



ISSUES OF POLLUTION MANAGEMENT IN  
RIVERINE VILLAGES AT KAMPONG MANG,  
BATANG SAMARAHAN

BY

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**Issues of Pollution Management in Riverine Villages at  
Kampong Mang, Batang Samarahan**

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**A research project submitted in partial fulfillment of the  
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## ABSTRACT

The issues of pollution in riverine villages in Sarawak have become more rampant than a health hazard, unsafe for home consumption and become deteriorated environmentally, with water-borne diseases threatening the quality of water and its natural habitat. This situation associates with the practices of riverine villages by dumping their domestics waste and unused products into the river. This research and findings were done at Kampong Mang, one of a village along Batang Samarahan Kuching by developing questionnaires as secondary data and random interviews with the villagers where I am staying. The results being reviewed and found out that there is an urgent need for proper garbage disposal site for the villagers and apparently government and local authority intervention is required to established proper place for waste disposal in relation to their provisions and by laws. Remedial action needs to be taken urgently since the river pollution is not only affected the life and growth of the people living nearby, but also water habitat in particular and environment as a whole.

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# CHAPTER 1: INTRODUCTION

## 1.0 Overview

Sarawak is the largest state in Malaysia and had a lot of rivers which link the hinterland to further south reaching the South China Sea. Due to its vast areas, most of its people are living along the rivers which they rely as a mode of transport and source of living. They travel by boat from one place to another especially to their farms if located across the river and most importantly to nearby bazaars or village shops to buy food and other domestic needs.

At the same time, the villagers need river water for drinking, cooking, bathing, washing their clothes and also providing them food such as fish and prawns. These river fish and prawns provide them with protein and also as their source of income. However, they also rely on rivers to dump their daily waste and garbage.

This practice was started in early 1992 when rural development program took its tall and reached most coastal areas along the Samarahan River. Federal Land Consolidation and Rehabilitation Authority (FELCRA) a government agency, embarked on economic transformation program (ETP) and opened large scale palm oil estates. The additional initiative on cattle rearing in plantation was introduced with the main objective to breed and increase the supply of feeder cattle for domestic consumption and minimizing the dependency on imports of meat from other countries. Thus, this further improved the standard of living of the local community.

Through these projects, FELCRA further enhanced their social corporate responsibilities by building roads connecting the villages to the main town such as Kota Samarahan and Kuching City. Sarawak Government is also playing supporting role by supplying electricity to the villagers thus the livelihood, economic and living standard of

the villagers are further improved. They started to build concrete house complete with electricity and refrigerator to store food.

However, this improvement in the lifestyle gives a few significant setbacks as below:-

- i. Riverine transport is decreasing since road transport is available and most people own vehicles at least a motorbike for mobility to nearby towns to buy their daily needs.
- ii. River becomes the home for the crocodiles with increasing population.
- iii. Technology change where plastic bags are widely in use and villagers used these bags to put their household garbage and throw them into the river. This practice, if left unchecked would lead to river pollution and siltation thus give effect to the environment and human being as a whole.

## **1.1 Background of the Study**

The issues of pollution in riverine villages have become more rampant of late in relation to health hazard. The water quality deteriorates, murky and seems not safe for home consumption. Thus the river itself had become deteriorated environmentally and would lead to water borne diseases threatening the quality of the water and the natural habitat of the river itself.

In this research study, I am concentrating on Batang Samarahan or Samarahan River which is located at Samarahan Division in Kuching region. There are about 21 villages situated along the river namely Kampong Sambir, Kampong Sebandi Matang, Kampong Tambirat, Kampong Semilang, Kampong Beliong, Kampong Moyan, Kampong Sebandi Ulu, Kampong Tanju Ulu, Kampong Tanju, Kampong Reba, Kampong Tiang Api, Kampong Sungai Pinang, Kampong Serepan, Kampong Beradek,

Kampong Mang, Kampong Melayu, Kampong Nakong, Kampong Reban, Kampong Lubok Antu and Kampong Lintang Baru of which most of these villagers depend on the river for their livelihood. However, the situation of concern is the daily disposal of garbage by the households into the river will lead to pollution if no precautionary measures are undertaken by the relevant authorities.

