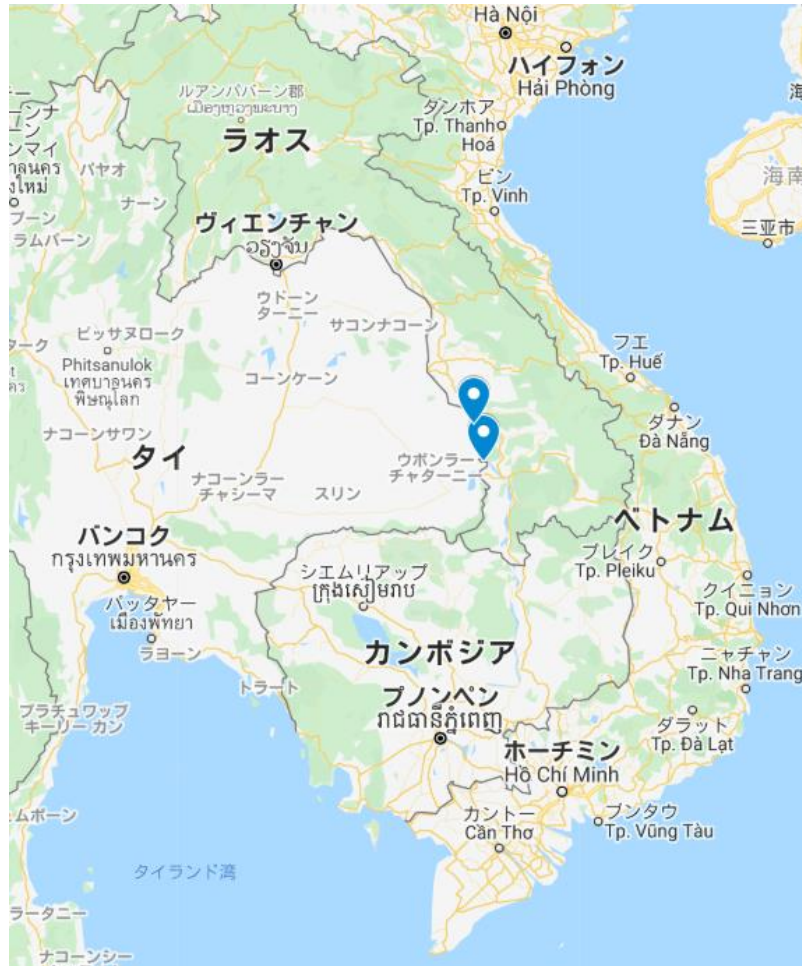


Data Analysis Report

Ubon Ratchathani



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Analysis Report

Primary study of Ubon Ratchathani

1. Secondary data collection

In this section, it showed the secondary data collected by our team according to the data inventory sheet. The listed of data was showed in Table 1. More details of each data as showed in Annex 1.1 - 1.11.

Table 1 Details of secondary data

Data		Description	Source	Annex
1) Data inventory				
1	Demographic information			
1.1	Population	Total population in each district with disaggregation by sex (male and female).	Ubon Ratchathani National Statistical Organization	1.1
1.2	Population Growth Rate	The population growth rate's unit is percentage per year.	Ubon Ratchathani National Statistical Organization	1.1
1.3	Floating Population	Number and location of restaurants.	Marine office 7' Ubonratchathani Brance	1.2
1.4	Household	Number of household in each district.	Ubon Ratchathani National Statistical Organization	1.1
2	Topographic/Basin characteristics information			
2.1	River networks: Main stream and Tributary of rivers	The network of main river, stream and the tributary in the watershed	Regional Irrigation Office 7 Ubon Ratchathani	Shapefile Email
2.2	Flow Observation	The flow and water level at any station in the outlet, or at the river mouth.	http://hydro-4.rid.go.th/main/4-RUNOFF.html	
2.3	Rainfall runoff data	Rainfall runoff data in each sub-basin, generated from rainfall runoff model	http://hydro-4.rid.go.th/4Runoffdata/7.GraphRunoff-Month/7.html	1.3
2.4	Flood Hazard Map	The shapefile of the flash flood in the city.	Regional Irrigation Office 7 Ubon Ratchathani	Shapefile Email
3	Infrastructure			

