SRWMA/J-PRISM II
WASTE OIL COLLECTION AND STORAGE PILOT PROJECT

IMPLEMENTATION REPORT

Phase I

Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries Phase II (J-PRISM II)

JICA SPREP Secretariat of the Pacific Regional Environment Programme J-PRISM SRWMA SAMOA RECYCLING & WASTE MANAGEMENT ASSOCIATION MNRE Ministry of natural resources and environment

SRWMA/J-PRISM II
Waste oil collection and storage Pilot project
Implementation report. Phase I

February 2022

J-PRISM II Project Office

https://www.sprep.org/j-prism-2/home

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SRWMA/J-PRISM II
WASTE OIL COLLECTION AND STORAGE PILOT PROJECT

IMPLEMENTATION REPORT
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LIST OF ACCRONYMS

3R+Return	the 3R+Return approach: reduce, reuse, recycle and return
HS	the Harmonized System is a standardized numerical method of classifying traded products. It is used by customs authorities around the world to identify products when assessing duties and taxes and for gathering statistics.
IBC	Intermediate Bulk Container
JICA	Japan International Cooperation Agency
J-PRISM I	Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management Phase I
J-PRISM II	Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management Phase II
MNRE	Ministry of Natural Resources and Environment of Samoa
MOU	memorandum of understanding
MSDS	Material Safety Data Sheet
NPO	nonprofit organization
PET	polyethylene terephthalate
PICs	Pacific Island Countries
PPE	personal protective equipment
SPREP	The Secretariat of the Pacific Regional Environment Programme
SRWMA	Samoa Recycling and Waste Management Association
SWOMP	Samoa Waste Oil Management Programme

EXECUTIVE SUMMARY

About J-PRISM I

Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management Phase I (J-PRISM I) started in 2011 aiming to develop the capacity of organizations and personnel to improve waste management in 11 Pacific Island Countries (PICs).

About 3R+Return Activities in J-PRISM II

Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management Phase II (J-PRISM II) was launched in February 2017 as a 5-year project that targets nine PICs. There are four outputs under the J-PRISM II regional cooperation activities. ***"Practical and sustainable 3R+Return system is enhanced"*** is the fourth expected output, that was established from the beginning of the project.

The "3R+Return" concept has been promoted by J-PRISM for more than 10 years. Most of the countries in the region are lacking recycling facilities and have limited recycling markets due to the small scale of their economy. The "3R+Return" concept promotes proper resource recycling and appropriate disposal by exporting (=returning) recyclable waste or difficult waste for disposal, while returning organic waste into soil for effective resource utilization.

In its effort to enhance the practical and sustainable 3R+Return system, J-PRISM recognized the importance of private recycling companies in improving waste management in the region through the good impact of their ongoing work on recovery of scrap metals and its shipment overseas. J-PRISM identified the need to improve the support of these private recycling operations through upgrading their recycling technology, facilities, and equipment. Based on that, one of the approaches considered by J-PRISM II was for the private recycling companies to voluntarily create an association (a nonprofit organization (NPO)), where the support from the Japan International Cooperation Agency (JICA) can be channeled to assist its members activities.

J-PRISM II is working on strengthening the regional network of recyclers in the Pacific through supporting the recycling association activities and promoting regional practical and sustainable 3R+Return system.

About SRWMA/J-PRISM II pilot project

The Samoa Recycling and Waste Management Association (SRWMA) is the first recycling association in the Pacific. Their voluntary activities are always the top runners in the region. As detailed in Chapter 1 of this implementation report, they started a waste oil management program in 2019. As a result of discussions with SRWMA, Ministry of Natural Resources and Environment (MNRE) and the Secretariat of the Pacific Regional Environment Programme (SPREP), this waste oil collection and storage activity will be supported as one of the activities of the pilot project. A memorandum of understanding (MOU) for this project was signed by MNRE, JICA, SRWMA and SPREP in June 2021.

Summary of waste oil collection and storage implementation results - phase 1

Collection Results

The total collection volume was 45,513 liters (40,964 kg) in September 2021 from four collections (211 drums and 21 small containers).

The collection was completed in 2 trips on all 4 days, and the average collection time per trip was 1 hour 49 minutes per trip.

Minimum items required to collect waste oil are a crane truck with straps, a forklift, a pump, pallets, and worker's personal protective equipment (PPE).

Most customers do not own a forklift, a pump, or pallets, and store the drums outside without a roof and concrete floor.

The average daily collection amount was 11,378 liters per day (≈51 drums), and the average daily collecting time was 4 hours 04 minutes per day.

SRWMA needs to allocate 8 staff members for collection. Since SRWMA allocated 2-5 employees, the rental car company drivers and J-PRISM II personnel support were essential.

SWOMP (Samoa Waste Oil Management Program) has no forklift transportation tool to the customer's site.

During Phase 1 SWOMP did not receive information from customers on the type of waste oil to be collected. Therefore, for Phase 2 the SWOMP collection request form was created. The information is to be obtained in advance before the waste oil collection, including the Material Safety Data Sheet (MSDS).

Storage Results

It took four days to weigh the waste oil containers, change the storage layout of the SWOMP facility, and store it. The average working hours per day were 6 hours and 33 minutes. It takes more time to weigh, change the layout of the facility, and storing than to collect.

SRWMA needs to allocate 7 staff members for storing. Since SRWMA assigned 4-5 employees, the rental car company drivers and J-PRISM II personnel support were essential.

Due to the current collection fee system of 20 sene/liter, each container needs to be weighed one by one. This task takes time.

Waste oil leaked from 25 drums during the unloading at the SWOMP facility. It was confirmed that drums that had been stored outdoors for a long period of time easily leaked due to the impact of the movement.

Since the leaked drums could not be weighed, the volume of oil was calculated at 200 liters per drum without weighing.

SWOMP has no cleaning and hygiene tools (such as wiping cloths, garbage bin, broom, trash bags) at the SWOMP facility.

Cost Analysis Results

It was confirmed that the revenue of the implementation of Phase 1 was 8,941 tala, but the expences reached 17,333.70, which created a deficit for SWOMP as a business.

Among variable costs, rental truck and forklift costs had the highest expenditure ratio (≈67%). To reduce the operational cost, SWOMP needs to check how to obtain a forklift transportation tool for customers, and its cost in Phase 2.

For a small collection (amount that can be carried in one trip), in order to reduce the forklift rental cost, one option is to not rent a forklift and use only the crane truck owned by the SRWMA member company. In that case, it is necessary to give due consideration to oil leak prevention measures and work safety measures for workers.

As one of the important business improvement measures, it is recommended to change the current SWOMP collection fee, and charge the customer the necessary expenses. After grasping the cost of the entire operation, analyzing the cost balance and the business model change based on the implementation results of Phase 2, SRWMA/J-PRISM II will consider all the necessary charge revisions. The current collection fee setting is not to be changed at the end of Phase 1.

PREVIOUS RESEARCH

Summary of previous research findings

The following list shows previous major studies and waste oil generation amount estimation data in Samoa. The estimated data can be classified into two groups: first group in 2012-2016 and second group in 2018-2021.

Source	Target oil	Findings on waste oil data	Comments
Envirocare Engineering Consult Ltd "Used Oils Audit Survey. An audit survey of used oils in Samoa", 2012	Engine oil Lubricant oil	Based on averaged quantity of lubrication oils imported and from site visits and interviews, the quantity of generated used oils and their disposal, an audit balance on annual averaged basis is summarized as follows: • Import Amount: 660,841 liters per year • Usage Amount: 630,941 liters per year • Used Oil Generated Amount: 248,363 liters per year • Used Oil in Storage Amount: 8,400 liters per year • Used Oil Disposed Amount: 248,363 liters per year	Customs records do not clearly separate hydraulic oils from other engine oils. Customs records show quantities in liters for some imports, kilograms for some and both units for some imports, thus it is difficult to arrive at definitive figures, except to convert imports in kgs to liters.
SPREP "Cost-benefit analysis of used oil management options for Samoa", 2013	Lubricant oil	• Import Amount: 660,000 liters per year • Used Oil Generated Amount: 250,800 liters per year • Four options are proposed in this report, and the Levy cost required to process them is shown below: 1. Used oil added as a diesel fuel augmenter for local electricity generation (Levy cost of 2% of oil purchase price (i.e., 0.18 WST per liter)) 2. Point of sale addition of used oil at a concentration of under 1 % to all diesel fuel sold in Samoa (Levy cost of 2% of oil purchase price (i.e., 0.18 WST per liter)) 3. Used oil shipped offshore for disposal to India (Levy cost of 9% of oil purchase price (i.e., 0.71 WST per liter)) 4. Used oil shipped offshore for disposal to Fiji (Levy cost of 10% of oil purchase price (i.e., 0.78 WST per liter))	Of the four options on the left, plans 1) and 2) are evaluated to be profitable domestically because both options can generate local income from used oil in Samoa. On the other hand, the plans 3) and 4) are evaluated as environmentally sustainable options but more expensive disposal option.

Source	Target oil	Findings on waste oil data	Comments
MNRE "Used Oil Management Plan for Samoa", 2014	No specific definition, but the description of waste oil data indicates "Lubricating oils"	• It is estimated that approximately 660,000 liters of lubricating oils are imported into Samoa on an annual basis • Of the 660,000 liters of lubricating oils imported in Samoa annually. It is estimated that approximately 38% of this volume results in used oil (i.e. 250,800 liters per annum) that needs to be appropriately managed to avoid environmental and human health impacts • It could be expected that between 50% and 60% of all lubricating oil imported into Samoa could eventually be recycled annually (i.e. up to 396,000 liters)	The Source of the data on the left is quoted from "Envirocare Engineering Consult Ltd (2012). Used Oil Audit Survey for Samoa". Unpublished report to SPREP. 31pp
SPREP "Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016–2025", 2016	• Engine oils • Transmission fluids • Refrigeration oils • Compressor oils • Metal working fluids and oils • Electrical insulating oil • Hydraulic fluids	• Theoretical Annual Generation: 270,975 liters per year • Stockpiles (estimated 2013/14): 8,400 liters per year	The source of the data on the left is quoted from "National used oil audits completed for SPREP during implementation of the SPREP/AFD Regional Solid Waste Management Initiative, and the SPREP/EU Pacific Hazardous Waste Management Project"
SPREP "Report one: Desktop review of used oil management data", 2018	No specific definition	• 2014 Annual lubricant importation: 660,000 liters • 2014 Annual used oil production: 330,000 liters • 2014 National used oil stockpile: 8,400 liters • National used oil storage capacity: 2,700,000 liters (PPS and EPC tanks)	The source of the Annual lubricant importation and used oil productions data is quoted from Envirocare Engineering Consult Ltd, "Cost Benefit Analysis of Used Oil Management Options for Samoa", 2015
World Bank "Samoa Waste Audit Report", 2021	Waste oil (lubricant oil)	• Total recycled: 17 tons per year • Exports, custom data: 21.8 tons per year • Stockpiles found: 340 tons per year • Waste generation: 17 tons per year • Imports: 71 tons per year	Customs data was investigated to benchmark waste generation, recycling and recovery figures. However, customs exports do not differentiate between exports of recyclables and exports of goods, so this was considered an inadequate measure of the quantity of recyclables exported. The quantities imported via customs data were calculated in as follows: • Several hundred HS codes were assigned representing more than 80% of imports by value to 30 high-level material categories. Details of import data are provided in the data uploaded to the INFORM database; • For each high-level category, the proportion of the imported material that would eventually end up as each type of waste was estimated, and what proportion was consumable (for example, it was estimated that PET water bottles are 99.5 % consumable and 0.5 % PET waste).

Source	Target oil	Findings on waste oil data	Comments
JICA "Data Collection Survey on promotion of recycling plastics and other materials inPacific Island Countries", 2021	Waste oil (lubricant oil)	• Amount of generation of waste oil in 2020: 344 tons per year » Waste oil discharge from end-of-life vehicle in 2020: 57 tons per year » Waste oil discharge other than from end-of-life vehicle in 2020: 287 tons per year • Amount of generation of waste oil in 2030: 492 tons per year » Waste oil discharge from end-of-life vehicle in 2030: 82 tons per year » Waste oil discharge other than from end-of-life vehicle in 2030: 410 tons per year	• The amount of waste lubricant oil generated in the JICA survey is based on the amount generated in 2014 in D. Haynes *et al*., "Report one: Desktop review of used oil management data". In this report, the amount of waste lubricant oil generated is estimated in liters. Based on this, the JICA survey team converted the weight of used lubricant oil to 0.9 kg per liter, and the amount of waste lubricant oil generated in each country is shown in tons. • The amount of recyclable resources generated is estimated based on the following two ways, with the base year set to 2019: 1. Amount of target items generated in 2019 in each country (used vehicle body, used lubricat oil); 2. The ratio of lubrication oil contained in the vehicle body was set to 1.5% of the vehicle weight, and the same amount was estimated. • 2020-2023: the amount generated in the base year (2019) was multiplied by the GDP growth rate of each year (2020-2022) from "World Bank Global Economic Prospects", June 2021. • 2023-2030: the amount generated in the base year (2019) was multiplied by the GDP growth rate of 2023 shown in "World Bank Global Economic Prospects", June 2021 (it was assumed that the GDP growth rate after 2023 will be maintained at the level of 2023).

First group: 2012-2016

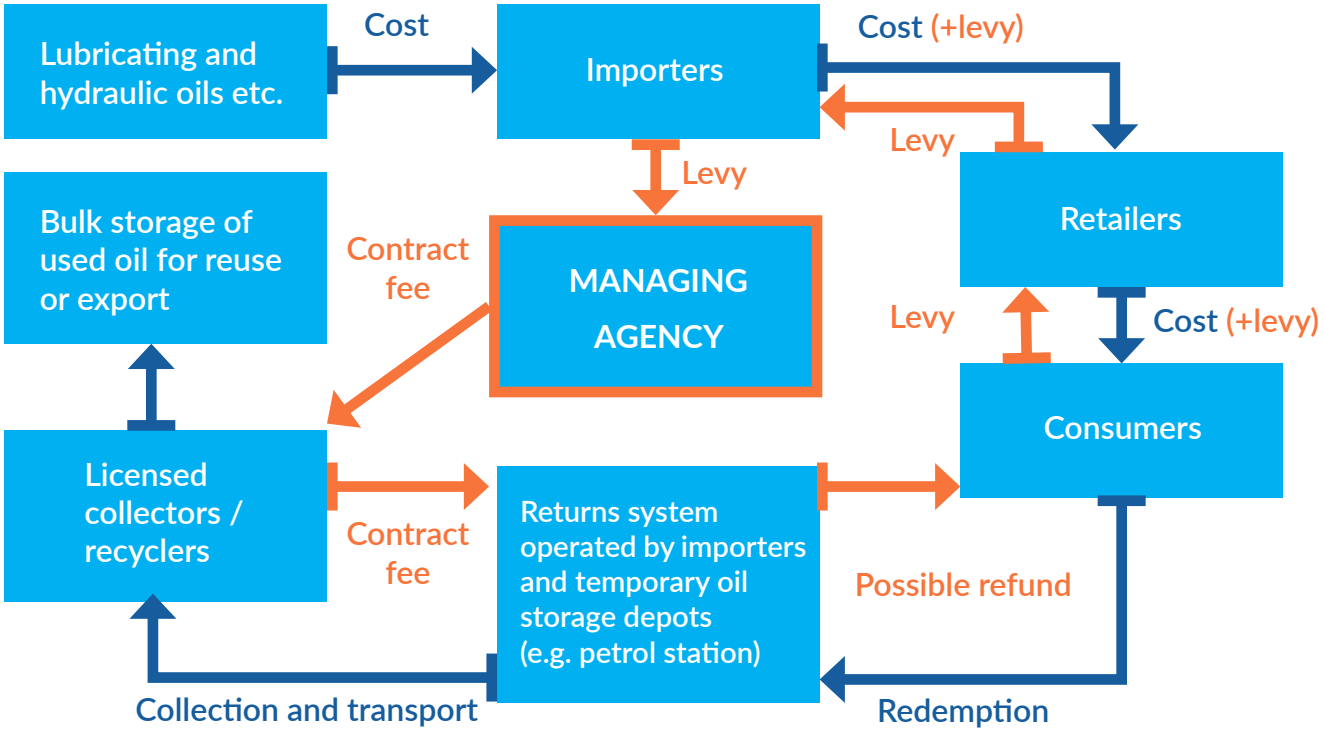
Waste oil generation data provided by Envirocare Engineering Consultant in 2012, a New Zealand consulting firm, made a significant contribution by being the first to create waste oil generation estimation data for Samoa. The 2012 report estimated waste oil generation and import amount, etc. through customs data surveys and interviews with major suppliers and generators in Samoa.