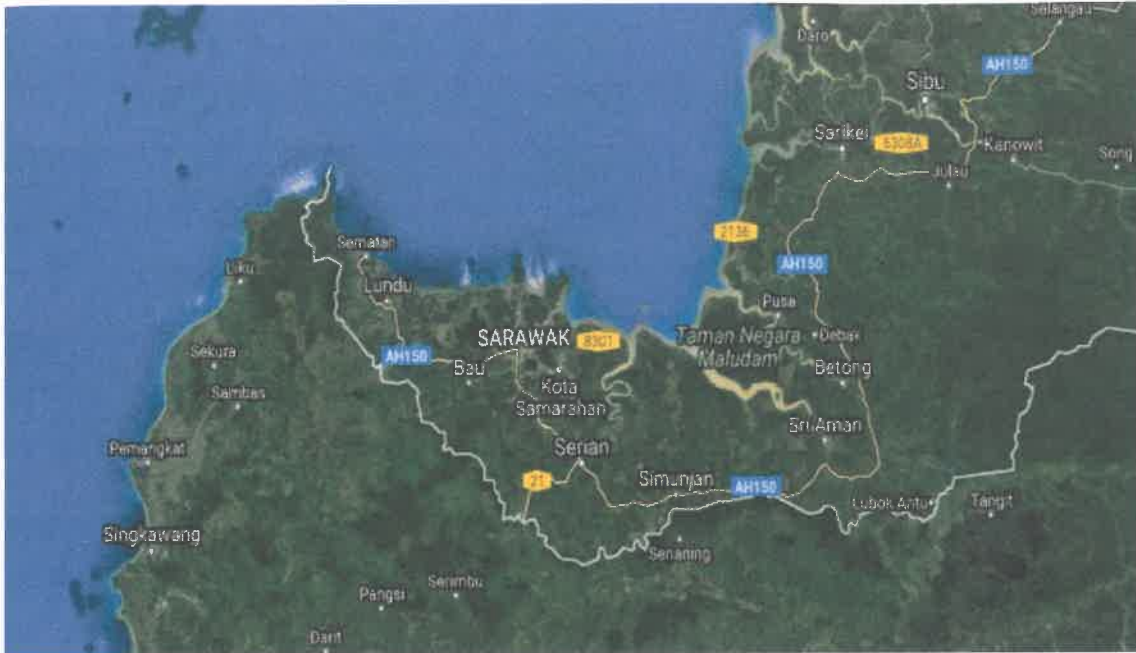
In this study, the focus will be on the development at Kampong Mang of which the prevailing practice of the villagers to dump domestic rubbish into Samarahan River. I have observed this phenomenon for the past seven years since moving here with my family. Kampong Mang is a Malay village consists of approximately 200 houses with an average of about four people in a family. Majority of the people in this village are working as farmers though most of the younger generation are working in towns as government servant or in private sectors and industries.

Figure 1: Satellite map of Batang Samarahan



Source: Map Data Map data ©2016 Google Imagery ©2016 TerraMetrics

Figure 2: Satellite map around Batang Samarahan and nearby towns



Source: Map Data Map data ©2016 Google Imagery ©2016 TerraMetrics

## 1.2 Objective of the Study.

This study will encompass the daily disposal of garbage by households at Kampong Mang, its volume, the nature of garbage and to compute the analysis on the situation at a certain time frame. By doing so, only then we are able to gauge the impact on the environment especially the river water and its habitants.

Furthermore, the outcome of this study would provide the rational on why the villagers dump their domestic waste into the river. The below photographs were taken during the researcher short visit to the villages in July to meet the family. The first photograph showed the road lead to the jetty which constantly used by the villages to throw rubbish.

The second photograph showed the Samarahan River during high tide. The water is murky and white plastic bottles are seen floating closer to the river side. These bottles follow the flow of water current, up and down the river based on the tide.



*Photo of Kpg Mang Jetty taken in July 2016*



*Photo of Batang Samarahan at high tide taken from Kpg Mang Jetty in July 2016*

### **1.3 Research Objectives and Questionnaires**

The objective of this research is to analyze the types and nature of domestic waste being disposed by the villagers daily into the river and its effect to the environment in 3 years to come. Another aspect is to justify the need for suitable site for waste disposal in compliance with Department of Natural Resources and Environment for the protection of the environment.

Questionnaires and interviews were used as the tools to gather relevant information from the villagers and segregated based on age group, number of members in a family, volume of garbage being disposed and the frequency of disposal. These data is to be computed in excel with graphic pattern so as to portray the desired result.

One hundred sets of questionnaires were being distributed to the villagers in Bahasa Malaysia version as per Appendix 1, the language which most of them are fluent at and for ease of communication. English translation is produced for ease of reference.