Data		Description	Source	Annex
3.1	Industrial area/ Economic zone/ Factory location	Location of factory with their information: type of factory.	Ubon Ratchathani Industry Department	1.4
3.2	Tourism area	Urban, nature, culture and history	Ubon Ratchathani Tourism and Sports Department	1.5
3.3	Hotel	Name and location	Ubon Ratchathani Tourism and Sports Department	1.6
3.4	Temple	Name and location	Ubon Ratchathani Provincial Office of Buddhism	1.7
3.5	School	Name and location	http://www.moe.go.th/	1.8
3.6	Hospital	Name and location	Ubon Ratchathani Provincial Health Office	1.9
4	Land use information			
4.1	Junkshop	Name and location	Ubon Ratchathani Department of Provincial Administration	1.10
4.2	Disposal site	Name and location	Provincial Offices for Natural Resources and Environment Ubon Ratchathani	1.11
4.3	Wastewater facility	Name and location	Provincial Offices for Natural Resources and Environment Ubon Ratchathani	1.12
2) Waste management				
1.1	Waste generation	Waste amount	Ubon Ratchathani Provincial Office for Local Administration	1.12
1.2	Waste collection	Waste collection	Ubon Ratchathani Provincial Office for Local Administration	1.12

2. Primary data collection (Field Survey)

In table 2, it showed a timeline for each activities of this study during January to March 2020.

Table 2 Timeline for data collection at Ubon Ratchathani Province

Date	Details	Remark
17 Jan 2020	Area survey at Khong Chiam District	Dr.Pawena Limpiteeprakan Asst.Prof.Nittaya Chakhamrun
22 Jan 2020	Installed net in the Mekong at Khong Chiam District	Dr.Pawena Limpiteeprakan

Date	Details	Remark
		Dr.Sanga Tubtimhin
23 Jan 2020	Area survey at Pho Sai District	Dr.Pawena Limpiteeprakan Dr.Sanga Tubtimhin
23-29 Jan 2020	Collect plastic waste from barrier in Khong Chiam district (7 days)	Dr.Pawena Limpiteeprakan Dr.Sanga Tubtimhin Bachelor Student
31 Jan 2020	Installed net in the Mekong at Pho Sai District	Dr.Pawena Limpiteeprakan Dr.Sanga Tubtimhin
1-7 Feb 2020	Collect plastic waste from barrier in Pho Sai district (7 days)	Dr.Pawena Limpiteeprakan Dr.Sanga Tubtimhin Bachelor Student
10-29 Feb 2020	Survey of artificial barriers and illegal dumping site in Ubon Ratchathani Province	Dr.Pawena Limpiteeprakan Dr.Sanga Tubtimhin Bachelor Student
16-28 Feb 2020	Data collection /coordination for data inventory of Ubon Ratchathani	Dr.Pawena Limpiteeprakan
March 2020	Report writing	Dr.Pawena Limpiteeprakan

2.1 Artificial barriers

There is no waste data collection from artificial barriers in Ubon Ratchathani. We have conducted a pre-survey at Pak Moon Dam and there were only water plants stuck in front of the water gate as shown in Figure 1. Most of the water gates in Ubon Ratchathani have the same situation with the hyacinth water plant. As in the dry season (less rainfall) may cause this event. The officer in the irrigation department also mentioned that many wastes are usually accumulated in the wet season.



Figure 1 Water gate at Pak Moon Dam

2.2 Survey in the Mekong River

Ubon Ratchathani, does not have any ports so we conducted the primary study on plastic waste at two locations on the Mekong River. One is in Khong Chiam District and another one is in Phosai District. Equipment used for the primary study was fishing net with mesh size around 1 cm and a rope with a thickness of around 5 mm as shown in Figure 2. The length was around 6 m, width around 7 m and the depth about 1.5 m. in the water. The outline of the net looks like a bag shape as shown in figure 3. The location of two sites is shown in Figure 4. The flow diagram of methodology was showed in figure 5.



