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Briefing Note

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Overview of Water Pollution in Myanmar

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Table of Contents

1. Introduction	1
2. Causes of Water Pollution	1
2.1. Agriculture (Chemical Fertilizer and Pesticides).....	1
2.2 Industry and Mining.....	2
2.3 Urban Waste Discharge	2
3. Consequences of Water Pollution in Myanmar	3
3.1 Health Problems.....	3
3.2 Damage to the Natural Environment.....	4
4. Existing Policies	5
4.1 National Action Plans	5
4.2 Global Framework.....	6
5. Policy options	6
5.1 Cleaning up water bodies	6
5.2 Proper use of chemical pesticides and fertilizer	7
5.3 Encouraging to factories and industries to use safe run-off practices.....	7
5.4 Awareness-raising and educating people about water pollution and its consequences.....	7
Conclusion	7
References	9

1. Introduction

It is undeniable that water is the most essential substance on earth. Without water, no creature can survive, and the consumption of clean water is vital for human health. Therefore, what people need is not just water, but access to water that is clean. Today, the world's nations, especially those that are developing, are facing a severe threat in respect of water pollution, which has a negative impact on the natural environment, human health, and on a country's social and economic growth. According to the World Health Organization (WHO), at least 2 billion people use contaminated drinking water globally [1]. Because of financial constraints, developing countries are not able to provide sufficient facilities to handle wastewater and control water pollution. Heavy metals from industrial processes, industrial waste, microbial pollutants from sewage, organic matter and nutrients, as well as suspended particles, are common water pollutants. Like many other developing nations, Myanmar is facing challenges related to water pollution [2].

2. Causes of Water Pollution

In this briefing note, the sources of water pollution are categorized in three sections that are the major contributors of water pollution:

- (2.1) Agriculture (chemical fertilizer and pesticides);
- (2.2) Industry and mining;
- (2.3) Urban waste discharge.

2.1. Agriculture (Chemical Fertilizer and Pesticides)

Around 70 percent of water consumption is for agricultural purposes, which makes agriculture one of the main causes of water pollution. Large amounts of chemicals from the agricultural sector, as well as organic matter, leftovers from drug use for animals, and saline drainage, are being released from farms and paddy fields into water bodies every day. According to statistics from the Food and Agricultural Organization (FAO), each year over USD 35 billion worth of pesticides are used worldwide [3]. However, many farmers do not have adequate knowledge about how to use chemical fertilizers and pesticides properly and very few farmers fully understand the effects of overuse of chemical fertilizers and pesticides. Overuse can negatively impact soil and water quality as well as increase minerals in bodies of water (known as 'eutrophication') which can lead to algae blooms that are harmful for the ecosystem [4].

Substances like sulphur, potassium, magnesium, and nitrogen in chemical pesticides and fertilizers can degrade the quality of soil and water. That is why the agricultural sector is one of the main causes of water pollution in Myanmar [5].

2.2 Industry and Mining

The industrial sector plays a crucial role in the development of a country. However, many industries do not treat wastewater sufficiently before discharging it into water bodies. There are hundreds of industrial zones in Myanmar and most of them are composed of small-scale industries. Those small industries do not have enough capital to invest in pollution control equipment. While the industrial sector is growing rapidly, but government planning is struggling to keep up with this industrial growth. Implementation and enforcement of regulations surrounding, for instance, proper waste disposal sites, and pollution control laws in order to limit the negative impacts of industrial growth are hard to achieve in a rapidly developing industrial landscape. According to research by the Green Motherland Development Association in two industrial zones, Hlaing Tharyar and Shwe Pyi Thar, the pollutant level in wastewater has risen over the past two years [6]. Industrial water pollution is in part caused by the extraction of minerals through mining and drilling for oil and gas: chemicals such as arsenic, sulfuric acid and mercury used in mining are significant water pollutants [7].

2.3 Urban Waste Discharge

In common with other countries, Myanmar has been experiencing rapid urbanization. This has made it difficult to keep up with the need for infrastructure could provide effective waste management systems in urban areas. Therefore, people dump their domestic waste in the street and open spaces or discharge it into water bodies. According to the World Bank, Myanmar creates an estimated 0.39 kilograms of waste per person per day. This means that over 20 million kilograms of waste is created daily in Myanmar, and this amount is expected to continue to escalate in coming years [8].