The estimates of annual used oil imports amount of 660,841 liters, and the annual used oil generated amount of 248,363 liters given in the 2012 report are also referred to in MNRE's 2014 report "Used Oil Management Plan for Samoa", and in the SPREP's "Cleaner Pacific 2025" report for ten years regional waste management strategy compiled in 2016. Therefore, the 2012 estimation results can be used as basic data on the amount of waste oil imported and generated in Samoa.

In addition, the types of waste oil that were surveyed in the 2012 report were engine oil and lubricant oil. However, the types of waste oil studied in the 2014 MNRE report and 2016 SPREP report are not necessarily the same. As stated in 2012 report, when estimating imports and generation data concerning customs data, the accuracy of customs selection of the type of oil is the key to obtaining accurate import/export data results. However, this is

not something that the surveyor can change. For this reason, it can be said that it is necessary to devise ways to estimate the total data in combination with the customs data survey and interview survey as in the 2012 survey.

In 2013 SPREP conducted a cost-benefit analysis of Samoa's used oil management options, showing more realistic countermeasure options that the Samoa government could consider. Four options are proposed in this report, but whichever option is selected, it is assumed that the stewardship system would fund the sustainable collection of used oil products. To operate the stewardship system, the managing agency would be responsible to charge the levies and pay the redemption to consumers etc. The proposed stewardship system diagram at that time is shown below.



Stewardship system flow diagram for used oil (SPREP, Cost-benefit analysis of used oil management options for Samoa, 2013, p9).

As mentioned above, the annual import amount of waste oil in Samoa during the first stage from 2012 to 2016 was estimated to be 660,000 liters, and the annual generation amount of waste oil was estimated to be about 250,000-270,000 liters.

Second group: 2018-2021

The latest report by SPREP on waste oil "Report one: Desktop review of used oil management data", compiled in 2018, estimates that Samoa's annual waste oil production as of 2014 was 330,000 liters.

In 2021, World Bank and JICA conducted a survey, and the target waste included waste oil. The type of waste oil covered by both surveys is limited to lubricant oil. Both surveys calculate waste oil in tons, but the results of previous surveys were presented in liters, so it is difficult to compare them. In Japan, a conversion factor of 0.9 kg/liter is used to convert the weight of waste oil to volume, so the value calculated in liters using this conversion value is shown in parentheses below.

World Bank's survey results show that annual import and generation amounts are much more limited than those of other previous research data, but the volume of stockpiles is very large.

- **Total recycled:** 17 tons per year (17 tons×1000 liter ÷ 0.9=18,888 liters)
- **Exports, custom data:** 21.8 tons per year (21.8 tons×1000 liters ÷ 0.9=24,222 liters)
- **Stockpiles found:** 340 tons per year (340 tons×1000 liters ÷ 0.9=377,777 liters)
- **Waste generation:** 17 tons per year (17 tons×1000 liters ÷ 0.9=18,888 liters)
- **Imports:** 71 tons per year (71 tons×1000 liters ÷ 0.9=78,888 liters)

JICA data collection survey that was conducted the same year has estimated the amount of waste oil generation in 2020 and 2030:

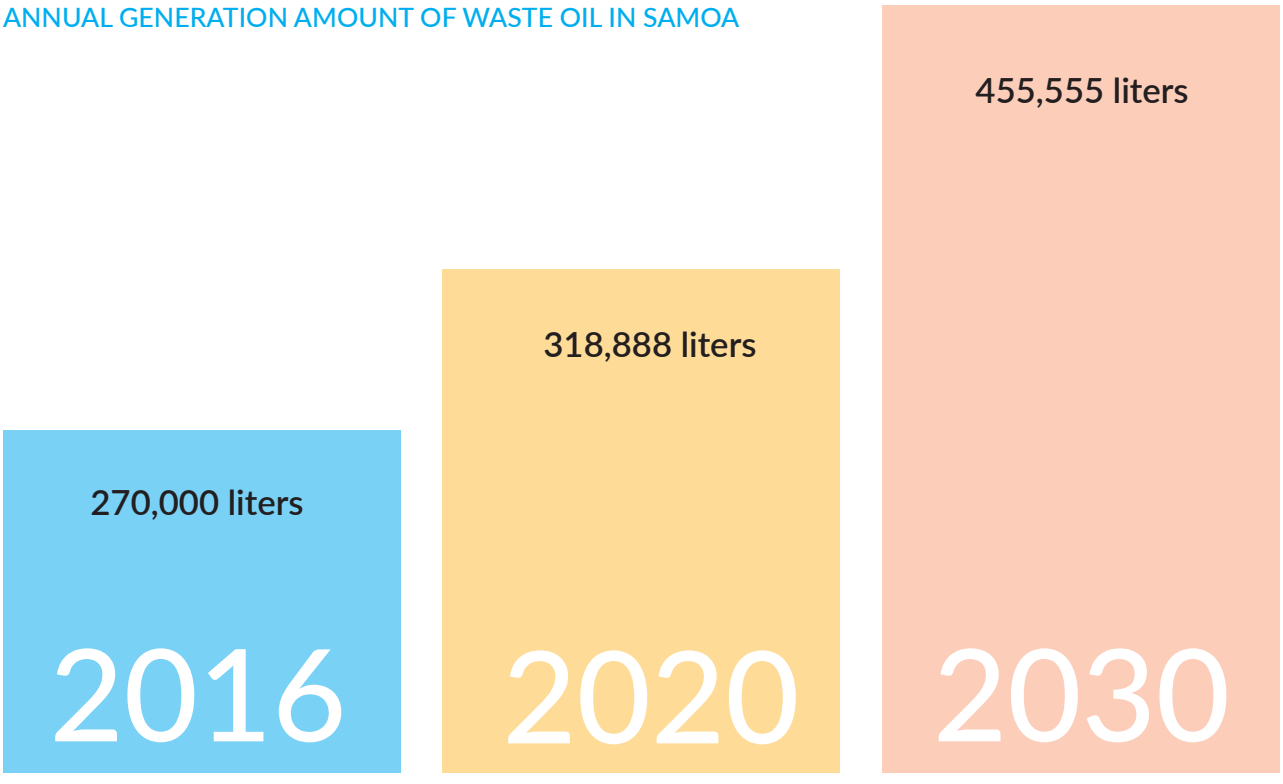
- **Amount of generation of waste oil in 2020:** 287 tons per year (287 tons×1000 liters÷0.9=318,888 liters);
- **Amount of generation of waste oil in 2030:** 410 tons per year (410 tons×1000 liters÷0.9=455,555 liters).

Summary of annual waste oil emission estimates in Samoa

The annual generation amount of waste oil in Samoa was approximately 250,000-270,000 liters based on the reports compiled from 2012 to 2016.

Based on the results of JICA data collection survey in 2021, it is estimated that the annual generation amount of waste oil in 2020 is about 318,888 liters, and the estimated annual generation amount of waste oil in 2030 is about 455,555 liters.

ANNUAL GENERATION AMOUNT OF WASTE OIL IN SAMOA



1. INTRODUCTION

1.1 Before SRWMA/J-PRISM II pilot project

1.1.1 History of SWOMP

SRWMA is the first recycling association established in the Pacific Island Countries in 2018. As a top runner in the region, SRWMA has a history of voluntarily collection activities focused on the beverage containers and waste oil from 2019 with the aim of promoting the proper collection and processing of low-economic value wastes in Samoa.

In accordance with the SRWMA Strategic Plan 2018-2027, Samoa Waste Oil Management Programme (SWOMP) was launched in August 2019. SWOMP is a unique pioneering initiative for the proper management of waste oil in Samoa that promotes regional collaboration for providing long-term solutions to waste management challenges.

To support the success of the program a 20 sene (0.2 WST) fee applies to every liter of waste oil collected which contributes to the sustainability of the program and the continued export of waste from Samoa. The initiative will bring together importers, sellers and users of waste oil to share the costs.

The main history of SWOMP activities are as follows:

- SWOMP Training (August 25, 2019) – 40 customers were invited to a one-day training on waste oil collection and storage;
- Launching ceremony of SWOMP (August 30, 2019) – SRWMA officially launched SWOMP;
- SWOMP Activity suspended due to pandemic (January 2020 – January 2021);
- Completion of SWOMP facility construction in Tafaigata (February 2021).

SWOMP training,
28 August 2019

SWOMP training participants
28 August 2019

SWOMP training,
28 August 2019

Launching ceremony of SWOMP,
30 August 2019

Launching ceremony of SWOMP,
30 August 2019

Meeting on waste oil export to
Fiji, 21 October 2019

Construction of SWOMP facility
completed, February 2021

First unload of waste oil to
SWOMP facility, February 2021

79 drums and 11 intermediate
bulk container (IBC) were stocked
in August 2021 before
SRWMA/J-PRISM II pilot project

Figure 1: SWOMP activity highlights.

1.1.2 SWOMP challenges

There are several challenges in implementing SWOMP by SRWMA, which made it difficult to collect waste oil on a regular basis.

1) Difficulty in assigning workers and vehicles due to chronic labor shortage

SRWMA member companies have difficulty assigning their trucks and required number of workers for the SWOMP activities. In particular, it is difficult for SRWMA to attend to customers with a large volume of waste oil.

2) Lack of data collection and analysis

Before implementing SRWMA/J-PRISM II pilot project, waste oil has been collected from several customers, who were charged a collection fees of 20 sene/liter. But the detailed data regarding the collection time, customers list updates and balance analysis based on the SWOMP implementation was not systematically provided by SRWMA.

3) Difficulty in securing export destinations

In 2019, SRWMA visited BlueScope, a steel company in Fiji, to discuss waste oil exports from Samoa to Fiji. However, the follow-up has taken a long time, and the discussion has not been completed until now. For this reason, the actual exportable waste oil amount and necessary procedures have not been examined. As a result, SWOMP cannot make a waste oil collection strategy as a concrete business plan.

1.1.3 Discussion on waste oil collection in SRWMA/J-PRISM II pilot project

Although J-PRISM II had high expectations for SRWMA-initiated SWOMP activity, as of 2019, the initial activity plans of J-PRISM II had no components to provide actual physical support for the waste collection and recycling activities carried out by the recycling association. For this reason, in January 2020 following the discussions, JICA/J-PRISM II changed its activity plan and shifted it from conducting the 3R+Return surveys to the implementation of the pilot project in collaboration with the recycling association in Samoa and the Solomon Islands.

Due to the pandemic that started in January 2020, the J-PRISM II team temporarily returned to Japan in April 2020, where they stayed for one year until April 2021. During this time SRWMA/J-PRISM II regular meetings on the implementation of the pilot project were held remotely. As a result, an agreement to include SWOMP in the activity plan was reached.

During the discussion of the content of the pilot project the possibility of treating waste oil in Samoa was considered. However, the remaining implementation time of the J-PRISM II is about one and a half years, and it was concluded that this timeframe is too short to introduce the waste oil treatment process.

Since SRWMA's final goal for SWOMP was to export waste oil to neighboring countries, it is necessary to secure a collection amount to achieve this goal. For this reason, SRWMA/J-PRISM II had decided to focus on activities related to proper collection and storage of waste oil in Samoa.

1.2 Outline of the SRWMA/J-PRISM II pilot project

1.2.1 Overall schedule

Based on the discussions described above, J-PRISM II and SRWMA determined the target wastes and activity contents of the pilot project. The outline of the pilot project was formed at the time of signing the MOU in June 2021. Following that, the implementation schedule of the waste oil collection pilot project was slightly delayed. The actual implementation schedule is explained in Chapter 2 "Implementation Plan".

Purpose	■ Recycling capacity of Samoa is strengthened. ■ Economical and eco-friendly waste methods are studied. ■ Necessary improvements and adjustments to continue sustainable and practical 3R+Return system are proposed.
Activities	■ Output 1: PET bottle recycling ■ Output 2: Plastic bricks manufacturing ■ Output 3: Waste oil collection and storage

	Output 3 (Waste oil)	Output 1 and 2 (PET bottle and plastic bricks)
Implementation schedule (tentative)	**May 2021** ■ Sign MOU among MNRE, SRWMA, JICA, SPREP **June 2021** ■ Selection and finalization of equipment ■ Procurement of equipment **July to December 2021** ■ Implement the pilot project for 6 months	**May 2021** ■ Sign MOU among MNRE, SRWMA, JICA, SPREP **June-December 2021** ■ Selection and finalization of equipment ■ Procurement of equipment **January to June 2022** ■ Implement the pilot project for 6 months

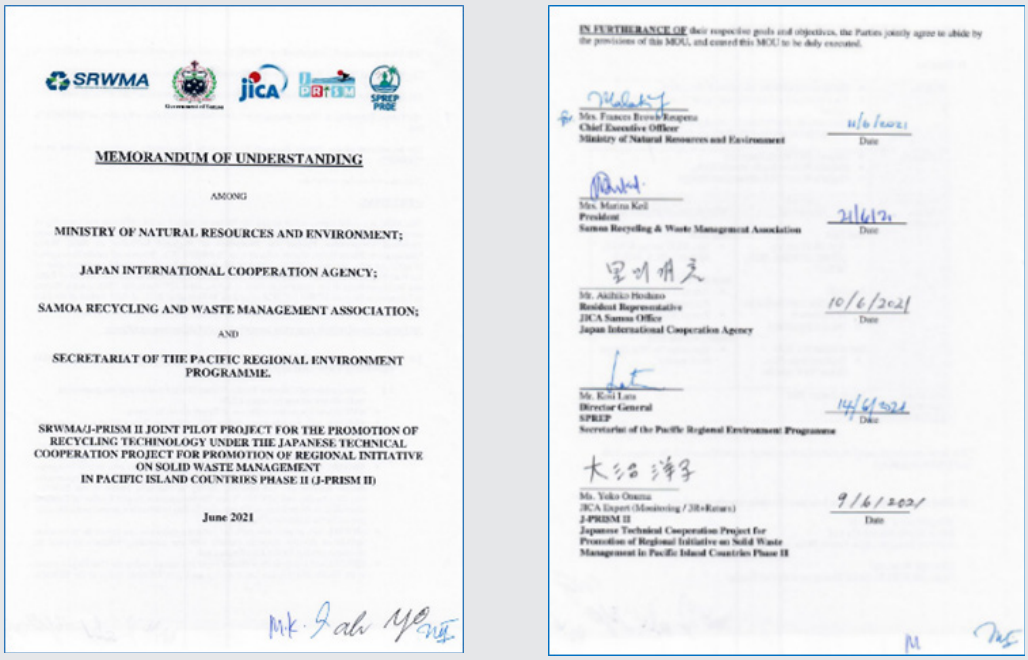
Figure 2: Outline of SRWMA/J-PRISM II pilot project.

1.2.2 Division of roles of MOU signers

JICA/J-PRISM II signed the MOU on the pilot project implementation with MNRE, SRWMA and SPREP in June 2021. The division of roles of each organization specified in Figure 3. The pilot project will be monitored and reviewed during the implementation period according to this division of roles.