A part from that, interviews were being conducted to prominent figures in the village such as the head man or Ketua Kampong who is supposed to be well verse with the problem, the need and the overall administration of the village.

### **1.4 Significance of the Study**

This study is able to address the issues of pollution and the need to sustain clean environment for the healthy living of the local community especially the villagers at Kpg Mang and those living along the Samarahan River.

Among others, the study implies the following issues:-

- i. The need to have a proper site for disposal of household garbage
- ii. Proper segregation of the waste disposal



- iii. The role of the relevant government agencies and authority to function effectively in executing their role and responsibilities to ensure clean and healthy environment.

## **1.5 Limitations of the Study**

There are a few constraints which I am facing in doing this research project. The main one is on the time frame of which I only started doing the survey on the first week of July 2016 until the 16<sup>th</sup> which was almost two weeks period.

One hundred questionnaires were distributed and only eighty respondents returned the forms. Another shortfall is the survey only confined to individual and daily garbage disposal without taking into account on festive seasons and wedding occasion of which more food remnants were expected.

The meeting with local authority such as the Samarahan Municipal Council and the Sarawak River Board dept. were not materialized due to time constraint and also the unavailability of the officers at that time.

Thus this report is not that comprehensive though more or less achieves the objective and purpose of this study.

## **1.6 Definition of Terms.**

The following terms are being used throughout the study.

- i. FELCRA – Federal Land Consolidation and Rehabilitation Authority
- ii. ETP – Economic transformation program
- iii. Kg – kilogram, unit of weight or volume measurement in metric.
- iv. WEEE - waste electrical and electronic equipment

## **1.7 Organization of the Project Paper.**

This project paper is aligned in the following manner: -

- i. Chapter 1 – To provide the general overview of the problem statements and the collection of research data & information.
- ii. Chapter 2 – Nature and types of domestic waste, development and effect to the river water, its habitat and environment.
- iii. Chapter 3 - The research methodology and compilation of relevant data for the required information.
- iv. Chapter 4 - To elaborate on the result of the findings against the problem statement
- v. Chapter 5 - The final analysis and the outcome of the research and future project to be undertaken.

## **1.8 Conclusion**

This Chapter is solely emphasizing on the general overview of the problem statement and its related functions and components. We will cover more on the actual aspects of the product in Chapter 2.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.0 Introduction**

Sarawak has always been known as the land of many rivers. Indeed, some of the villages are named after the rivers that run through. As mentioned in Chapter 1, most of the early human activities were associated and confined to the river because the river provided them with water for their daily need such as drinking, bathing and washing clothes. River also served as a source of food especially fish and other marine life that man could eat.

However, there are other human activities that have directly degraded the natural environment, particularly in regard to river water quality in Sarawak such as clearing of forests, natural vegetation for agriculture activities, timber harvesting and so forth. The Urban developments such as housing, commercial and industrial complexes, infrastructure development such as road construction, discharge of untreated waste water and raw sewage, disposal of the city effluent which the majority of the drain discharge their mixture into the river would give effect to the eco system and the environment,

### **2.1 Nature and type of waste.**

There are various types and nature of waste which are disposed, produced and need proper management and disposal process so as to avoid severe effect to the river water, its habitat and environment as a whole. Otherwise we are living in unhealthy environment which hinders our growth and development.

Generally, waste could be liquid or solid waste. Both are considered could be hazardous. Liquid and solid waste types can also be grouped into organic, re-usable and recyclable waste with some details below:-

**i. Liquid type**

Waste can come in non-solid form and some solid waste can also be converted to a liquid waste form for disposal. It includes point source and non-point source discharges such as storm water and wastewater. Examples of liquid waste include wash water from homes, liquids used for cleaning in industries and waste detergents.

**ii. Solid type**

Solid waste homes and other places which include old car tires, old newspapers, broken furniture and even food waste. They may include any waste that is non-liquid. Predominantly, is any garbage, refuse or rubbish that we make in our

**iii. Hazardous type**

Hazardous or harmful waste are those that potentially threaten public health or the environment. Such waste could be inflammable or can easily catch fire, reactive that is can easily explode, corrosive (can easily eat through metal) or toxic (poisonous to human and animals).

In many countries, it is required by law to involve the appropriate authority to supervise the disposal of such hazardous waste. Examples include fire extinguishers, old propane tanks, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g. fluorescent bulbs) and batteries. In Malaysia these are categorised as scheduled waste under the jurisdiction of Health & Safety of the Department of Environment.

