



WWJMRD 2019; 5(11): 55-60
www.wwjmr.com
International Journal
Peer Reviewed Journal
Refereed Journal
Indexed Journal
Impact Factor MJIF: 4.25
E-ISSN: 2454-6615

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Marine pollution issue: Cause and solutions

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Abstract

The country of Vietnam has a coastline stretching over 3,260km, and more than 3,000 large and small islands. These are favorable conditions for our country to develop marine economic sectors such as oil and gas, tourism, fisheries, etc. The reality shows that those needs and interests have been depleting gradually. Marine resources and make the marine environment increasingly polluted seriously. The statistics show that every year, about 70% of waste discharged into the sea comes from the mainland when factories, factories, residential areas, hospitals, pesticides but a large amount of this waste has not been treated, through a drainage system that discharges directly into rivers, hundreds of rivers flow into the sea or directly discharged into the sea, carrying large quantities of sediments, plastics, chemicals, metal, oil sludge, even radioactive substances. Another reason is that the sanitation in coastal tourist areas has not been paid attention, the waste has not been collected and treated thoroughly, the people's sense of environmental sanitation is still low, leading to the situation that throw rubbish, leftovers indiscriminately on the sea turning the beach into a huge dumping place of garbage. In addition, pollution of waste from marine activities such as maritime and oil spills from oil and gas exploration activities. Ship accidents, irrational fishing and aquaculture also have a significant impact on the marine environment. According to scientists, the quality of the marine environment and coastal areas in Vietnam is continuing to decline.

Keywords: marine environment, shipping, maritime

1. Introduction

The reality of marine environmental pollution is a "red" issue, and the sudden death of natural seafood and aquaculture on an unprecedented scale occurred in the Central provinces in April. Concluded by domestic and foreign scientists due to toxicology and toxic algae. Therefore, if it is not implemented soon, feasible measures to reduce and prevent pollution will seriously affect the sustainable development strategy of our country and islands. According to the Ministry of Natural Resources and Environment, the main cause of marine pollution is the widespread development of industry and tourism; irrational aquaculture; population growth and poverty; simple lifestyle and low intellectual level; institutions and policies are still inadequate. There are currently 70% to 80% of marine waste originating inland when factories, factories, industrial parks and residential areas discharge untreated solid waste into rivers in coastal plains or direct discharge to the sea. For example, in the process of aquaculture also generates a significant amount of solid waste directly into the sea, the main source of waste is fertilizers and artificial feeds used in aquaculture. On average, one hectare of shrimp farming releases about 5 tons of solid waste and tens of thousands of cubic meters of wastewater in a crop. With a total area of shrimp farming more than 600 thousand hectares, each year will release nearly 3 million tons of solid waste into the environment. Specifically, in the provinces from Quang Ninh to Quang Binh, over 37,000 hectares have been exploited and put into aquaculture (accounting for 30-35% of brackish water). Most of the facilities went into farming on an industrial scale, resulting in the destruction of habitats, spawning grounds and breeding grounds, and epidemic diseases ... Through research and investigation of the Institute of Oceanography In Vietnam, the pollution of the sea and island environment is also caused by the improper exploitation and use of the coastal sandy areas by the localities, leading to the lack of fresh water, erosion and sedimentation of the coast with increasing levels. Serious. The exploitation of seafood by

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mines and the use of toxic chemicals quickly deplete aquatic resources, causing serious consequences for marine ecoregions. Tourism activities have a significant impact on the ecological environment and natural landscape of the sea. Typically Cat Ba National Park with 5,400 ha of water surface, from a fresh island, today the environment here has been metamorphic since being put into exploitation of tourism and aquaculture, because every day Thousands of tons of waste are dumped directly into the sea. Another cause of marine pollution is the oil spill. The large economic growth rate has greatly increased the consumption of gasoline. Economic benefits lead to excessive oil exploitation. As a result, a huge amount of oil is leaked into the marine environment due to the operation of the ships and due to incidents of shipwreck damage or shipwrecking, incidents at exploration and drilling platforms. It is noteworthy that serious oil spills in recent years have tended to increase, causing serious damage to the marine environment, especially in aquaculture areas. In addition, the waters of our country have hundreds of oil and gas exploration and exploitation wells, in addition to discharging water and oil in large volumes, each year, this activity also generates 5,600 tons of petroleum waste, in 20% to 30% of which is hazardous solid waste that does not have a dump and treatment place. That is not to mention the oil pollution caused by oil exploitation and transportation on the sea is constantly increasing. Every year, over 100 rivers in our country discharge 880 km³ of

water and 270-300 million tons of silt, leading to many substances that can pollute the sea such as organic matter, nutrients, heavy metals and many substances. Toxic waste from concentrated residential areas, industrial and urban areas, coastal aquaculture areas and agricultural production areas. In 2010, the amount of waste has increased greatly in coastal areas, of which oil is about 35,160 tons / day, total nitrogen is 26-52 tons / day and total ammonium 15-30 tons / day. The environmental status report indicates that the quality of marine and coastal environments continues to decline. Seawater in some areas appears to be acidified due to a change in pH in surface seawater. Coastal seawater appears to be polluted by organic matter, zinc, some plant protection drugs. Red tide phenomenon occurs in the South Central Coast, especially in Khanh Hoa, Ninh Thuan, and Binh Thuan, killing the shrimp and fish cultured in this region. The changing quality of the marine environment results in the destruction of the natural habitats of the species, causing great losses in coastal diversity. About 85 species of seafood with different levels of endangers and over 70 species have been included in the Vietnam Red Book. Environmental experts say that vessels are a major source of pollution to the environment. Especially in port cities and coastal areas because of their use of poor quality asphalt fuels, which have high levels of emissions such as nitrogen oxides (NO), sulfur dioxide (SO₂). In addition, these wastes also produce acid rain and tiny particles of soot in the air.