Item	JICA	SRWMA	MNRE	SPREP
Management of collected target wastes		✓		
Information recording and reporting	✓	✓		
Project coordination and management			✓	
Ownership and operation maintenance of equipment	✓ (During implementation period)		✓ (After implementation period)	
Public awareness and education	✓		✓	
Capacity development needs	✓		✓	
Monitoring and reporting	✓		✓	
Project review and evaluation	✓		✓	✓
Sharing of information and lessons learnt	✓		✓	
Provision of technical assistance				✓

Figure 3: Division of roles on SRWMA/J-PRISM II pilot project implementation.



MEMORANDUM OF UNDERSTANDING

AMONG

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT;

JAPAN INTERNATIONAL COOPERATION AGENCY;

SAMOA RECYCLING AND WASTE MANAGEMENT ASSOCIATION;

AND

SECRETARIAT OF THE PACIFIC REGIONAL ENVIRONMENT PROGRAMME.

SRWMA/J-PRISM II JOINT PILOT PROJECT FOR THE PROMOTION OF RECYCLING TECHNOLOGY UNDER THE JAPANESE TECHNICAL COOPERATION PROJECT FOR PROMOTION OF REGIONAL INITIATIVE ON SOLID WASTE MANAGEMENT IN PACIFIC ISLAND COUNTRIES PHASE II (J-PRISM II)

June 2021

Figure 4: Signed MOU.

1.3 Procurement items of the SRWMA/ J-PRISM II pilot project

1.3.1 Equipment procured by J-PRISM II

SRWMA and J-PRISM II compiled a list of necessary equipment that was purchased/hired by J-PRISM II before the first phase commenced.

Category	Item	Qty	Total Cost (WST)	Photo
Vehicle Usage level: **High**	Hiab Crane Truck (Loading capacity: 6 tons)	1	3,087.00 (=180/hour×17.15 hour)	
	Forklift (Loading capacity: 2.5 tons)	1	2,812.00 (=100/hour×28.12 hour)	

Category	Item	Qty	Total Cost (WST)	Photo
PPE Usage level: **High**	Cut-resistant gloves	5	34.50 (=6.9/unit×5)	
	Safety boots	5	525.00 (=105/unit×5)	
	Long sleeve overall	5	775.00 (=155/unit×5)	
	Safety hard hat	5	149.50 (=29.9/unit×5)	
	Safety glasses	5	62.50 (=12.5/unit×5)	
	Chemical gloves	5	149.50 (=29.9/unit×5)	

Category	Item	Qty	Total Cost (WST)	Photo
Fire Extinguisher Usage level: **Not used**	3.5kg CO^2 Fire extinguisher	1	496.00	
	4.5kg ABC Dry powder fire extinguisher	2	580.00 (=290/unit×2)	
Signage Usage level: **Low**	No Smoking/safety gear	1	229.74	
	Enquiries	1	229.74	
	Drop off zone	2	459.48 (=229.74/unit×2)	
	Hazardous waste oil storage	1	229.74	

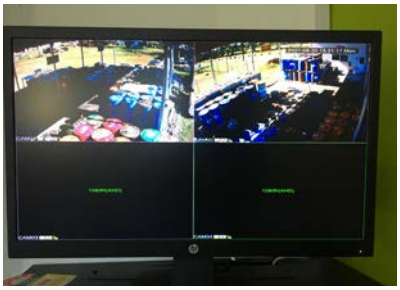
Category	Item	Qty	Total Cost (WST)	Photo
Security Camera Usage level: **High**	2 camera sets	1	4,083.00	
				
TOTAL			13,902.70	

Figure 5: J-PRISM II procurement list.

1.3.2 Equipment procured by SRWMA

At the start of the implementation of the pilot project, it was found that there was a need for extra equipment that was not included in the initial plan. These items were purchased by SRWMA.

Category	Item	Qty	Total Cost (WST)	Photo
Weighing Scale Usage level: **High**	3000kg 1/0.5kg scale Using the flat weighing machine purchased from UNDP's CERO waste project	1	6,500.00	 
Oil spill kit (→Sawdust) Usage level: **High**		1	150.00/Jumbo Bag (=1tons)	

Category	Item	Qty	Total Cost (WST)	Photo
Pump Usage level: **High**		1	188.00	
Pallets Usage level: **High**		20	50.00/truck load (=20 pallets)	
		TOTAL	388.00 (Remarks: Weighing scale is provided by UNDP and is not included in the total price)	

Figure 6: SRWMA procurement list.

2. COLLECTION – IMPLEMENTATION REPORT –

2.1 Procedure for waste oil collection

The waste oil collection conducted in the SRWMA/J-PRISM II pilot project was carried out according to the following procedure.

PROCEDURES

I. Objectives

1. To identify waste oil collection capacity and challenges of SWOMP in Phase 1.
2. To propose measures to improve the operation of SWOMP in Phase 2.

II. Outputs

1. Results of waste oil collection.
2. Major identified issues at waste collection stage.
3. Required number of workers and division of work.
4. Points to be reviewed for waste oil collection in Phase 2.

III. Selection of collection destination customer

SRWMA selected 4 customers who have a SWOMP collection contract with them and has a certain amount of waste oil stored.

IV. Preparation

1. Rental truck and forklift – arranged crane truck and forklift as shown in Figure 5.
2. Workers – arranged by SRWMA as shown in Figure 12.
3. Equipment – arranged by SRWMA and J-PRISM II as shown in Figures 5 and 6.
4. Data sheets – prepared by J-PRISM II.
5. Coordinating collection dates with customers – arranged by SRWMA.
6. Instruction to workers – arranged by SRWMA and J-PRISM II.

V. Procedure

1. Dispatch rental truck and forklift to the customer site on the day of collection.
2. Confirm the storage location of waste oil with the customer and remove obstacles that interfere with the collection.
3. Transport waste oil drums with forklift to truck.
4. Load drums on the loading platform up to the maximum loading capacity of the truck.
5. Wrap and fix the straps to prevent the drums loaded on the loading platform from falling.
6. Choose gentle slope routes and carry them to SWOMP facility.
7. Remove the straps and reload the drums to the forklift (or use the crane straps to unload the drums one by one to the SWOMP facility).
8. Return the truck to the customer's site and collect and transport the remaining drums by procedure 1) to 8) above.
9. Repeat 1) to 8) every collection day for the duration of Phase 1.

Figure 7: Procedure for waste oil collection.

2.2 Collection results

2.2.1 Results of collection amount

As waste oil is measured by weight it is necessary to use a conversion factor when converting the weight to volume. In Japan, a conversion factor of ***0.9 kg/liter*** is used when converting the weight of waste oil to volume. This conversion value was used to calculate values in liters given in this report.

In the first phase it took a total of 4 days to collect waste oil, and a total of 45,513 liters of waste oil was collected from the three companies that are located in Vaitele area.

Collection Day		Location	Collection Amount (liter/day)	SPREP
Day 1	30 August (Mon)	Ford Samoa	10,722	51 drums, 9,650 kg
Day 2	6 September (Mon)	Vailima Breweries	8,997	40 drums + 21 small containers, 8,098 kg
Day 3	13 September (Mon)	Nissan Hyundai Service Center	12,897	60 drums, 11,608 kg
Day 4	20 September (Mon)	Nissan Hyundai Service Center	12,897	60 drums, 11,608 kg
TOTAL			45,513	211 drums + 21 small containers, 40,964 kg
AVERAGE DAILY COLLECTION AMOUNT			11,378 (≈ 51 drums, 10,241 kg)	

Figure 8: Collection amount breakdown.

2.2.2 Average collection amount

Based on the results of waste oil collection for 4 days, the average waste oil collection capacity of SRWMA is calculated as follows. “Per day” refers to the collection day.

Average daily collection amount	11,378 liter/day (≈ 51 drums)
Average collection amount per trip	5,689 liter/trip (≈ 25 drums)
Average daily working time (collection, loading, transportation, unloading)	4 hour 04 minutes/day
Average working time per trip (collection, loading, transportation, unloading)	1 hour 49 minutes/trip
Average running speed before collection (SWOMP to customer)	22.8 km/h
Average running speed after collection (customer to SWOMP)	17.6 km/h
Average Required Labor Force for Collection	8 workers/day

Figure 9: Average collection amount.

2.2.3 Time and motion results

Time spent during the collection on Day 1 to Day 4 is shown in the following tables. The time count starts at the departure from SWOMP facility for collection, and finishes at the end of the unloading of the drums at SWOMP facility.

Date	Work content	1st trip	2nd trip	Average	%
Day 1 30 Aug	Total time	1:50	1:57	1:53	100%
	Truck and forklift preparation time	0:05	0:10	0:07	6.6%
	Collection time from SWOMP to customer	0:15	0:10	0:12	11.0%
	Transportation time from customer to SWOMP	0:25	0:27	0:26	22.9%
	Waste oil loading time	0:30	0:45	0:37	33.0%
	Waste oil unloading time	0:35	0:25	0:30	26.4%
Day 2 6 Sep	Total time	1:10	1:02	1:06	100%
	Truck and forklift preparation time	0:10	0:06	0:08	12.1%
	Collection time from SWOMP to customer	0:15	0:16	0:15	23.4%
	Transportation time from customer to SWOMP	0:15	0:17	0:16	24.2%
	Waste oil loading time	0:20	0:11	0:15	23.4%
	Waste oil unloading time	0:10	0:12	0:11	16.6%
Day 3 13 Sep	Total time	1:53	2:01	1:57	100%
	Truck and forklift preparation time	0:13	0:00	0:06	5.5%
	Collection time from SWOMP to customer	0:15	0:12	0:13	11.5%
	Transportation time from customer to SWOMP	0:14	0:18	0:16	13.6%
	Waste oil loading time	0:26	0:54	0:40	34.1%
	Waste oil unloading time	0:45	0:37	0:41	35.0%
Day 4 20 Sep	Total time	2:23	2:18	2:20	100%
	Truck and forklift preparation time	0:09	0:01	0:05	3.5%
	Collection time from SWOMP to customer	0:15	0:14	0:14	10.3%
	Transportation time from customer to SWOMP	0:18	0:15	0:16	11.7%
	Waste oil loading time	0:50	1:09	0:59	42.3%
	Waste oil unloading time	0:51	0:39	0:45	32.0%

Figure 10: Time and motion breakdown.

2.2.4 Speed and distance results

Distance and truck speed per trip are shown in the following figure. The purpose of this study is to estimate the waste oil total collection time per trip and the amount of waste oil that can be collected per hour by SRWMA.

Date	Trip	Speed, distance, time calculation result	
Day 1 30 Aug	1st trip	Distance from SWOMP to customer	5.5km
		Running speed before collection (SWOMP to customer)	22km/h
		Running speed after collection (customer to SWOMP)	13km/h
	2nd trip	Distance from SWOMP to customer	5.5km
		Running speed before collection (SWOMP to customer)	33km/h
		Running speed after collection (customer to SWOMP)	12km/h
Day 2 6 Sep	1st trip	Distance from SWOMP to customer	6.0km
		Running speed before collection (SWOMP to customer)	24km/h
		Running speed after collection (customer to SWOMP)	24km/h
	2nd trip	Distance from SWOMP to customer	6.0km
		Running speed before collection (SWOMP to customer)	22km/h
		Running speed after collection (customer to SWOMP)	21km/h
Day 3 13 Sep	1st trip	Distance from SWOMP to customer	4.9km
		Running speed before collection (SWOMP to customer)	19km/h
		Running speed after collection (customer to SWOMP)	20km/h
	2nd trip	Distance from SWOMP to customer	4.9km
		Running speed before collection (SWOMP to customer)	24km/h
		Running speed after collection (customer to SWOMP)	16km/h
Day 4 20 Sep	1st trip	Distance from SWOMP to customer	4.9km
		Running speed before collection (SWOMP to customer)	19km/h
		Running speed after collection (customer to SWOMP)	16km/h
	2nd trip	Distance from SWOMP to customer	4.9km
		Running speed before collection (SWOMP to customer)	20km/h
		Running speed after collection (customer to SWOMP)	19km/h

Figure 11: Speed and distance breakdown.

2.2.5 Required labor force for collection

The breakdown of the number of workers engaged in this collection work is as follows. See chapter 2.4 for the detailed analysis.

	Total number of workers (1+2+3)	Number of workers from SRWMA			Number of drivers from rental truck company			Data recorder
		Total (1)	Load and Unload	Forklift at SWOMP	Total (2)	Truck	Forklift at Customer site	Total (3)
Day 1 30 Aug	5	2	2	0	3	2	1	0
Day 2 6 Sep	4	3	2	1	1	1	0	0
Day 3 13 Sep	8	4	2	2	3	2	1	1
Day 4 20 Sep	7	3	2	1	3	2	1	1

Figure 12: Breakdown of the number of assigned personnel on collection by work contents.

2.3 Major identified issues at the collection stage

2.3.1 Identified issues regarding SRWMA collection work

MAJOR IDENTIFIED ISSUES

1. **SRWMA has no forklift transportation tool from SWOMP facility to customers:** Since SRWMA does not have special truck or trolley to transport forklifts owned by SRWMA member companies to customers, their forklifts could only be used at SWOMP facility. There is no opportunity to use them at the customers' sites at the moment.

2. **SRWMA has no pumps to rental to customers:** Since SRWMA owns only one pump, it was not able to lend it to pump up the leaked waste oil at the customers' site.

3. **SRWMA did not have enough pallets for the collection and storage:** It was confirmed that SRWMA should obtain the required pallets for both collection and storage before the collection.

Special truck for carrying the forklift owned by rental truck company. Forklift is fixed to the loading platform with belts.

The loading platform is movable. Unload the forklift backwards fixing only the front belt.

Since SRWMA has only one pump, it is always used at the SWOMP facility. It was confirmed that it could not be carried to the customer.

It was confirmed that pallets can be purchased from a local beverage company for 50.00 tala/truck load (=20 pallets).

Figure 13: Issues confirmed in SRMWA collection work.

2.3.2 Identified issues regarding customer's waste oil storage

MAJOR IDENTIFIED ISSUES

1. **Most customers store the drums outside without roof and concrete floor:** It was confirmed that most of the customers store their waste oil drums outside.
2. **Most customers do not own forklift, pump, and pallets:** Since most of the customers do not own these items, it is important for SRWMA to encourage customers to acquire them. Phase 2 of the project will also allow customers to rent these items from SRWMA.
3. **Current collection flow of SWOMP has no check method to identify the type of waste oil before the collection:** It was confirmed that SRWMA collected information from the customers verbally only and did not seek any evidence documents. In Phase 2 it is necessary to change to a SWOMP business flow in which information on the types of waste oil is obtained from customers before the collection.
4. **Outdoor storage of drums by customers causes leakage during its movement, SRWMA needs to set up awareness campaigns to encourage customers to store drums indoors:** It was concluded that SRWMA should encourage customers to store drums indoors with a roof and concrete floor to prevent waste oil leakage at customers sites.

Drums are stored in a cluttered manner. Car bodies are placed on the drums that cannot be collected until SRWMA workers remove the clutter.

Drums are stored outdoors for long period of time and are corroded.

Only one company owns a pump and pumped up the leaking drum.

Only one company owns a forklift and pallets, and they brought their drums to truck without help of SRWMA workers.

Figure 14: Issues confirmed at customers sites.

Since forklifts, pallets, and pumps are the essential items for SWOMP collection work, it is recommended to redesign the SWOMP collection system for Phase 2 of the project, so that SRWMA has capacity to provide these items to their customers (the item cost will be included in collection costs as service provided).