**iv. Organic type**

Organic waste comes from plants or animals sources. Commonly, they include food waste, fruit and vegetable peels, flower trimmings and even dog poop can be classified as organic waste. They are biodegradable which means are easily broken down by other organisms over time and turned into manure. Many people turn their organic waste into fertilizer use them in their gardens.

**v. Recyclable type.**

Recycling is processing used materials (waste) into new, useful products. This is done to reduce the use of raw materials that would have been used. Waste that can be potentially recycled is termed "Recyclable waste". Aluminium products (like soda, milk and tomato cans), Plastics (grocery shopping bags, plastic bottles), Glass products (like wine and beer bottles, broken glass), Paper products (used envelopes, newspapers and magazines, cardboard boxes) can be recycled and fall into this category.

**vi. Municipal solid waste**

Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue, and waste from streets. This garbage is caused mainly from residential and commercial complexes. With rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly and its composition changing. The existing landfills are neither well equipped nor well managed and are not lined properly to protect against contamination of soil and groundwater. Certain biodegradable items can also be composted and reused. In fact proper handling

of the biodegradable waste will considerably lessen the burden of solid waste that each place has to tackle.

**vii. Hazardous waste**

Industrial and hospital waste is considered hazardous as they may contain toxic substances. Certain types of household waste are also hazardous. Hazardous wastes could be highly toxic to humans, animals, and plants; are corrosive, highly inflammable, or explosive; and react when exposed to certain things e.g. gases.

Household wastes that can be categorized as hazardous waste include old batteries, shoe polish, paint tins, old medicines, and medicine bottles.

Hospital waste contaminated by chemicals used in hospitals is considered hazardous. These chemicals include formaldehyde and phenols, which are used as disinfectants, and mercury, which is used in thermometers or equipment that measure blood pressure.

In the industrial sector, the major generators of hazardous waste are the metal, chemical, paper, pesticide, dye, refining, and rubber goods industries. Direct exposure to chemicals in hazardous waste such as mercury and cyanide can be fatal.

## **2.2 Methods of Waste Disposal**

This is the key element of this project research that is the determinant of proper waste disposal as an effort to prevent destruction to the environment. It serves as the platform for the relevant authorities and community in general to complement each other for the best approach in handling this situation. There are various way of disposal of which some may be as elaborated below.

i. **Landfill**

Landfill is the most popularly used method of waste disposal used. This process of waste disposal focuses attention on burying the waste in the land. Landfills are found in all areas. There is a process used that eliminates the odours and dangers of waste before it is placed into the ground. Though found to be popular but it is certainly far from the only procedure and one that may also bring with it an assortment of space.

This method is becoming less these days although, thanks to the lack of space available and the strong presence of methane and other landfill gases, both of which can cause numerous contamination problems. Many areas are reconsidering the use of landfills.

ii. **Incineration/Combustion**

Incineration or combustion is a type disposal method in which municipal solid wastes are burned at high temperatures so as to convert them into residue and gaseous products. The biggest advantage of this type of method is that it can reduce the volume of solid waste from 20 to 30 percent of the original volume, decreases the space they take up and reduce the stress on landfills.

This process is also known as thermal treatment where solid waste materials are converted by Incinerators into heat, gas, steam and ash. Incineration is something that is very in countries where landfill space is no longer available, which includes Japan.

### **iii. Recovery and Recycling**

Resource recovery is the process of taking useful discarded items for a specific next use. These discarded items are then processed to extract or recover materials and resources or convert them to energy in the form of useable heat, electricity or fuel.

Recycling is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. Recycling is the third component of Reduce, Reuse and Recycle waste hierarchy. The idea behind recycling is to reduce energy usage, reduce volume of landfills, reduce air and water pollution, reduce greenhouse gas emissions and preserve natural resources for future use.

### **iv. Plasma gasification**

Plasma gasification is another form of waste management. Plasma is a primarily an electrically charged or a highly ionized gas. Lighting is one type of plasma which produces temperatures that exceed 12,600 °F. With this method of waste disposal, a vessel uses characteristic plasma torches operating at +10,000 °F which is creating a gasification zone till 3,000 °F for the conversion of solid or liquid wastes into a syngas.

During the treatment solid waste by plasma gasification, the waste's molecular bonds are broken down as result of the intense heat in the vessels and the elemental components. Through this process, destruction of waste and dangerous materials is found. This form of waste disposal provides renewable energy and an assortment of other fantastic benefits.