freelance	myathsupaing0@gmail.com	09-976403629	Female	23	Yangon Region	6/6/2023
150	Daw Wah Wah Khine	Treasurer	FREDA	khine.wahwah@gmail.com	09-445442373	Female	47	Yangon Region	6/6/2023
151	Dr.San Thwin	Audit	FREDA	santhwin@gmail.com	9975949106	Male	59	Yangon Region	6/6/2023

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153	U Aye Min	S.C.O	FREDA	ayeminn2009@gmail.com	9792100502	Male	38	Yangon Region	6/6/2023
154	U Paw Ni		Video		09-423023072	Male	56	Yangon Region	6/6/2023
155	U Min Swe		FREDA		09-420730833	Male	62	Yangon Region	6/6/2023
156	U Phone Naing		FREDA		09-974812692	Male	62	Yangon Region	6/6/2023