2.3.3 Identified issues regarding the type of waste oil

The three companies that waste oil was collected from during Phase 1 were not requested to provide evidence documents regarding the types of waste oil, SRWMA confirmed the types of waste oil before the collection verbally only. For this reason, the type of waste oil for each container could not be specified, and even in cases with drums leaked in the SWOMP facility, it was difficult for SRWMA to determine whether it can be stored mixed with other types of waste oil or not.

1) Safety data sheet check

Based on this lesson, after storing the waste oil at the SWOMP facility, SRWMA and J-PRISM II confirmed the manufacturer, serial number of waste oil from the three companies, and downloaded the safety data sheets from the oil manufacturer's websites.

ExxonMobil

Product Name: MOBIL VELOCITE OIL NO. 6
Revision Date: 09 Sep 2019
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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT
Product Name: MOBIL VELOCITE OIL NO. 6
Product Description: Base Oil and Additives.
Product Code: 201560509080, 600668-00, 970334
Intended Use: Circulating/gear oil

COMPANY IDENTIFICATION
Supplier: EXXON MOBIL CORPORATION
22777 Springwoods Village Parkway
Spring, TX 77389 USA
24 Hour Health Emergency 609-737-4411
Transportation Emergency Phone 800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information 800-662-4525
MSDS Internet Address www.exxon.com, www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION:

Aspiration toxicant: Category 1.

LABEL:
Pictogram:

Signal Word: Danger

Hazard Statements:
H304: May be fatal if swallowed and enters airways.

Precautionary Statements:
P273: Avoid release to the environment.P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting.P405: Store locked up.P501: Dispose of contents and container in accordance with local regulations.

Figure 15: Safety data sheet.

By checking the safety data sheets, it was confirmed that the waste oil collected during Phase 1 included a wide variety of types such as engine oil, gear oil, hydraulic oil, and compressor oil etc. The safety data sheets contain information including hazards identification, composition, first aid measures, firefighting measures, handling and storage measures, and disposal considerations.

From the lessons learned in Phase 1 regarding the difficulty of identifying the type of waste oil, it is important to note that in Phase 2 SRWMA needs to obtain information on the type of waste oil including the safety data sheet for each drum from customers in advance.

Customer Name	Product Description	Product Name	Intended Use	Hazardous Identification
Ford Samoa	Engine Oil	N/A	N/A	N/A
Vailima Breweries	Base oil and additives	Mobil Gear 600 x XP 220 (630)	Gear Oil	Non-hazardous
	Base oil and additives	Mobil Gear 600 x XP 150 (629)	Gear Oil	Non-hazardous
	Base oil and additives	Mobil Gear 600 x XP 320 (632)	Gear Oil	Non-hazardous
	Synthetic base stocks and additives	Mobil 627	Circulating/Gear Oil	Non-hazardous
	Base oil and additives	DTE 26	Hydraulic Fluid	Non-hazardous
	Base oil and additives	Velocite 6	Circulating/Gear Oil	Hazardous Aspiration toxicant: Category1
	Mineral base oil with tailored additive pack	Roto Z	Compressor Oil	Non-specific hazardous
	Refrigerating machine oil	Suniso	Lubricant for Compressor	Non-hazardous
Nissan Hyundai	Engine oil	N/A	N/A	N/A

Figure 16: Waste oil type.

"Ammonia liquid" is written on the container.

Hazardous label "Corrosive" is attached to the container.

Figure 17: Labels and information on the container indicating harmfulness and environmental impact.

2) Inquiries about the types of waste oil conducted in Phase 1

Due the fact that SRWMA could not determine the type of waste oil in each drum, including the leaked drums during the collection and storage work, they have requested information on the type of waste oil that was collected by sending e-mails to the three customers.

The waste oil collected from Vailima was different from the oil collected from the other two companies in color and odor of the leaked waste oil. For that reason, SRWMA asked them about the waste oil types. Vailima provided SRWMA with the list of types of waste oil used on site (Figure 18). These oils seem to discharge from all gearboxes, air compressors, ammonia compressors and agitators. Based on the information on the oil manufacturer's brand names and product numbers received from Vailima, the safety data sheet was obtained and the list of types of waste oil was compiled (Figure 16). It was found that these waste oils are of different types, have different flash points and hazard categories. The information that SRWMA obtained from the generators after the collection is very useful, but it is still difficult for SRWMA to distinguish between the characteristics of these waste oils and whether they belong to the hazardous category or not.

Mobil Gear 600 x XP 220 (630)
Mobil Gear 600 x XP 150 (629)
Mobil Gear 600 x XP 320 (632)
Mobil 627
DTE 26
Velocite 6
Roto Z
Suniso

* Spent oil is from all gearboxes, air compressors, ammonia compressors and agitators. Please find below the list of oil used onsite.

Figure 18: Waste oil information provided by customer via e-mail.

The experience gained from these operations is that it is important to obtain information from customers in advance to confirm the type and hazard information of waste oil before SRWMA collects it, and at the minimum, request the submission of a safety data sheet by customers and make them aware that it is their responsibility to provide information on the type of waste oil for each drum.

In the second phase it is necessary to request that prior to collection the customer submits 1) information on the type of waste oil to be collected and the safety data sheets, 2) information on the waste oil stored in each drum which can be traced in customer's list, and 3) to instruct the customer not to mix different types of waste oil in one drum.

In order to ensure that in the second phase of SRWMA/J-PRISM II pilot project the required information from customers is received before the collection, it is practical to change SWOMP check procedures. SRWMA should request customers to submit the waste oil collection request form covering the above 1) to 3) and plan the collection trip to site only after confirming that the full scope of information was provided by checking the filled-out information on the check sheet developed by SRWMA.

The information provided by the customer on the check sheet is to be reviewed by SRWMA, and if it is confirmed that there is no problem with the contents, the customer's waste oil will be collected.

2.4 Confirmation of difference in the required number of workers depending on whether the forklift and pallets are used

2.4.1 Work required to move drums from storage to the forklift

It was identified that the number of workers required for the preparation stage (Figure 19) varies greatly depending on whether the customers has prepared the drums for collection in advance so that SRWMA staffs can easily collected them or not.

By asking the customer in advance to prepare the drums for collection SRWMA will be able to minimize the number of workers required. In Phase 2 before the trip to the site SRWMA should instruct the customer to move the drums to a place where they can be easily collected.

One of the four collection trips was to the site that proved to be the best example of preparation for the collection of drums by the customer (case 2 on September 6th). Prior to collection, four drums were placed on one pallet and the other 4 drums were covered with plastic sheet. Only the forklift driver was needed to load the drums to the truck. In other words, it was confirmed that the work from this storage location to the forklift can be done by one worker provided that the customer has the forklift and pallets.

Workflow and required number of workers			Total number of workers
Case 1: No pallets and manually carried drums to forklift / 13 September			
			5
Preparation for picking up drums with the forklift: 2 workers	Loading 1 drum on the forklift: 1 worker	Loading 2 drums on the truck: 3 workers	
Case 2: 4 drums have been loaded on the pallets by customer / 6 September			
			1
Preparation for picking up with the forklift: 1 worker	Transportation of 4 drums to the truck: 1 worker	Loading drums on the truck: 1 worker	

Figure 19: Number of workers required for loading the drums from storage to the forklift.

2.4.2 Work required to move drums from the forklift to the truck

On the loading and unloading stages of work, it was confirmed that the forklift and pallets are essential items for the process.

The hired forklift that was dispatched to the customer's yard encountered an engine trouble on the 13 September. To temporary replace it the Hiab crane truck was hired for loading. It was observed that the transportation efficiency of the crane truck was less by a quarter of that of the forklift, and as a consequence it entailed physically demanding work for SRMWA workers. This is a very important finding to prevent the leakage of drums during transportation and to maintain the occupational safety of workers in the future.

Based on the above results, in Phase 2, the practice of assigning a forklift to the customer's yard and SWOMP facility for loading and unloading waste oil drums will be continued.

In conclusion, to minimize the number of workers SRWMA is required to use forklifts and pallets at all times.

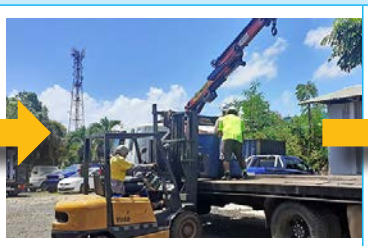
Workflow and required number of workers			Total number of workers
Case 1: No pallets and loading 2 drums to the forklift / 13 September			
			3
Loading to the forklift: 3 workers	Unloading drums from the forklift: 3 workers	Fixing drums with belts on the truck: 2 workers	
Case 2: Using pallets and loading 4 drums on a pallet to the forklift / 6 September			
			2
Transportation to the truck: 1 worker	Loading drums on the truck: 1 worker	Fixing drums with belts on the truck: 2 workers	

Figure 20: Number of workers needed for loading of drums from forklift to truck.

2.4.3 Work required to unload drums from the truck to the SWOMP facility

In case 1 on the 30th of August, a total of five workers were engaged in unloading waste oil. This was due to the fact that the forklift was not arranged at the SWOMP facility, and the unloading was carried out using the crane of the truck.

In comparison, in cases when the forklift and pallets were used both at the customer's site and the SWOMP facility, only 2-3 workers were required to assist the whole process.

<table>
<tr><th colspan="3">Workflow and required number of workers</th><th>Total number of workers</th></tr>
<tr><td colspan="4">Case 1: No forklift and pallets, using crane to unload the drums / 30 August</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td rowspan="2">5</td></tr>
<tr><td>Removal of belts: 4 workers</td><td>Unloading drums from the truck: 4 workers</td><td>Storing the drums: 2 workers</td></tr>
<tr><td colspan="4">Case 2: Using the forklift but no pallets, manually moving to the storage place at the SWOMP facility / 13 September</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td rowspan="2">3</td></tr>
<tr><td>Removal of belts: 3 workers</td><td>Unloading drums from the truck: 3 workers</td><td>Storing the drums: 2 workers</td></tr>
<tr><td colspan="4">Case 3: Transporting to the SWOMP storage using the forklift and pallets / 6 September</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td rowspan="2">2</td></tr>
<tr><td>Removal of belts: 2 workers</td><td>Unloading drums from the truck: 2 workers</td><td>Storing the drums: 1 worker</td></tr>
</table>

Figure 21: Number of workers needed for loading of drums from forklift to truck.

2.5 Required number of workers and division of work

MAJOR IDENTIFIED ISSUES

1. **SRWMA must always assign a supervisor to give instructions to customer and workers:** We confirmed that all the SWOMP collection and storage work need to have a supervisor who can give necessary instructions to the workers.

2. **A total of 8 staff is required for the SWOMP collection work:** The breakdown and division of roles of staff is shown in Figure 22.

2.5.1 Phase 1 personnel assignment results

In Phase 1 of the project, on the collection dates personnel was assigned both from SRWMA and J-PRISM II (Figure 12).

J-PRISM II assigned two workers who were always on site and in charge of supervising and data recording. Apart from the J-PRISM II personnel, about 4-8 people were engaged in this task, including SRWMA staff and rental truck company drivers.

Based on the comparison of the efficiency results analyzed in 2.4 above, if SRWMA provides a truck and a forklift both at customer's sites and at the SWOMP facility, and supplies the required number of pallets and pumps for the waste oil collection and storage, the number of SRWMA workers required for the job can be minimized.

	Total number of workers (1+2+3)	**Number of workers from SRWMA**			**Number of drivers from rental truck company**			**Data recorder**
		Total (1)	*Load and Unload*	*Forklift at SWOMP*	*Total (2)*	*Truck*	*Forklift at Customer site*	*Total (3)*
Day 1 30 Aug	5	2	2	0	3	2	1	0
Day 2 6 Sep	4	3	2	1	1	1	0	0
Day 3 13 Sep	8	4	2	2	3	2	1	1
Day 4 20 Sep	7	3	2	1	3	2	1	1

Figure 22: Breakdown of the number of assigned personnel on collection by work contents.

2.5.2 Number of assignments and division of roles recommended in Phase 2

Based on the comparison of the efficiency results and the required number of workers analyzed in 2.4, it is recommended to have at least 8 workers for Phase 2, and assign their roles as follows (Figure 23):

Required personnel	Required number of workers	Findings obtained in Phase 1
Supervisor	1	Personnel was required to give instructions to workers
Drivers (truck, forklift)	2	Assigned 2 drivers from a rental car company
Workers for loading, unloading, weighing and storing	2-3	Confirmed that this is physically demanding job
Worker to pump up leaked drums at SWOMP facility	1-2	Considering the number of drums leaked, a significant leak occurred in Phase 1
Data recording staff	1	Personnel was required to check the number and weight of collected drums to calculate the collection fee for customers
TOTAL (Minimum required number of personnel)	8	

Figure 23: Number of workers needed for the SWOMP collection work in Phase 2.

2.5.3 Supervisor duties and responsibilities

Through the implementation of Phase 1, it was confirmed that the role of the supervisor who organizes the team on-site is particularly important. As shown in the image below, SRWMA needs the personnel who can comprehensively supervise on-site safety management and workers' safety, that includes giving instructions to drivers and workers, on-site communication with customers, coordination of the layout at the SWOMP facility. Additionally, the data recording staff is required to support the supervisor to ensure correct records of the amount of waste oil collected and to count the number of leaked drums, as well as receive the collection fee from the customer.

Source: https://www.thebalancecareers.com/supervisor-2276098

2.6 Points to be reviewed for the collection in Phase 2

Based on the issues with the collection of waste oil in SWOMP identified in Phase 1, the operations will be improved in Phase 2 as follows:

		Phase 1 Implementation results	Phase 2 Implementation improvement points
Equipment	Forklifts	■ Assigned rental forklift and truck to customers sites only. ■ SRWMA's forklift was used at the SWOMP facility.	■ Assigned both rental forklift and truck to customers sites and SWOMP facility. ■ Necessary rental costs are included in the collection fees charged to the customer.
	Pallets	SRWMA did not use the pallets at the time of collection because it did not own the pallets required for collections.	SRWMA prepares the necessary pallets and uses them at the time of collection after checking the number of drums identified in the collection request form.
	Pumps	■ SRWMA's pump was used at the SWOMP facility. ■ No pump rental service to customers.	■ SRWMA obtains another pump to rent it to customers. ■ Necessary rental costs are included in the collection fees charged to the customer.
Identification of waste oil type	Collection request form	■ No SWOMP collection request form preparation. ■ SRWMA did not receive in advance an accurate information about the types of waste oil.	■ SRWMA creates SWOMP collection request form. ■ SRWMA knows exactly how many drums are to be collected based on the request form.
	MSDS	SRWMA did not check MSDS data with customers in advance.	SRWMA requests MSDS data from customers together with the collection request form.
Personnel assignment	Required number of workers	2-5 workers from SRWMA.	■ SRWMA must allocate 6 staff members including a supervisor and a data recording officer. ■ 2 drivers must be assigned by the rental truck company.

Figure 24: Summary of changes to the collection method in the pilot project.

3. STORAGE – IMPLEMENTATION REPORT –

3.1 Procedure for waste oil weighing and storage

The waste oil weighing, and storage conducted during the SRWMA/J-PRISM II pilot project was carried out according to the following procedure.

PROCEDURES FOR WASTE OIL WEIGHING AND STORAGE

I. Objectives

1. To identify waste oil weighing and storage capacity and challenges of SWOMP in Phase 1.
2. To propose measures to improve the operation of SWOMP in Phase 2.

II. Outputs

1. Results of waste oil weighing and storage.
2. Major identified issues in waste weighing and facility layout stage.
3. Required number of workers and division of work.
4. Points to be reviewed for waste oil storage in Phase 2.

III. Waste oil storage layout of SWOMP facility

Based on the usage method of the SWOMP facility and the storage layout plan examined by SRWMA, the layout was finalized during the actual work at the site.