In the rainy season, people in major cities, especially in Yangon, suffer from floods since rubbish blocks the drainage systems. In Yangon, there are 50 open channels flowing out into six major rivers and these constitute one of the major sources of water pollution. Many factories and

industrial zones are situated in Yangon and Mandalay, and they, too, discharge a huge mass of waste into water bodies daily [9].

3. Consequences of Water Pollution in Myanmar

Water pollution has many consequences. It can, for instance have an indirect negative impact on the climate, as polluted water may kill aquatic plants that would otherwise help to reduce CO₂ levels in the atmosphere. Human health is also threatened by water pollution when humans use contaminated water. The consequences will be outlined in detail below, first in relation to human health and then in relation to the natural environment.

3.1 Health Problems

Drinking clean water is vital for human health. Diseases that cause diarrhea, such as cholera, as well as other serious illnesses including typhoid and dysentery, can be caused by drinking unclean water. Water-borne diseases can spread through contaminated water. Developing countries face more health problems caused by contaminated water than is the case among inhabitants in the developed world. Rural inhabitants suffer more than people who live in urban locations from the consequences of water pollution, as they have lower access to treated water. According to research by the Occupational and Environmental Health Division (OEHD) under the Ministry Health and Sports, released in 2018, over 29 percent of the sources of domestic water in the Ayeyarwaddy region were contaminated with levels of arsenic higher than the WHO standards, and over 8 percent were contaminated at levels that were more than five times higher. In the Bago region, over 41 percent of domestic water supply sources had arsenic levels that were above WHO standards, with 8 percent, again, that were five times the limit [10]. Table 1 lists the occurrence of water-borne diseases in Myanmar, and their fatalities, in 2017.

Table 1: Water-borne diseases in Myanmar 2017

No	Name of diseases	Cases	Deaths
1	Diarrhea(mild)	472,275	58
2	Diarrhea(severe)	9,576	1,173
3	Dysentery	123,741	35
4	Typhoid	3,955	7
5	Hepatitis	6,434	7

Source: Khaing Soe , K. (2018). *Water and Health in Myanmar* [11]

3.2 Damage to the Natural Environment

In Myanmar, the natural environment is severely threatened by water pollution. For example, Inlay Lake, the second largest inland lake in Myanmar, is facing this problem. Local people use chemical fertilizers and insecticides in their floating farms and this causes water pollution. In some areas of Inlay Lake, poison has been found in some fish and vegetables, especially in tomatoes, which constitute the main product of Inlay Lake. This poses a danger both to the people who live in Inlay Lake and to the customers who eat tomatoes and fish from this source [12].

The Ayeyarwaddy River, the most important river for the livelihoods of the Myanmar people, is facing degradation in its water quality. People discharge waste directly into the river, and contaminated water from local businesses, along with pesticides and fertilizers from farms, pollutes the river water. The levels of poisonous chemicals such as cyanide and arsenic in river water are increasing. As millions of people depend on Ayeyarwaddy River water for household use, the contamination of this river can cause serious health problems. The contaminated water can also harm the ecosystem [13].

The United Nations has issued warnings about the contamination of water and the improper disposal of waste into marine water. In addition to pollution from human waste, water bodies are also at risk of acidification as they absorb the carbon dioxide that humans expel; ocean acidification has increased 26 percent since the beginning of the industrial revolution [14].

4. Existing Policies

Most countries have enacted policies, laws, rules, and regulations to control water pollution.

4.1 National Action Plans

The government has enacted many policies and has been implementing many projects to control water pollution. Myanmar has a number of sectoral laws that are related to the protection and conservation of natural resources and to controlling pollution [15]:

1. The Factories Act 1951 controls factories involved with chemicals, particularly those that are hazardous or toxic;
2. The Forest Law 1992 designates all mangrove forests as Protected Areas. Fishing within a three-hundred-yard limit around a mangrove area is strictly prohibited;
3. The Pesticide Law 1990 monitors and controls the selection, storage, transportation and use of pesticides;
4. The Myanmar Marine Law 1994 promotes the safe disposal of waste, tailings and fumes;
5. The Myanmar Pearl Law 1993 protects and conserves the pearl oyster fishing grounds from destruction, and oysters from over-fishing;
6. The Water Power Act 1927 prohibits the pollution of public water sources to obtain energy or for mining purposes;
7. The Law Relating to Aquaculture 1989, the Law Relating to the Fishing Rights of Foreign Fishing Vessels 1989, the Myanmar Marine Fisheries Law 1990 and the Freshwater Fisheries Law 1991 provides for the further development of fisheries, preventing overfishing, safeguarding and protecting fishing grounds and managing fisheries. These laws prohibit fishing without a license, causing water pollution and the use of destructive fishing practices, and promote the sustainable use of fishery resources;
8. The Territorial Sea and Maritime Zone Law 1997 defines and determines the maritime zones, contiguous zones, exclusive economic zones and continental shelf in respect of the preservation and protection of the marine environment and its resources, as well as the control of marine pollution;
9. The Ministry of Industry (1) issued a standing order in 1995 on water and air pollution to limit damage to the environment by waste discharged from factories;