Figure 2 Fishing net and rope used in the study

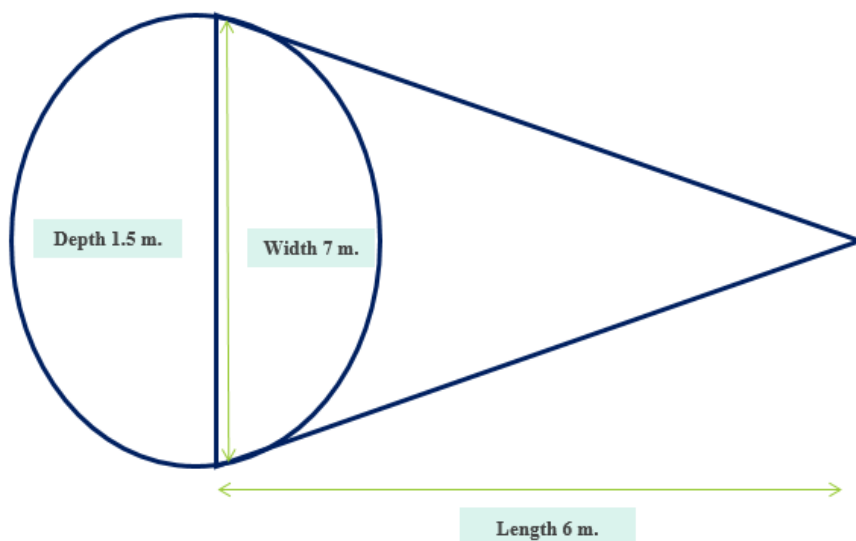


Figure 3 Layout of the net



Figure 4 Location of survey sites

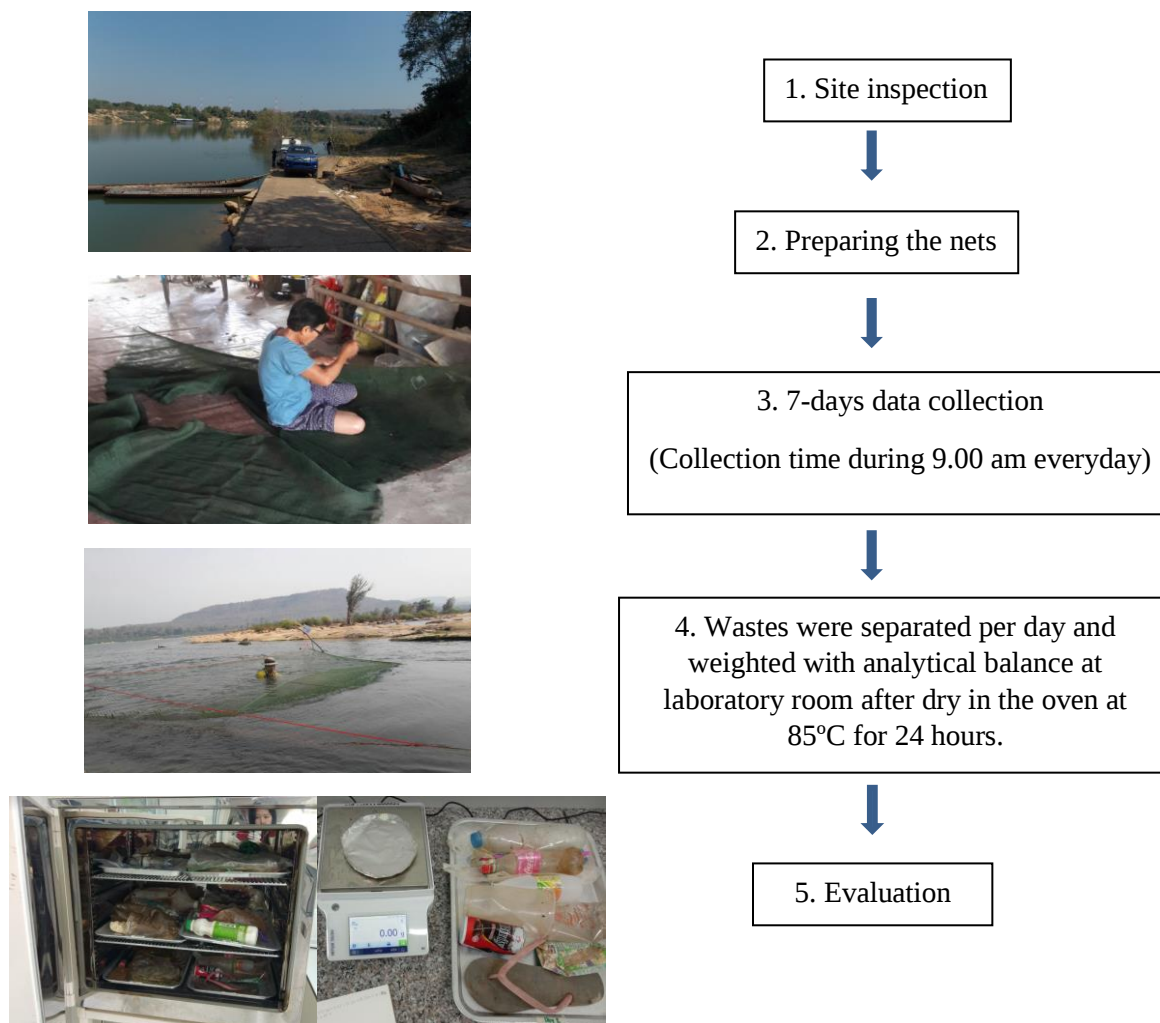


Figure 5 Diagram show methodology of waste audit

2.2.1 Result of Khong Chiam District

The location at Khong Chiam District (Figure 6) was selected based on many criteria. The first one was that the location in the river was a downstream part of the community. The assumption is this area will have some of the plastic litter from the community who lived upstream. The second reason is this location in downstream of the boat port that people use to cross the border to Lao and for tourism. The number of people using this port during the data collection period is shown in Table 3. For the plastic waste collection each day, we used a boat to collect the waste at the spot where the mesh was installed as shown