IV. Preparation

1. Assign forklift to SWOMP – arranged forklift (Figures 5 and 28).
2. Workers – arranged by SRWMA (Figure 28).
3. Equipment – arranged by SRWMA and J-PRISM II (Figures 5 and 6).
4. Data sheets – prepared by J-PRISM II.
5. SWOMP facility layout draft plan – arranged by SRWMA.
6. Instruction to workers - arranged by SRWMA and J-PRISM II.

V. Procedure

1. Dispatch rental forklift to the SWOMP facility on the day of weighing and storage.
2. Make a design drawing and the layout plan of the SWOMP facility.
3. Put drums on the forklift and weigh them one by one on the scales.
4. Record the weight.
5. Pump up waste oil drums that leaked at the SWOMP facility to an empty IBC tank.
6. Place weighed drums on the pallet. After loading 4 drums on the pallet, carry them to the storage location with a forklift.
7. Stack pallets in 3 layers with a forklift.
8. Repeat steps 1) to 6) every weighing and storage day for the duration of Phase 1.

Figure 25: Procedure for waste oil weighing and storage.

3.2 Weighing and Storage Results

3.2.1 Results of weighing and SWOMP facility layout change results

As explained in Chapter 2 "Collection", waste oil is measured by weight, it is necessary to use a conversion factor when converting the weight to volume. In Japan, a conversion factor of 0.9 kg/liter is used when converting the weight of waste oil to volume. This conversion factor was used to calculate values in liters given in this report.

It took a total of 4 days to weigh and store collected waste oil at the SWOMP facility during Phase 1.

Weighing and SWOMP facility layout change day		Location	Weighing amount (liter/day)	Breakdown
Day 1	*8 September (Wed)* Weighed the waste oil collected from Vailima	SWOMP	8,997	39 drums+ 2 small drums + 13 small containers + 5 large containers, 8,098 kg
Day 2	*15 September (Wed)* Weighed the waste oil collected from Ford, and layout change work conducted	SWOMP	10,722	51 drums, 9,650 kg
Day 3	*27 September (Mon)* Weighed the waste oil collected from Hyundai	SWOMP	12,897	60 drums, 11,608 kg
Day 4	*29 September (Wed)* Weighed the waste oil collected from Hyundai	SWOMP	12,897	60 drums, 11,608 kg
		TOTAL	**45,513**	
AVERAGE DAILY WEIGH AND LAYOUT CHANGE AMOUNT			**11,378 (≈ 51 drums)**	

Figure 26: Weighing and layout change amount breakdown.

3.2.2 Average weighing amount

Based on the results of waste oil weighing, storage, and layout change during the 4 days, the average waste oil weighing and storage capacity of SRWMA is calculated as follows ("per day" refers to the collection day).

Average daily working time (weighing, storage, layout change)	6 hour 33 minutes/day
Average required labor force for weighing and storage, layout change	7 workers/day

Figure 27: Average waste oil weighing and storage capacity of SRWMA.

3.2.3 Required labor force for weigh and storage

The breakdown of the number of workers engaged in the collection work:

	Total number of workers (1+2+3)	Number of workers from SRWMA		Number of drivers from rental truck company	SRWMA supervisor and data recorder
		Total (1)	**Load and Unload**	**Forklift Driver and Assistant Total (2)**	**Total (3)**
Day 1 / 08 Sep	6	3	2	2	1
Day 2 / 15 Sep	6	3	2	2	1
Day 3 / 27 Sep	7	4	3	2	1
Day 4 / 29 Sep	7	4	3	2	1

Figure 28: Breakdown of the number of assigned personnel on storage by work contents.

Leakage of waste oil when the drum was lifted with a forklift at Ford.

Leakage of waste oil when workers lifted the drum at Hyundai.

Leakage of waste oil at the SWOMP facility.

Identification of the type of collected waste oil.

Drums with unidentified type of waste oil were labeled with a cross mark sticker

When SRWMA staff opened the waste oil drums, there was a strange odor, the staff put on surgical masks and proceeded to check the type of waste oil.

Figure 29: Waste oil leakage that occurred while moving and storing drums.

3.3 Major identified issues at the weighing stage

3.3.1 Identified issues regarding SRWMA weighing work

MAJOR IDENTIFIED ISSUES

1. **Weighing drums one by one takes time:** Since SRWMA's collection fee is 20 sene per liter, it is necessary to weigh and record each drum separately. This is time-consuming.

2. **As the leaked drum could not be weighed, their content was calculated at 200 kg each:** If waste oil leaked from the drum when moving to or storing at the SWOMP facility, priority was given to pumping it to an empty IBC tank immediately, and weighing of it was not conducted.

3. **In some cases, the scales were not fully charged on the weighing day and could not be used:** It was observed that preparation by SRWMA in advance was not sufficiently done.

4. **Both SRWMA forklifts and rental forklifts sometimes stopped due to engine problem during work:** It was observed that preparation by SRWMA in advance was not sufficiently done.

Transporting the drums on the forklift, weighing them one by one and recording the data.

Weighing result is not displayed due to insufficient charge of the weighing machine.

Engine trouble 1: engine of the rental forklift did not start, so Lee Transport filled the brake fluid to the hydraulic brake.

Engine trouble 2: engine of SRWMA's forklift did not start, so SRWMA checked the wiring and greased the problematic part.

Figure 29.1: Issues confirmed in SRMWA weigh work.

At the stage of weighing drums, it was confirmed that the above-mentioned operational problems occur due to the lack of regular maintenance of the weighing machine and forklift.

3.3.2 Number of drums leaked during unloading and storage at SWOMP facility

During the 4 days of waste oil weighing, storage, and layout change at the SWOMP facility a total of 25 drums leaked waste oil.

Six of these drums leaked after the weighing. Remaining 19 drums leaked before the weighing. The leaked oil was pumped into IBC tanks owned by SRWMA/SWOMP immediately without being weighed, so the weight of the leaked drums is assumed to be 200 liters per drum, the number being calculated using the conversion value.

DRUM #	Weight (kg)	Description	Notes
1	204	All Blue	Leaked (removed to pump into IBC)
2	83	Super S	Leaked (removed to pump into IBC)
3	173	All Blue	Leaked (removed to pump into IBC)
4	202	Super S	Leaked (removed to pump into IBC)
5	190	All Blue	Leaked (removed to pump into IBC)
6	188	Super S	Leaked (removed to pump into IBC)
7	Did not weigh	Super S	Leaked (removed to pump into IBC)
8	Did not weigh	Super S	Leaked (removed to pump into IBC)
9	Did not weigh		Leaked (removed to pump into IBC)
10	Did not weigh		Leaked (removed to pump into IBC)
11	Did not weigh		Leaked (removed to pump into IBC)
12	Did not weigh		Leaked (removed to pump into IBC)
13	Did not weigh		Leaked (removed to pump into IBC)
14	Did not weigh		Leaked (removed to pump into IBC)
15	Did not weigh		Leaked (removed to pump into IBC)
16	Did not weigh		Leaked (removed to pump into IBC)
17	Did not weigh		Leaked (removed to pump into IBC)
18	Did not weigh		Leaked (removed to pump into IBC)
19	Did not weigh		Leaked (removed to pump into IBC)
20	Did not weigh		Leaked (removed to pump into IBC)
21	Did not weigh		Leaked (removed to pump into IBC)
22	Did not weigh		Leaked (removed to pump into IBC)
23	Did not weigh		Leaked (removed to pump into IBC)
24	Did not weigh		Leaked (removed to pump into IBC)
25	Did not weigh		Leaked (removed to pump into IBC)
Total	**5,000**	1 leaked drum assumed to be 200L	

Figure 30: Issues identified in SRMWA weigh work.

Out of 211 drums collected in Phase 1, twenty-five drums leaked after being transported to the SWOMP facility, therefore approximately 11.8% of the collected drums leaked.

SWOMP's current collection fee system (per liter) makes it mandatory to weigh each drum one by one, and that takes considerable time and effort for SRWMA.

Furthermore, in cases when waste oil leakage does occur, an actual weigh of the drum cannot be measured, and as a result the customer will be charged a inaccurate collection fee.

3.4 Major identified issues at the SWOMP facility layout and storage stage

3.4.1 Identified issues regarding SRWMA layout and design work

MAJOR IDENTIFIED ISSUES

1. **SWOMP facility layout and storage method should have been set before the pilot project was implemented:** SRWMA/J-PRISM II concluded that if the drums were left as they were prior to the pilot project, it would not be enough storage space. SRWMA prepared a facility layout draft for the implementation of Phase 1.

2. **Creating a SWOMP storage layout drawing allows to identify the storage capacity of the SWOMP facility:** Identifying the storage capacity of the facility was one of the major achievements in the implementation of Phase 1. This makes it possible not only to specify the storage capacity, but also to specify the equipment required for storage and the SWOMP business operating cost analysis.

3. **Work safety gear was prepared and procured before the implementation of the pilot project, but the cleaning and hygiene items for the SWOMP facility were not acquired:** SWOMP facility does not have this necessary equipment. SRWMA needs to prepare cleaning tools and equipment storage area at the SWOMP facility.

Figure 31 shows the changes in the SWOMP facility layout starting from September 15. At this stage, SRWMA had not created a layout drawing plan.

The big change was that the drums that were brought to the SWOMP facility after September 15 were always placed on pallets. This method increases the storage space at the SWOMP facility twice.

0. SWOMP Facility layout before pilot project implementation.

Second layer of drums was piled up on pallets.

IBC tanks and drums placed without specific layout planning.

1. SWOMP Facility by the end of the first day of collection (August 30).

Stored in an empty space of the SWOMP facility.

At this stage, the drums were stored without the pallets.

2. SWOMP facility by the end of the second day of collection (September 6).

Since the customer uses pallets to store the drums, it was easy to transport it to SWOMP.

There was a space for a forklift to move in the middle of the facility.

3. SWOMP facility by the end of the first day of weighing (September 8).

Identification of the type of waste oil that was previously unknown.

The drums with unidentified type of waste oil were labeled with a cross mark sticker.

4. SWOMP facility by the end of the third day of collection (September 13).

Most of the indoor storage space was occupied by drums.

Front part was secured as a passage area for weighing and forklift.

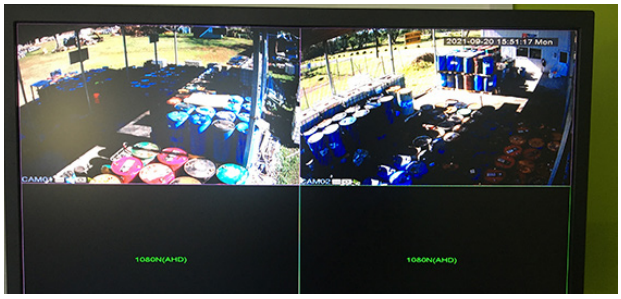
5. SWOMP facility by the end of the second day of weighing (September 15).

From this day the drums were stacked in two levels using pallets.

Storage space of the drums collected on August 30 was minimized by using pallets.

Figure 31: Layout of SWOMP facility that changed over time before setting storage planning-1.

6. SWOMP facility by the end of the fourth day of collection (September 20)



IBC tanks and drums were supposed to be stacked in two levels, but this could not be achieved due to the lack of pallets.

Drums that could not be stacked in two levels due to the lack of pallets were stored outdoors.

7. SWOMP facility by the end of the third day of weighing (September 27)

Successful stacking of 3 levels using pallets.

By changing the layout to 3 level storage, the indoor storage capacity was increased.

8. SWOMP facility by the end of the fourth day of weighing (September 29).

IBC tanks and drums are stacked in 3 levels using pallets and forklift.

Storage space is arranged for each customer to make it easier to estimate the amount of oil collected.

Figure 32: Layout of SWOMP facility that changed over time before setting storage planning-2.

3.4.2 Creating and modifying layout drawing of SWOMP facility

With the implementation of the SRWMA/J-PRISM II pilot project, as the waste oil collection progressed, the need to create a layout drawing of the SWOMP facility to implement storing in a planned manner had increased.

For this reason, SRWMA created the SWOMP facility storage layout drawing (Figure 33) during the pilot project implementation period.

On the right side of this drawing is the SWOMP facility office, and on the left side is the recycling facility under construction by Embassy of Japan GGP project. The black squares indicate IBC tanks stock site, and the pink squares indicate pallets (four drums on one pallet).

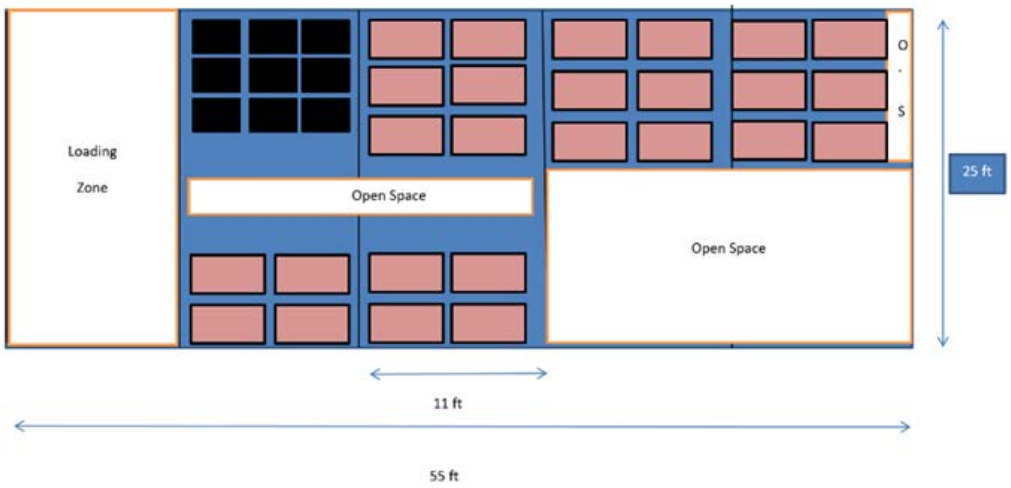


Figure 33: Draft Storage Layout of SWOMP facility by SRWMA created on September 16.

Based on the above storage planning, Figure 34 below calculates the storage capacity of the facility when IBC tanks and pallets are stacked in two or three levels.

Formulating a storage plan for the SWOMP facility helped weighing, storage work, and confirmation of work procedures with workers to be carried out smoothly. By calculating the storage capacity of the current SWOMP facility, it has become possible to make decisions based on accurate figures when analyzing and formulating SWOMP business plan.

Storage method	IBC Tanks		Drums		Total (SWOMP storage capacity)	
	Quantity	Liter	Quantity (Pallet No)	Liter	Quantity	Liter
2nd level	18	18,000	52	46,176	70	64,176
3rd level	27	27,000	78	69,264	105	96,264

Figure 34: Storage capacity of SWOMP facility calculated based on the layout drawing.

3.5 Required number of workers and division of work

MAJOR IDENTIFIED ISSUES

1. **SRWMA must always assign a supervisor and a data recorder to give instructions to customers and workers:** It was confirmed that the SWOMP storage process must have a supervisor who can give necessary instructions to the workers and a data recorder to compile accurate weighing results in a document.

2. **A total of 7 staff is required:** The breakdown and division of roles of staff is shown in Figure 35.

3.5.1 Phase 1 personnel assignment results

During Phase 1, SRWMA and J-PRISM II assigned personnel for the weighing and storage dates (Figure 35).

J-PRISM II assigned two people who were always on site and were performing roles of a supervisor and a data recorders. Except these J-PRISM II workers, about 6-7 people were engaged in this task. They were assigned by SRWMA and rental truck company.

Based on the comparison of the efficiency results and the required number of workers analyzed in 2.4, if SRWMA provides a truck and a forklift both at customer's sites and at the SWOMP facility, and supplies the required number of pallets and pumps for the waste oil collection and storage, the number of SRWMA workers required for the job can be minimized.