10. The Myanmar Investment Commission issued a notification in 1994 specifying that it was compulsory for all permitted enterprises to install sewage treatment plants, industrial waste water treatment plants and other pollution control procedures and abide by existing sanitary and health regulations set by the State.

4.2 Global Framework

As water pollution and access to clean water have become global concerns, the United Nations has set up the following two practical goals within the Sustainable Development Goals (SDGs) that are related to water:

- 6. Clean water and sanitation;
- 14. Conserve and sustainably use the oceans, seas and marine resources.

In order to fulfil the SDGs of the UN, countries throughout the world need to increase their investment in the management of freshwater ecosystems and sanitation facilities in order to provide people with clean water and adequate sanitation facilities. They are also required to effectively conserve marine Protected Areas and implement the relevant laws, rules and regulations in order to reduce overfishing, marine pollution and ocean acidification [14].

Myanmar's Ministry of Finance and Planning released a 'Sustainable Development Plan' for the period 2018-2030. This includes seven concrete action plans related to water resources, which the document explicitly links to SDG 6 on clean water and sanitation. The action plans revolve around the management of water at the township or village level, improvements in infrastructure, the provision of education and awareness-raising campaigns about water and waste handling, and the building of partnerships across the region to achieve all of these aims [16].

5. Policy options

Many measures could be adopted to control water pollution. Some of these are as follows:

5.1 Cleaning up water bodies

Removing contaminants from water is difficult and is only effective if the source of contamination is removed first. In other words, it is important to prevent further waste from reaching the water

before clean-up is started [17]. Although Myanmar does have anti-littering laws, these are not strictly enforced. While awareness-raising campaigns have been mounted, their effectiveness might be improved if they were run in tandem with stricter enforcement of littering laws through fines.

5.2 Proper use of chemical pesticides and fertilizers

As Myanmar is an agricultural and developing country, it is impractical to forbid the use of all chemical pesticides and fertilizers. However, such products are a big factor in water pollution. Therefore, the enforcement of the pesticide law is important [18].

5.3 Encouraging factories and industries to use safe run-off practices

Some factories and industries discharge waste water directly into water bodies, which can negatively affect the water quality. Therefore, encouraging factories and industries to avoid such practices and to instead conduct safe run-off practices could help to significantly reduce the pollution of water bodies.

5.4 Awareness-raising and educating people about water pollution and its consequences

One of the main causes of water pollution in Myanmar is that ordinary people do not properly understand the negative consequences of water pollution. Therefore, public awareness about water pollution and its consequences could be promoted nationwide [21].

6. Conclusion

Water pollution - the contamination of water bodies by toxic and harmful chemicals, materials, contaminants and compounds - has become a global issue. The main causes include the improper disposal of waste, urbanization, industrialization, mining, and agriculture. The large-scale contamination of water has many undesirable consequences: it causes serious health problems, and harms ecosystems and the natural environment as well as a country's economy.

Myanmar's economy has traditionally been agriculture based, but it currently has a growing industrial sector. In addition, Myanmar has many natural mineral resources. Unsurprisingly, mining, agriculture and industry are the main sources of water pollution. Tightened regulations

and the use of best practices are necessary to ensure that these economically important sectors minimize their impact on Myanmar's clean water.

There is also an issue of water pollution at the household level, as many people are unfamiliar with the rules, laws, and regulations surrounding pollution. This means that they intentionally or unintentionally break the rules and regulations. Therefore, a long-term solution might be an increase in the number of public awareness-raising campaigns run by the government itself or in partnership with private bodies. These campaigns could be linked to existing educational projects. Effective enforcement of existing laws and regulations through fines could help to prevent pollution in the meantime.

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