in Figure 7. The data collection period was 7 days including working days and the weekend. A photo of the total plastic waste collected each day is shown in Figure 8. Total amount of plastic wastes collected for 7 days was 81 pieces as showed in Table 4. Dry weight after put in oven at 85 °C for 24 hour was 1,214.2 g. The water level in the Mekong River as showed in Table 4 is based on data from the Meteorological Station of the Khong Chiam Meteorological Station.

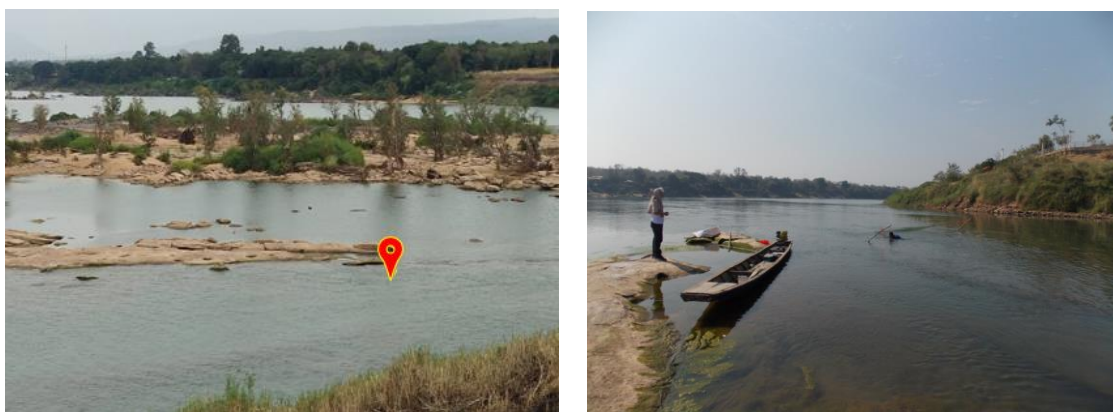


Figure 6 Location of waste audit at Khong Chiam District



Figure 7 How to collect plastic waste

Table 3 Number of boat trip and passenger per day at Khong Chiam Port

Date	No. of boat (trip)	No. of passengers (person)	Remarks
23/1/2020	7	59	Thursday
24/1/2020	9	90	Friday
25/1/2020	17	170	Saturday
26/1/2020	17	170	Sunday
27/1/2020	15	150	Monday
28/1/2020	10	100	Tuesday
29/1/2020	9	83	Wednesday