	Total number of workers (1+2+3)	Number of workers from SRWMA		Number of drivers from rental truck company	SRWMA supervisor and data recorder
		Total (1)	**Load and unload**	**Forklift Driver and Assistant Total (2)**	**Total (3)**
Day 1 / 08 Sep	6	3	2	2	1
Day 2 / 15 Sep	6	3	2	2	1
Day 3 / 27 Sep	7	4	3	2	1
Day 4 / 29 Sep	7	4	3	2	1

Figure 35: Breakdown of the number of assigned personnel on storage by work type.

3.5.2 Number of assignments and division of roles recommended in Phase 2

Based on the comparison of the efficiency results and the required number of workers, it is recommended to consider the number of workers and the division of roles for Phase 2 as specified in Figure 36. At least 7 workers are required to operate SWOMP during Phase 2 at the weighing and storing stages.

Required personnel	Required number of workers	Findings obtained in Phase 1
Supervisor	1	Personnel was required to give instructions to workers
Drivers (forklift)	2	Assigned 2 drivers from a rental car company
Workers for loading, unloading, weighing and storing	2	Confirmed that this is physically demanding job
Worker for pump up leaked drums at SWOMP Facility	1	Considering the number of drums leaked, a significant leak occurred in Phase 1
Data recording staff	1	Personnel was required to check the number and weight of collected drums to calculate the collection fee for customers
TOTAL (Minimum required number of personnel)	7	

Figure 36: Number of workers needed for SWOMP in Phase 2.

3.6 Points to be reviewed for the storage stage in Phase 2

Based on the issues raised regarding the weighing and storage of waste oil at SWOMP identified in Phase 1, the operations will be improved as follows in Phase 2.

		Phase 1 Implementation results	Phase 2 Implementation improvement points
Equipment	Forklifts	■ Assigned rental forklift to SWOMP. ■ SRWMA's forklift was used at the SWOMP facility.	■ Assigned rental forklift to SWOMP same as in Phase 1. ■ Necessary rental costs are included in the collection fee charged to the customer.
	Pallets	SRWMA did not use the pallets at the biggening of weighing and storage process because they did not own the pallets required for weighing and storage works.	SRWMA prepares the pallets and use them always at the time of weighing and storage works.
	Pumps	SRWMA's pump was used at the SWOMP facility.	Keep a pump at the SWOMP facility and use it immediately in case of waste oil leakage.
	Cleaning and hygiene items	SWOMP facility does not have facility occupational safety and hygiene goods.	J-PRISM procures garbage bin, trash bags, brooms, dustpans, hoses, wiping cloths, paper towels, duct tape, markers, gloves and other items etc
Weighing	Weighing and charging method	■ Since SRWMA's collection fee system is 20 sene per liter, it is necessary to weigh and record each drum one by one, and that is time-consuming. ■ Since the leaked drums could not be weighed, their weight was assumed to be 200 kg per drum.	In Phase 2, J-PRISM II proposes that the SWOMP collection fee system should be set based on the number of drums, not per liter. The purpose of this is to omit the work of weighing the drums individually.
SWOMP Facility Layout	Facility layout	■ Ideally the layout plan should have been prepared before the pilot project commenced, but it was drafted during its implementation in Phase 1. ■ By calculating the storage capacity of the current SWOMP facility, it has become possible to make decisions based on accurate figures when analyzing and formulating SWOMP business plan.	In Phase 2 SRWMA and J-PRISM II will investigate the possibility of export based on the storage capacity of the facility analyzed in Phase 1.
Personnel assignment	Required number of workers	4-5 staff from SRWMA	■ SRWMA needs to allocate 5 workers including a supervisor and a data recording officer. ■ 2 drivers will be assigned by the rental truck company.

Figure 37: Changes to the storage method in the pilot project.

4. COST ANALYSIS

4.1 Phase 1 implementation cost analysis and cost item classification

4.1.1 Principles of cost analysis in Phase 1

This chapter provides analysis of the structure of the current SWOMP program cost mechanism based on the results of the Pilot Project of waste oil collection and storage in Phase 1 in September 2021.

The principle of cost analysis is based on the following two points.

1. The purpose of the cost analysis is to calculate the cost required to complete the collection and storage of waste oil, and to revise the SWOMP charge costs to a level that can be covered by the charging fees to the customers.

2. This cost analysis does not include transportation and export costs after storage at the SWOMP facility.

In Phase 2 of SRWMA/J-PRISM II pilot project, options and costs at the time of export will be compared. Therefore, especially for the point two above, SWOMP's total process flow and cost information will be analyzed in Phase 2 and the contents will be included in the completion report of the pilot project.

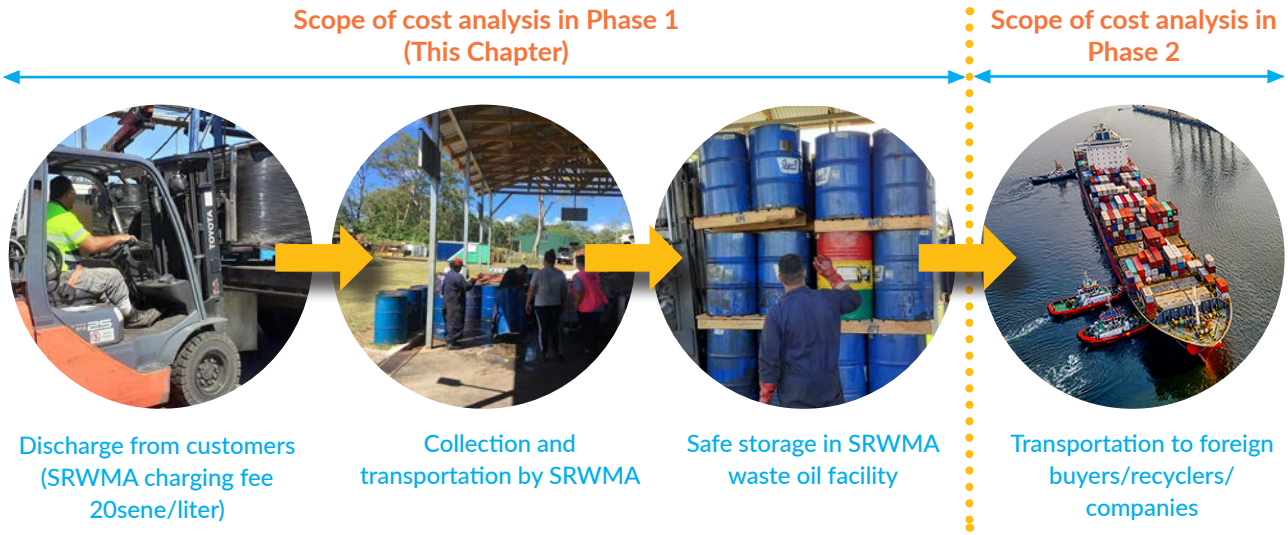


Figure 38: Scope of cost analysis in this chapter.

4.2 Phase 1 income and expenditure calculation results

4.2.1 Basis for cost calculation

In order to calculate the cost required to implement SRWMA/J-PRISM II Pilot Project Phase 1 for one month in September 2021, the following calculation basis was set, and the total implementation cost for Phase 1 is calculated based on the following points.

SWOMP COST CALCULATION BASIS IN PHASE1

I. Average daily collection amount

1. Number of drums: 51 drums/day.
2. Collection amount: 10,241 liter/day.

II. SWOMP working days and hours

1. Collection: once a week (total of 4 days/month, 4 hours/day).
2. Weighing and storage: once a week (total of 4 days/month, 6.5 hours/day).
3. Total number of working days: 8 days/month.

III. Required number of workers

1. Collection: 6 SRWMA workers (1 supervisor, 3 loading and unloading, 1 pump-up, 1 data recording staff), 2 drivers are assigned by the rental truck company.
2. Weighing and storage: 5 SRWMA workers (1 supervisor, 2 loading and unloading, 1 pump-up, 1 data recording staff), 2 drivers are assigned by the rental truck company.

IV. Vehicle arrangement

Collection days

- 1 rental crane truck (6 tons): used for 4 hours at the customer's site.
- 1 rental forklift (2.5 tons): used for 3 hours at the customer's site.
- 1 SRWMA forklift (2.5 tons): used for 1 hours at the SWOMP facility.

V. Weighing and storage days

- 1 rental forklift (2.5 tons): use for 6.5 hours at the SWOMP facility.

Figure 39: Cost calculation basis in waste oil pilot project Phase1.

4.2.2 Phase 1 implementation cost analysis and cost item classification

Based on the above cost calculation basis, the following income statement was prepared to identify the total cost spent for the implementation of Phase 1, the collection fee income obtained from the collected amount of waste oil, and the net income based on them.

From these calculation results, it can be seen that a large deficit was generated when comparing the costs and the revenue which is based on the implementation of Phase 1 method. However, in Phase 1, as equipment funds, J-PRISM II prepared equipment and required items to be used at the SWOMP facility, so it is thought that the total amount required for working capital will not be as large as in Figure 40 below.

In addition, this amount of revenue was expected, and SRWMA has not yet collected customers fee during the implementation of Phase1. However, if the collection fee is received from the customers, the ownership of the

waste oil of an unknown type will also be transferred to SRWMA. Figure 40 below shows the income and expenditure calculation results assuming that SRWMA bears the environmental risks.

At this stage SRWMA has not yet calculated the possibility of export and the cost of it. Therefore, the calculations in Figure 40 show only the cost and income (collection fee: 20 sene per liter) required for SRWMA to collect the waste oil and store it at the SWOMP facility. Currently, exporting the collected waste oil is the final goal for SWOMP, so in Phase 2 of the pilot project countermeasures and costs are to be analyzed in order to reach this final goal.

Item of Expenses					Tala	%	Calculation Basis
Revenue (SWOMP Collection Fee Income)					8,941.00		211 drums×40tala/drum+455kg÷0.9×0.20tala/liter+400 tala (=collection fee+pick-up fee)
Total Cost	Total 1)+2)+3)				17,333.70	100%	
	1) Material Cost	Total (1)+(2)			15,113.70	87%	
		JPRISM Procurement	Total (1)		14,683.70		
				Rental Truck Total	**6,680.00**		
				Truck for Collection	2,880.00		Rental fee 180tala/h×4hours/day×4day
				Forklift for Collection	1,200.00		Rental fee 100tala/h×3hours/day×4day
				Forklift for Weigh and Storage	2,600.00		Rental fee 100tala/h×6.5hours/day×4day
				PPE Total	**1,696.00**		
				Gloves	34.50		6.9tala×5set
				Safety Boots	525.00		105tala×5set
				Long Sleeves	775.00		155tala×5set
				Safety Hats	149.50		29.9tala×5set
				Safety Glasses	62.50		12.5tala×5set
				Chemical Gloves	149.50		29.9tala×5set
				Fire Extinguisher Total	**1,076.00**		
				3.5kg CO2	496.00		496tala/unit
				4.5kg ABC Dry Powder	580.00		290tala/unit×2
				Signage Total	**1,148.70**		
				No smoking/safety gear	229.74		229.74tala/unit
				Enquiries	229.74		229.74tala/unit
				Drop off zone	459.48		229.74tala/unit×2
				Hazardous storage	229.74		229.74tala/unit
				Security Camera Total	**4,083.00**		4083tala/unit (2 camera set)
		SRWMA Procurement	Total (2)		430.00		
			Oil spill kit (sawdust)		150.00		150tala/jumbo bag (=about 1 ton)
			Pump		180.00		180tala/unit
			Pallets		100.00		50tala/truck load(=about 20 pallets)×2
	2) Labor Cost			**Total**	**1,170.00**	7%	
		SRWMA Staffs	Labor for Collection		480.00		5tala/h×4hour/day×6persons/day×4day
			SRWMA Forklift Drivers		40.00		5tala/h×1hour/day×2persons/day×4day
			Labor for Weigh and Storage		650.00		5tala/h×6.5hour/day×5persons/day×4day
	3) Fixed Cost			**Total**	**1,050.00**	6%	
		SWOMP Facility Operation Cost	Water		150.00		150tala/month
			Electricity		250.00		250tala/month
			Internet		200.00		200tala/month
			Miscellaneous Cost		450.00		
Net Income					**-8,392.70**		Net Income= Revenue-Total Cost

Figure 40: Income statement of waste oil pilot project Phase1.

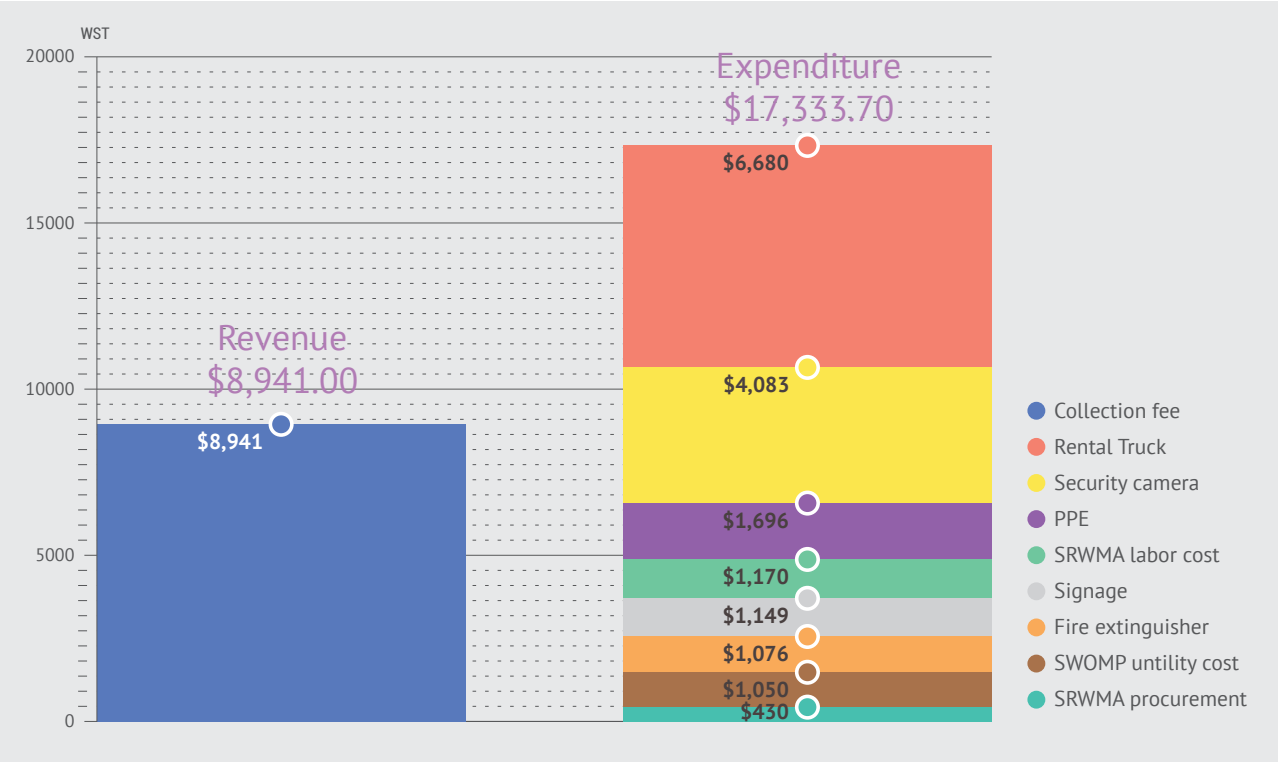


Figure 41: Comparison of income and expenditure (WST).