Figure 8 Plastic waste collected each day at Khong Chiam District

Table 4 Total pieces of plastic waste and water level of Mekong River at Khong Chiam District

Day	Date	Total piece of plastic waste (pieces)	Weight (g.)	Water level (m.)
1	23/1/2020	19	188.8	1.90
2	24/1/2020	14	198.75	1.92
3	25/1/2020	5	211.83	1.95
4	26/1/2020	16	146.62	1.95
5	27/1/2020	0	-	1.90
6	28/1/2020	11	333.76	1.90
7	29/1/2020	16	134.44	1.88
	Total	81	1,214.2	

2.2.2 Result of Phosai District

The location at Phosai District (Figure 9) was selected based on the point that this part is the narrowest part of the Mekong River in Phosai District. For plastic waste collection each day, we walked into the water to the spot where the mesh was installed as showed in Figure 9. Data collection period was 7 days including working day and the weekend. A photo of the total plastic waste collected each day is showed in figure 10. Total amount of plastic waste collected for 7 days was 61 pieces as showed in Table 5. Dry weight after put in oven at 85 °C for 24 hour was 443.92 g.



Figure 9 Location of Phosai District



Figure 10 Plastic waste collected each day at Phosai District

Table 5 Total pieces of plastic waste at Phosai District

Day	Date	Total piece of plastic waste (pieces)	Weight (g.)
1	1/2/2020	8	111.44
2	2/2/2020	6	29.16
3	3/2/2020	7	12.01
4	4/2/2020	10	56.15
5	5/2/2020	12	101.11
6	6/2/2020	14	98.51
7	7/2/2020	4	35.54
Total		61	443.92

All the wastes collected from both sites were categorized using Ocean Trash Data Form. There were a small number of pieces of other trash such as glass bottles, beverage cans, sponge, tires, paper and milk boxes which were found together with plastic waste as shown in Table 6 and 7.

Table 6 Summary type of waste according to Ocean 6 Summary type of waste according to Ocean trash data form trash data form at Khong Chaim District

Items	Total No. of Khong Chaim District (pieces)	Photo
Mostly likely to find items:		
Food wrappers (candy, chip, etc.)	6	
Take out /away containers (Foam)	2	

Items	Total No. of Khong Chaim District (pieces)	Photo
Bottle caps (Plastic)	1	
Lids (Plastic)	2	
Straws	4	
Spoons	1	
Beverage bottles (Plastic)	12	
Beverage bottles (Glass)	1	
Beverage cans	1	
Grocery Bags (Plastic)	11	
Other Plastic Bags	12	

Items	Total No. of Khong Chaim District (pieces)	Photo
Cups & Plates (Foam)	6	
Fishing Gear:		
Fishing net	1	
Rope	2	
Paper	1	
Packaging Materials:		
6-Pack Holders	1	
Other plastic/Foam Packaging	5	
Strapping Bands	4	
Tobacco Packaging	1	

Items	Total No. of Khong Chaim District (pieces)	Photo
Other trash:		
Tires	3	
Sponge	1	
Jacket	1	
Milk box	1	

Table 7 Summary type of waste according to Ocean trash data form of Phosai District

Items	Total No. of Phosai District (pieces)	Photo
Mostly likely to find items:		
Cigarette Butts	1	
Food wrappers (candy, chip, etc.)	1	
Bottle caps (Plastic)	2	
Straws	1	
Beverage bottles (Plastic)	3	

Beverage cans	1	
Grocery Bags (Plastic)	8	
Other Plastic Bags	20	
Fishing Gear:		
Rope	8	
Packaging Materials:		
Other plastic/Foam Packaging	7	
Other plastic Bottles (Soap, face wash, toothpaste)	3	
Strapping Bands	1	
Tobacco Packaging	2	
Tiny trash less than 2.5 cm.:		
Plastic piece	7	
Other trash:		
Paper	3	
Milk box	1	