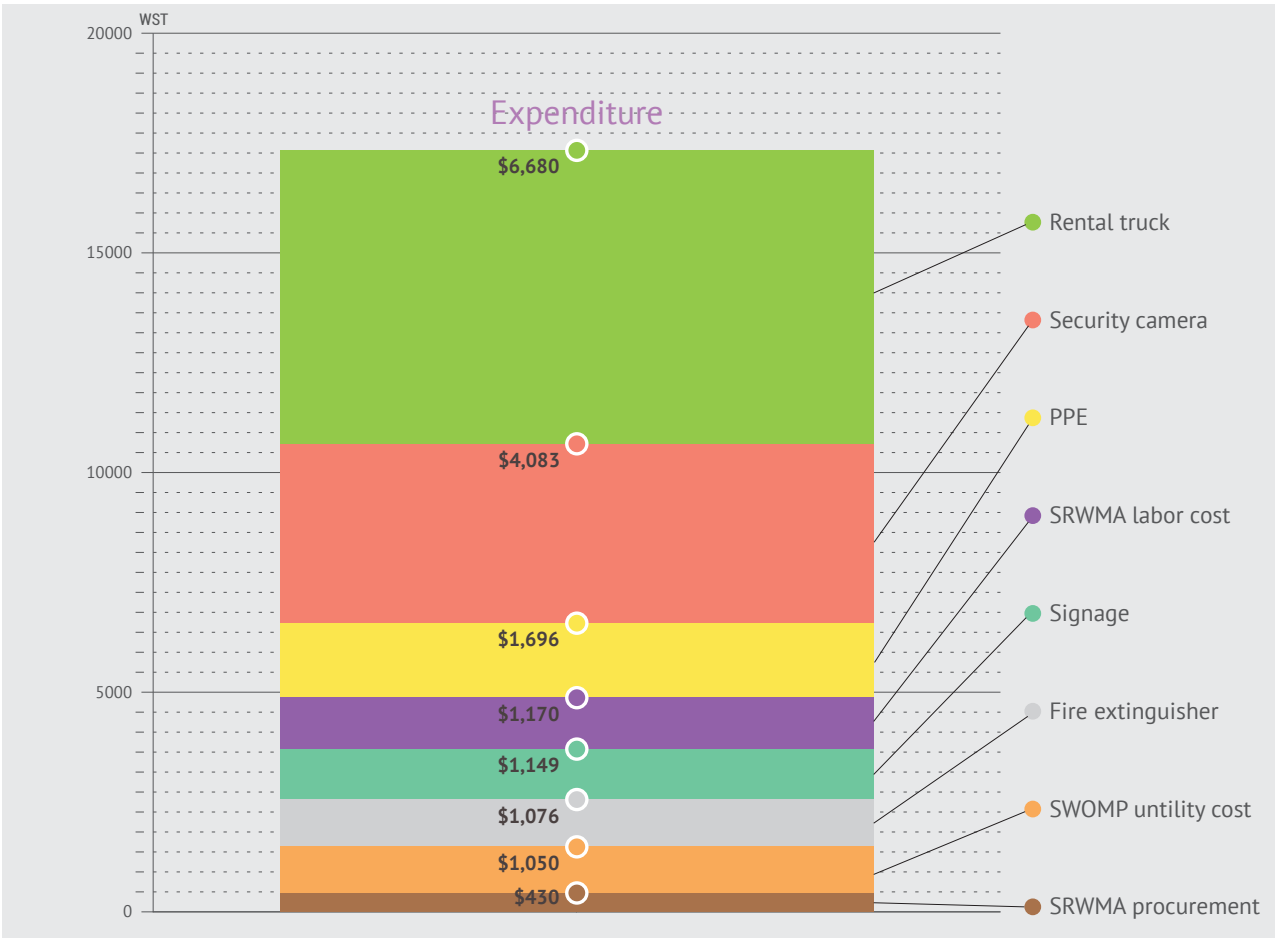


Figure 42: Expenditure breakdown (WST).

From the income and expenditure balance check results in Figures 40, 41, and 42, it can be seen that the waste oil collection and storage method in Phase 1 was in the red as a business.

Therefore, it is difficult for SWOMP as a business to continue this operation, and it is necessary to change the operation cost balance by either reducing the variable and/or fixed cost or changing the current collection fee setting.

Among variable costs, rental truck and forklift cost has the highest expenditure ratio, and these cost and SRWMA labor costs alone exceed SWOMP's revenue.

However, all of the workers assigned for this pilot project are employees of SRWMA member companies, and there are no workers dedicated to SWOMP. Therefore, most of the variable costs are incurred only when waste oil collection or storage are done, not fixed costs.

For this reason, the current fixed costs required for SWOMP operation are only electricity, water, internet, miscellaneous costs, and the total amount is 1,050.00 tala per month, which accounts for only about 6.06% of the total expenditure.

4.2.3 Forklift transportation methods and options

As shown in Figure 43, when looking at the ratio of variable costs, rental truck costs have the highest ratio, accounting for about 67% of the total variable cost. In order to operate SWOMP more economically and efficiently, it is considered most effective to reduce this rental truck cost.

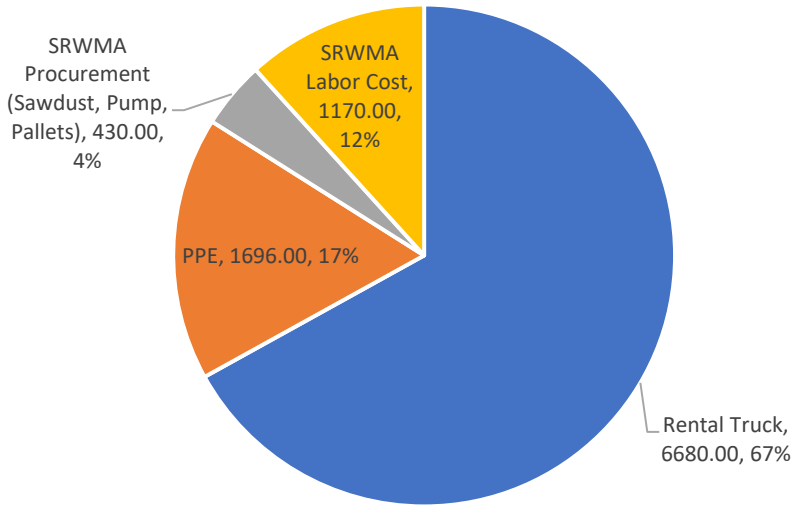


Figure 43: Variable cost ratio.

Since SRWMA does not own the vehicle as an association, so it is essential to use the vehicle of the two member companies for any SRWMA activities. These vehicles can be used for SWOMP activities, but fuel and labor costs will be covered by each company.

Additionally, neither member company has the means to tow a forklift on their truck and bring it to SWOMP customers. Therefore, in order to efficiently transport waste oil from the customer, a means of transporting the forklift to the customer is required. For that purpose, there are two options that SRWMA can do: one is to rent a dedicated truck like the one rented in Phase 1 as shown in Figure 46, another one is to buy a trailer that can tow and carry a forklift on a truck.

During Phase 1 it was impossible to find a trailer that can tow a forklift, so instead a truck with a movable loading platform that can carry a forklift was rented (Figure 45).

Crane truck owned by Waste Management.

Forklift owned by Pacific Recycle.

Figure 44: Truck and forklift owned by SRWMA member companies.

Special truck for carrying forklift owned by rental truck company. Forklift is secured on the loading platform with belts.

The loading platform is movable. Unloading the forklift backwards securing only the front belt.

Figure 45: Truck and forklift rented by J-PRISM II.

Forklift trailer example.

Forklift trailer example.

Figure 46: Example of forklift trailer.

Source: https://www.alibaba.com/product-detail/Trailer-For-Carrying-Forklift-and-Car_50033248852.html

Since the truck rental cost accounts for a large proportion of the SWOMP operating cost, SRWMA should compare the types of vehicles used for collecting and storing waste oils, analyze their purchasing cost and operation and maintenance cost, and make a decision which vehicle to use. It is necessary to determine whether it is the most cost-effective choice in order to reduce the operation costs of SWOMP.

In addition, SRWMA should request assistance in purchasing trucks and trailers if there is an opportunity to receive financial assistance in procuring these vehicles from the government or donors. If SRWMA/SWOMP owns these vehicles and can operate SWOMP, the operation cost can be greatly reduced.

4.3 Priority matrix on SWOMP Business improvement measures

The waste oil collection and storage flow of Phase 1 operated by SWOMP resulted in expenses exceeding the income that created a deficit. Therefore, SRWMA/SWOMP need to consider the priority actions to reduce the business deficit as much as they can, and to implement SWOMP in the sustainable business way.

Based on the implementation results and lesson learnt from Phase 1, J-PRISM II proposes the following priority action matrix to SRWMA. The next chapter describes in detail two measures that are of particularly "high" importance and urgency.

	"High" importance	"Low" importance
"High" urgency	■ SWOMP operation cost reduction. ■ Revision of collection fee.	Getting the fund from government or donor for SWOMP operation support.
"Low" urgency	■ Securing export destinations. ■ Check and compare export destination waste oil acceptance conditions, transportation routes, and transportation costs.	Developing the internal final disposal method.

Figure 47: Priority matrix on business improvement measures.

4.4 SWOMP operation cost reduction

4.4.1 Do not use forklift when the scale of waste oil collection is not large

The customers of Phase 1 stored large amount of waste oil in many drums; the number of collected drums was 40 to 60 per day. In order to efficiently collect waste oil drums at the customer's site, it was necessary to bring a forklift to the customer's site. It was hired by J-PRISM II from a rental car company.

However, waste oil can be collected by a crane truck without using a forklift. As shown in Figure 48, waste oil can be collected by a driver and two workers by wrapping a belt around a crane truck, loading and unloading drums.

However, drums that have been stored outdoors for a long time are likely to leak if they are impacted by movement, and this loading/unloading flow is not recommended from the viewpoint of risk reduction at the time of collection and worker's safety management.

Yet, from the cost analysis results of Phase 1, the rental cost of the vehicle is the highest among the operation costs, so in order to reduce this cost not renting the vehicle and using only the crane truck owned by the SRWMA member company is an economical transportation option for SRWMA.

Wrap the belt around the crane and wrap it around the waste oil drum to secure it.

Lift up the waste oil drum secured by belt.

Unloading waste oil drums fixed by a belt.

Remove the belt, lay the drum on the floor, and move it by rolling.

Figure 48: Waste oil unloading workflow without using a forklift.

Cost comparison scenarios	**Scenario 1: Cost minimization scenario** Cost of collecting waste oil using a truck provided by partners without renting a forklift		**Scenario 2: Status Quo scenario** Cost of collecting waste oil using rented forklift	
Cost calculation prerequisites	■ Use crane truck owned by SRWMA member companies ■ Distance from SWOMP to customer: 5.0 km ■ 28 drums, 1 trip		■ Rent a forklift (this fee includes tone driver and one driver assistant working force) ■ Distance from SWOMP to customer: 5.0 km ■ 28 drums, 1 trip ■ SRWMA forklift is used at SWOMP	
Working hours required for 1 collection of waste oil trip.	**Work content**	**Time required (hours)**	**Work content**	**Time required (hours)**
	Truck movement to customer site (SWOMP → customer)	0.5	Truck movement to customer site (SWOMP → customer)	0.5
	Waste oil loading	1.0	Waste oil loading	0.3
	Truck movement to SWOMP	0.5	Truck movement to SWOMP	0.5
	Waste oil unloading	1.0	Waste oil unloading	0.16
	Total working time per trip	**3.0**	**Total working time per trip**	**1.46**

<table>
<tr><td rowspan="5">Cost comparison</td><td colspan="2">Cost items</td><td>Tala</td><td colspan="2">Cost items</td><td>Tala</td></tr>
<tr><td colspan="2">Fuel cost
(1 diesel crane truck (average fuel consumption value: 7-8 km/L)</td><td>6.12</td><td colspan="2">Forklift rental cost
(100 tala/h×0.3 hours)</td><td>30.00</td></tr>
<tr><td colspan="2">Labor cost
(5 tala/h×3.0 hours×2 people)</td><td>30.00</td><td colspan="2">Labor cost (5 tala/h×1.30 hours×2 people)</td><td>13.00</td></tr>
<tr><td colspan="2">Labor cost at SWOMP for unloading
(5 tala/h×1.0 hour×2 people)</td><td>10.00</td><td colspan="2">Pallet
(20 pallets)</td><td>50.00</td></tr>
<tr><td colspan="2">Total cost</td><td>46.12</td><td colspan="2">Total cost</td><td>93.00</td></tr>
<tr><td rowspan="2">Advantages and disadvantages of this waste oil collection method</td><td colspan="3">Cost of collecting waste oil using a truck provided by partners without renting a forklift</td><td colspan="2">Cost of collecting waste oil using rented forklift</td></tr>
<tr><td>Advantages</td><td colspan="2">Disadvantages</td><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td></td><td>■ Total cost is low
■ Cost of waste oil collection paid by SRWMA can be minimized</td><td colspan="2">■ Loading and unloading waste oil using a crane truck by two SRWMA workers is 2-3 times longer than using a forklift
■ Manual loading and unloading of drums increases the possibility of waste oil leakage during work</td><td>■ Waste oil loading and unloading time is 2-3 times shorter
■ Loading and unloading of drums using a forklift decreases the possibility of waste oil leakage during work
■ Can use the labor force of a forklift driver and driver's assistant</td><td>■ Total cost is high
■ This collection fee alone cannot cover the cost of the rental cost of a forklift and a truck</td></tr>
</table>

Figure 49: Comparison of SWOMP operation costs depending on whether or not the forklift is used at the customer's site.

4.5 Revision of collection fee

4.5.1 Proposal for reviewing collection fee

As was discussed in Chapter 4.2, there was a deficit in the SWOMP Phase1 operation balance, and it is one of the considerable business improvement measures to change the current SWOMP collection charge tariff as shown in the priority matrix table (Figure 47).

Based on that, J-PRISM II proposes several business improvement measures to SRWMA listed in Figure 50. Of these three proposals, 2 and 3 are necessary measures when targeting customers who have a large amount of waste oil stored, such as those who participated in Phase 1.

The collection fee revision of Proposal 1 is important so that SWOMP can continue operating as a business regardless of the amount of waste oil stored by customers and the waste oil collection method implemented in Phase 1.

Increase the rate that SWOMP charges customers	(Example) ■ Collection fee: 40 tala/drum (=20 sene/liter, no change of the fee itself but no weight-based charge) ■ Rental forklift fee: 200 tala/hour ■ Pallet rental fee: 5 tala/pallet ■ Pump rental fee: 100 tala/collection
Secure means of transporting SRWMA forklift as soon as possible (trailer/ truck)	■ Apply trailer and/or truck to GGP or any project ■ Get the quotes on trailor and truck
Secure the requited minimum equipment and collection request documents to be filled out by customers before the SWOMP collection.	■ Required pallets (for providing rental service) ■ Required pumps (for providing rental service) ■ PPE, cleaning and hygiene Items ■ Collection request form ■ MSDS submission (safety data sheet)

Figure 50: Proposal points for SWOMP to implement Phase 2.

4.5.2 Expected income if SRWMA charges new collection fees to customers

This chapter explores by how much the income can be expected to grow if the current SWOMP collection fee settings are changed.

The prices given in Figure 50 do not guarantee sufficient income that would cover all necessary expenses. When considering options for earning new income other than the current collection fee, it is important to understand what happens if the collection fee is calculated based on the fact whether or not the customer owns the required equipment and whether or not this equipment needs to be used in each case. This is a provisional cost setting idea for consideration.

In addition to the current collection fee per liter, the rental costs of forklift, pump and pallets must be introduced. Forklift is hired on per-hour basis, pump – on per-day basis, and pallets depending on the number of drums to be collected.

The new setting of the collection fee will be based on the collection per drum instead of the fee calculated based on the weight of the container (Figure 51).

Figure 52 summarizes the ownership status of the three equipment items by customers of Phase 1. Items labeled "N/A" in this table are the items that customers do not own, indicating that these may be potentially additional costs that could be added to the new SWOMP's collection fee.