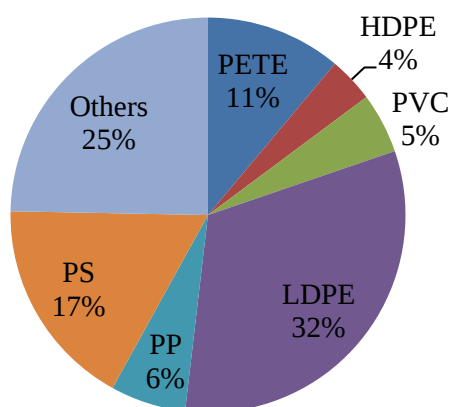
All plastic wastes were categorized as 7 types of materials which are PETE, HDPE, PS, PP, LDPE and others. The details as showed in Table 8. Percent of plastic materials type at Khong Chiam and Phosai District was showed in Figure 11. Top two plastics types are LDPE and follow by PS. Since this type of waste is not commonly collected for recycling.

Table 8 Types of plastic materials

Types of materials	Khong Chiam district	Phosai district
PETE	 9 pieces	 3 pieces
HDPE	 3 pieces	 3 pieces
PVC	 4 pieces	 1 pieces
PS	 14 pieces	 7 pieces
PP	 5 pieces	 3 pieces
LDPE	 24 pieces	 33 pieces

Types of materials	Khong Chiam district	Phosai district
Others	 19 pieces	 18 pieces

Khong Chiam District



Phosai District

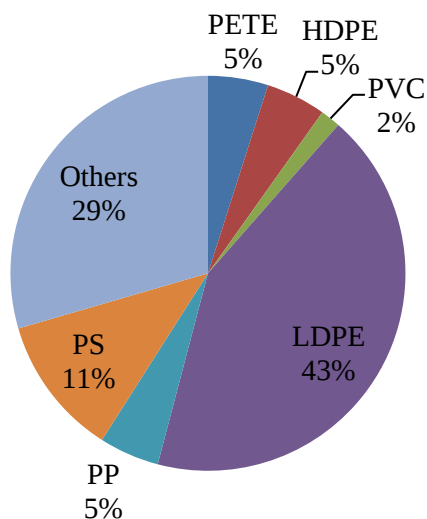


Figure 11 Percent of plastic materials type at Khong Chiam and Phosai District

2.2.3 Difficulties and Lesson learnt

1) Logistic aspect

- Water flow of the river during the study period was smooth and slow.

- The net can be installed only in certain parts of the river such as the shallow part and the place near to the shore.
- In January and February, there is a lot of fresh water seaweed in the river which stuck in the net.

2) Technical aspect

- Not so many wastes leakage were collected by the net.
- Some of plastic is old one and some is very new. Based on the types of plastic, we can assume that their sources might come from activities both on land and in water itself.

2.3 Illegal dumping sites

The total number of illegal dumping sites in Ubon Ratchathani was 65 locations. 62 sites were unsanitary disposal site that belong to local municipality (Annex 1.13). There were 3 sites of illegal dumping that did not show in the list. The list of municipality dumping sites is from Ministry of Interior's record which excludes sanitary landfills and incinerators. The summary of data is showed in Annex... Most of the waste found in the waste pit or waste pile was plastic waste as showed in figure 12.



Figure 12 Photo of dumping site that belong to local municipality in Ubon Ratchathani

3. Overall Recommendation for the CounterMEASURE Project

1. Primary data survey should be conducted in the wet season in order to compare the possible leakage of plastic waste between the seasons.
2. Since there is not so many waste leakage were collected by the net, therefore we need to find others method to monitor the type of plastic waste leakage in the river. For example we can use waste composition that we found on shore nearby the river to check about types of materials.
3. The main problems of Ubon Ratchathani that should be focused is unsanitary dumpsites which might be a main source of plastic leakage to the river during raining season.
4. In sorting plastics by type of plastic, it is difficult to separate by the eyes, since the plastic waste collected does not have all types of labels. In the future, there should be criteria for sorting plastic types such as manual for classify each plastic type.