		Current SWOMP collection fee (Phase 1)	Proposal for a reviewed collection fee
Collection fee charge		*20 sene/liter* →Weigh drums and collect a fee per liter according to their weight	*40 tala/drum* →Do not weigh drums but collect fee per number of drums
Rental fee	Forklift rental	None	*200 tala/hour*
	Pallet rental	None	*5 tala/pallet* →Use 1 pallet for 4 drums
	Pump rental	None	*100 tala/day*

Figure 51: Expected income breakdown.

Collection day	Company name	Equipment ownership status		
		Forklift	Pallet	Pump
Day 1	Ford Samoa	N/A	N/A	N/A
Day 2	Vailima Breweries	✓	✓	N/A
Day 3	Nissan Hyundai Service center	N/A	N/A	✓
Day 4	Nissan Hyundai Service center	N/A	N/A	✓

Figure 52: Equipment ownership status in Phase1.

Figure 53 shows the expected amount of income if SWOMP collects rental fees from customers for lending them equipment required for collection.

Current total income of SWOMP is 8,941.00 tala, but if the hireage fee of the rental equipment is set at the value specified in Figures 50 and 51, the total income of 11,376.00 tala can be expected.

Regarding the calculation of the collection fee in Phase 1, it was necessary to weigh each drum, record the weight, calculate the collection fee, and charge the customer. However, the new toll collection method charges 40 tala per drum and eliminates the need to weigh each drum, reducing the costs and work associated with the weighing stage. Weighing is only required when waste oil is discharged in small containers rather than normal 200 liter steel drums, when the existing SWOMP 20 sene per liter fee applies. By simplifying the toll collection system this way, unnecessary work steps can be avoided and the income can be increased.

Rental cost of the forklift charged by the rental car company is 100 tala per hour, howerver SWOMP can double the price they charge the customer and rent out the forklift at 200 tala per hour.

The rental fee of the pump will be charged only when the oil leak actually occurs and the SWOMP pump is used at the customer's site.

This forklift, pump and pallets rental fee will not apply if customers provide their own equipment. Among Phase 1 customers, Vailima has their own forklift and pallets and no waste oil leaked from their containers at the time of SWOMP collection, so they will not be charged this additional rental fee. This leads to an incentive for customers not to be charged an additional fee if they own the required equipment, and for SRWMA and SWOMP, the work of providing each of these items is minimized, so it is a win-win situation for both sides.

Category	Company Name	Collectable Costs (Tala)	Calculation Basis
Collection fee	Ford Samoa	2,040.00	51 drums×40tala/drum
	Vailima Breweries	1,691.00	40 drums×40tala/drum+455kg×0.20tala/liter
	Nissan Hyundai Service center (Day1)	2,400.00	60 drums×40tala/drum
	Nissan Hyundai Service center (Day2)	2,400.00	60 drums×40tala/drum + 100tala
	subtotal (1)	**8,531.00**	

Category	Company Name	Collectable Costs (Tala)	Calculation Basis
Forklift rental fee	Ford Samoa	800.00	4hour×200tala/hour
	Vailima Breweries	0.00	Not subject to collection because the forklift was owned by the company
	Nissan Hyundai Service center (Day1)	800.00	4hour×200tala/hour
	Nissan Hyundai Service center (Day2)	930.00	4hour and 41minutes×200tala/hour
	subtotal (2)	**2,530.00**	
Pallet rental fee	Ford Samoa	65.00	13pallets×5tala/pallet. 13pallets=51drums÷4
	Vailima Breweries	0.00	Not subject to collection because the drums were owned by the company and handed over to SWOMP
	Nissan Hyundai Service center (Day1)	75.00	15pallets×5tala/pallet. 15pallets=60drums÷4
	Nissan Hyundai Service center (Day2)	75.00	15pallets×5tala/pallet. 15pallets=60drums÷4
	subtotal (3)	**215.00**	
Pump rental fee	Ford Samoa	100.00	100tala/day
	Vailima Breweries	0.00	Not subject to collection because the oil leakage did not occur during the collection
	Nissan Hyundai Service center (Day1)	0.00	Not subject to collection because the pump was owned by the company
	Nissan Hyundai Service center (Day2)	0.00	Not subject to collection because the pump was owned by the company
	subtotal (4)	**100.00**	
	TOTAL	**11,376.00**	subtotal(1)+(2)+(3)+(4)

Figure 53: Expected income breakdown per customer if SWOMP charge new rental fees.

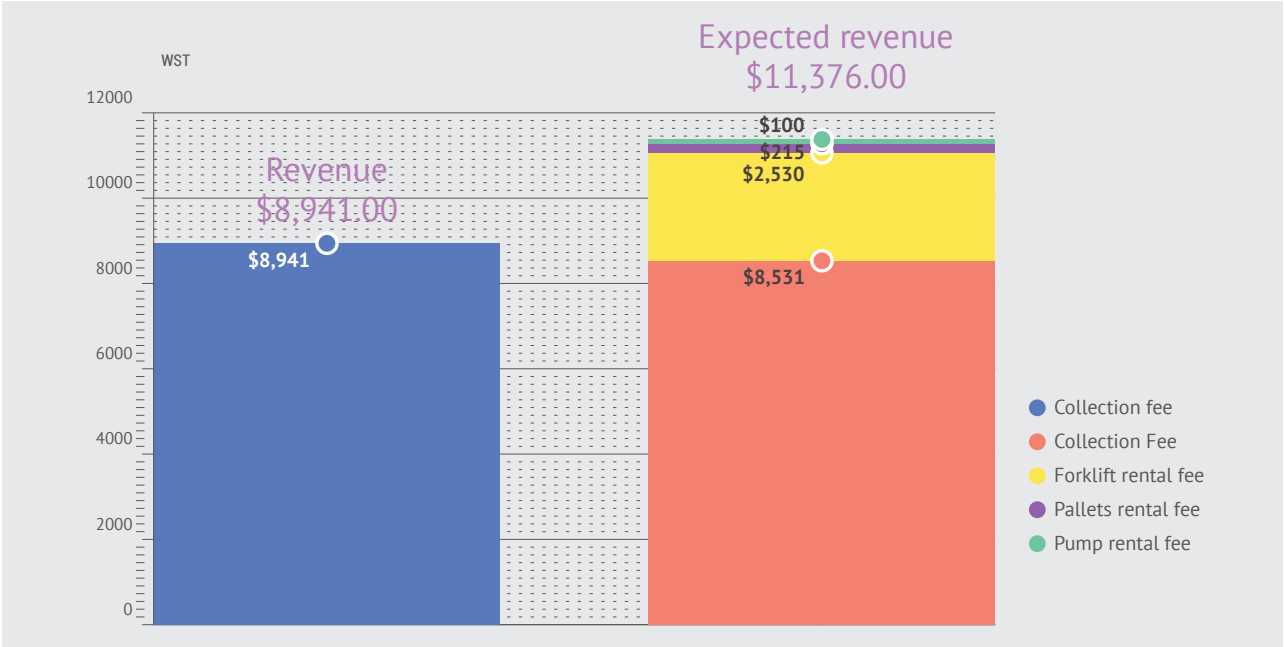


Figure 54: Comparison of income based on current SWOMP collection fee and expected income based on a new rental collection fee.

4.6 Points to be reviewed for the storing stage in Phase 2

This chapter examines options for the charge revision method for the implementation of Phase 2. After calculating the cost of the entire operation, analyzing the balance and the business model change based on the implementation results of Phase 2, SRWMA/J-PRISM II will consider all the necessary charge revisions. The collection fee will not be changed at the end of Phase 1.

Based on the issues raised regarding the SWOMP's cost balance identified in Phase 1, the operations will be improved in Phase 2 as follows:

		Phase 1 Implementation results	Phase 2 Implementation improvement points
Operation cost reduction	Find out how and how much it costs to transport a forklift to a customer	A trailer that could tow a forklift could not be found in Samoa, so J-PRISM II rented a forklift from a rental company and used it at the customer's sites	Check how to buy a forklift trailer in Samoa, rental price, etc. and reflect the operation cost reduction method by the end of Phase 2
	Do not use a forklift for small-scale collection	The customers of Phase 1 stored large amount of waste oil in many drums; the number of collected drums was 40 to 60 per day. In order to efficiently collect waste oil drums at the customer's site, it was necessary to bring a forklift to the customer's site.	For small-scale collection (all collected drums can be carried in one trip), in order to reduce the forklift rental cost, do not rent it and use only the crane truck owned by the SRWMA member company.
Revision of Collection Fee	Forklifts	No rental cost was charged to customers	Shift toward collecting the rental fees from customers when the customer does not own a forklift after analyzing the total operation cost information of SWOMP in Phase 2
	Pallets	No rental cost was charged to customers	Shift toward collecting the rental fees from customers when the customer does not own pallets after analyzing the total operation cost information of SWOMP in Phase 2
	Pumps	No rental cost was charged to customers	Shift toward collecting the rental fees from customers when the customer does not own a pump after analyzing the total operation cost information of SWOMP in Phase 2

Figure 55: Summary of changes of the collection fee system in the pilot project.

5. CONTINUOUS IMPROVEMENTS AND ACTIVITY PROPOSALS FOR PHASE 2

5.1 Proposal for Phase 2 implementation plan

5.1.1 Purpose and schedule

PHASE 2 IMPLEMENTATION PLAN

I. Objectives

1. To compare the export destination options of the collected waste oil and confirm the total cost of SWOMP operation.
2. To improve the SWOMP collection and storage operation based on the results of Phase 1 implementation.

II. Outputs

1. Export options and cost analysis results.
2. Pilot project implementation report, Phase 2.
3. Hold a seminar to report the completion of the implementation of the pilot project.

III. Implementation schedule

February to June 2022 (5 months)

Figure 56: Purpose and schedule.

5.1.2. Phase 2 implementation method (difference from Phase 1)

The main points to be carried out at each stage of the implementation of Phase 2 are listed in Figure 57. In Phase 2, J-PRISM II would like to focus on securing option information for export destinations.

Preparation before Collection	■ Procurement of occupational health and hygiene items in the SWOPM facility ■ Revision of SWOMP fee collection system (if necessary)
Collection Method	■ Procurement of items required for collection (forklift, pallet, pump) ■ Procurement of SRWMA workers, rental truck and forklift at the time of collection
Storage Method	■ Procurement of items required for storage (forklift, pallet, pump) ■ Procurement of SRWMA workers, rental truck and forklift at the time of collection ■ Do not weigh drums in Phase 2 (40 tala/drum)
Final Disposal Method	■ Explore options for export destinations, flow and cost ■ Conduct laboratory tests to identify the type of waste oil collected

Figure 57: Phase 2 activity points.

5.2 Waste oil export and appropriate treatment option plan (tentative)

5.2.1. Tentative options

As of February 2022, it is envisioned that the following future plans will be investigated, and their feasibility will be confirmed in Phase 2 of the Waste Oil Pilot Project.

EXPORTING/APPROPRIATE TREATMENT OPTIONS (TENTATIVE AS OF FEB 2022)

I. Possible scenarios on exportation

1. Transport to BlueScope, Fiji
2. Transport to recycler, Australia
3. Cooperate with a member company of a nearby recycling association in the Pacific to process waste oil in regional collaboration (e.g., PNG, Solomon Islands etc.)

II. Possible scenarios on appropriate treatment

4. Develop proper disposal or recycling routes in cooperation with MNRE's National Waste Oil Management Planning Project (under Sustainable Waste Actions in the Pacific (SWAP) project, Agence Française de Development (AFD))
5. Develop proper disposal or recycling routes in cooperation with other private companies

Figure 58: Potential scenario for SWOMP collected waste oil.

5.2.2 Activity schedule breakdown

As of February 2022, the activity schedule for each month is as follows:

	Activity 1: Confirmation of export destination, option comparison	**Activity 2: Waste oil collection and storage**
February	Transport to BlueScope, Fiji Transport to Recycler, Australia	Continue collection and storage at the request of customers
March	Cooperate with a member company of a nearby recycling association in the Pacific to process waste oil in regional collaboration (e.g., PNG, Solomon Islands etc.)	Conduct laboratory tests on collected waste oil (implemented according to the requirements of the recipient)
April	Develop proper disposal or recycling routes in cooperation with MNRE's National Waste Oil Management Planning Project (under SWAP project)	Same as above
May	Develop proper disposal or recycling routes in cooperation with other private companies	Same as above
June	Compile Pilot Project Implementation Report, Phase 2	
July-September	Hold a Seminar to report the completion of the implementation of the pilot project	

Figure 59: Potential scenario for SWOMP collected waste oil.

5.3 Public awareness on proper collection of waste oil

5.3.1 Feedback and customer responsibility seminar for SWOMP customers

Since Phase 1 of the waste oil collection and storage pilot project has been completed in 2021, and issues related to the current SWOMP collection and storage work that require customer's cooperation have been clarified, SRWMA/J-PRISM II would like to hold an information sharing seminar to provide the results and feedback to the customers of Phase 2.

The tentative program of the seminar is outlined in Figure 60. The seminar will cover the following topics: scope revisions of SWOMP and the process of safe handling, storage and collection of waste oil, as well as health and safety within the work place and environment.

PROGRAMME		
TIME	**ITEM**	**SPEAKER/ PRESENTER**
9.45am- 10.00am	Registration	
10.00am- 10.15am	Opening Prayer, Welcoming Remarks and Photo Session	Mrs Marina Keil President, SRWMA
10.15am- 10.35am	SRWMA and JICA/J-PRISM II Pilot Project Phase 1 Implementation Results and Feedbacks on Waste Oil Collection and Storage	Ms Yoko Onuma J-PRISM Expert, JICA
10.35am- 10.55am	SRWMA and JICA/J-PRISM II Pilot Project Phase 2 Launching and Implementation planning	Ms Fina Sio SRWMA
10.55am- 11.15am	Changes of SWOMP Operation and Requests to Customers	Ms Morry Su'a SWOMP Manager, SRWMA
11.15am- 11.35am	Q and A	SRWMA
11.35am- 11.40am	Closing Remarks	Mr Akihiko Hoshino Resident Representative, JICA Samoa
11.40am-11.45am	Closing Prayer	Mr Silafau John Sio VICE PRESIDENT, SRWMA
11:45am – 12:15pm	Lunch	

Figure 60: Tentative program draft of SRWMA/ J-PRISM waste oil feedback seminar.

5.3.2. Pilot project completion seminar

Upon completion of Phase 2 of waste oil collection and storage activity, as well as obtaining implementation results on plastic recycling, SRWMA/J-PRISM II pilot project will organize a completion seminar to share the results with the stakeholders, MNRE, SPREP and other development partners.

5.4 Monitoring and reviewing on SRWMA/J-PRISM II pilot project

5.4.1 Phase 1 pilot project monitoring

During the waste oil collection on September 6th within Phase 1 of the pilot project, SRWMA invited MNRE, SPREP and SWAP to the SWOMP facility to share the collection status and issues.

The site visit was featured in Samoa Observer newspaper (https://www.samoaobserver.ws/category/samoa/91035).

Ms. Morry Su'a, the project manager of SWOMP, explained the details and challenges of the SWOMP implementation.

Group photo with representatives of MNRE, SPREP, SWAP, SRWMA and J-PRISM II.

Figure 61: On-site briefing for SRWMA's waste oil collection and storage activity held at SWOMP facility on September 6, 2021

5.4.2. Phase 2 pilot project monitoring

Before Phase 2 commences, SRWMA/J-PRISM II plan to hold a seminar to share the lessons learned from the implementation results of Phase 1 of the pilot project.

Upon the completion of Phase 2, another knowledge sharing seminar will be organized, tentatively between July and September 2022.

When the waste oil collection and storage in Phase 2 is completed, SRWMA will once again invite MNRE, SPREP, and other donors to visit SWOMP facility for a review of the SRWMA/J-PRISM II pilot project.