Fig. 1: Marine pollution in Vietnam sea

Currently, Vietnam has over 1.700 transport vessels, with the number of fishing vessels of about 130.000, corresponding to the amount of gasoline fuel consumed about 4 million tons per year. It can be said that this is the source of pollution to the sea, coastal areas and many places, seriously affecting the marine ecosystem, destroying marine resources, endangering human health. The quality of Vietnamese ships is not high, many vehicles are too old, obsolete, low fuel burning efficiency

and no exhaust gas treatment system ... so they emit more toxic gases such as: SO₂, CO₂, CO, NO₂, C_xH_y ... The quality of Vietnamese ships is not high ... so they emit more toxic gases. The Prime Minister has approved the Implementation Plan of Implementation of Appendices III, IV, V and VI of the MARPOL Convention - International Convention for the Prevention of Pollution from ships. This plan aims to fully and fully implement the provisions of Appendices III, IV, V and VI of the International

Convention for the Prevention of Pollution from Ship (MARPOL) of which Vietnam is a member. To ensure the legitimate rights and interests of the coastal state, the port State, the flag State. According to this plan, from 2016 to 2020, the Government will review and improve the system of legal documents on environmental pollution prevention caused by the ship and management of waste arising from ships in operation. Marine navigation, offshore oil and gas exploration and exploitation, investigation and detection of violations and marine accidents in order to fully and comprehensively implement legal documents and regulations of Appendices III, IV, V and VI of the MARPOL Convention. Annually implement the provisions of Annexes III, IV, V and VI of the MARPOL Convention, including the inspection and control to fulfill the responsibility of the State for vessels flying the Vietnamese flag. , The responsibility of the coastal state and the responsibility of the port state.

2. Causes and impacts

Besides, capacity building for the inspection and certification of vessels carrying the Vietnamese national flag, conducting marine casualties investigations, timely handling of violations, including Both the training of seaport State Inspectorate officers, the State Port State Inspection (PSC) and the inspectors shall conduct the assessment, inspection and control of the ship's systems and techniques. From 2016 to 2030, study mechanisms and policies for investment in the construction and upgrading of waste reception systems at seaports in accordance with MARPOL Annex III, IV, V and VI; to study and apply the equipment for inspection and control of waste arising from ships. Assessment of current environmental pollution caused by the seagoing vessel, the situation of waste management at Vietnamese seaports and the extent to which they meet the requirements of the MARPOL Convention; Study, develop and propose the establishment of environmental protection measures to prevent pollution caused by ships in Vietnamese waters to submit to the International Maritime Organization through; Propaganda, dissemination, training, training for organizations and individuals involved in the implementation of the provisions in Annex III, IV, V and VI of the MARPOL Convention. Strengthen cooperation with international organizations in the maritime field and other countries in the region to exchange information, provide technical assistance, train civil servants, civil servants, officers and boats. Membership and transfer of technology related to the implementation of the MARPOL Convention; Promote bilateral cooperation with the States Parties to the Convention in order to consult the experience and take advantage of their technical assistance and assistance. It can be said that this is a new step in the prevention of pollution caused by ships of Vietnam. The MARPOL Convention is one of the key conventions on marine environmental protection and Vietnam has acceded to the Convention since 1991. The Convention establishes regulations to prevent pollution caused by the carriage of goods by oil. Mine, dangerous goods, toxic, as well as water, garbage and emissions from the ship. As the relentless development of science and technology as well as the environmental issues that arise in the maritime industry's practices (oil spills, emerging pollution problems, etc...) The technical requirements of MARPOL 73/78 have been continuously amended and amended. Up

to now, the MARPOL 73/78 has six appendices detailing the relevant contents.

2.1. Causes

As we all know, pollution is occurring everywhere, such as air pollution, soil pollution and not outside of that is the pollution of the marine environment. Recently, the media as well as other mass media have reported a lot about the phenomenon of mass death fish in the central coastal area makes the lives of people here are difficult and even more difficult This raises many concerns about whether to live in this land. There is no article about the official cause of the problem, but what we can easily see is that the marine environment is increasingly polluted. The sea is rich and diverse in terms of resources, filled with potential for diversified economic development. Not only that, the sea is also an easy place to develop tourism and develop aquaculture. While beautiful sea is, it is useful but the sea is also gradually polluted by many agents, which is mainly the agent itself. Every day tons of untreated wastes pour into the sea, people living along the coast also take the coast as a dumping ground. The lack of awareness of the people contributes to the polluted marine environment. In addition, factories and factories that discharge waste water along with toxic chemicals to the sea not only pollute the sea, but also harm human health and all living things. Pollution of the marine environment also occurs in some seaports due to inadequate access of vessels to and from the canal, dumping of waste, etc. Some seaports also have excess mercury levels, such as Vung Tau port. Up to 3.1 times. Many people also catch fish using landmines which cause a lot of harmful chemicals. Between 70% and 80% of domestic waste comes from inland waterways when factories, factories, industrial parks and residential areas discharged wastewater, untreated solid waste into inland rivers. Coastal plains or discharge directly to the sea. For example, aquaculture also produces a significant amount of solid waste directly to the sea. The main sources of waste are fertilizers and artificial feeds used in aquaculture. On average, one hectare of shrimp ponds will emit about 5 tons of solid waste and tens of thousands of m³ of waste water in one crop. With a total shrimp farming area of more than 600,000 hectares, it will emit nearly 3 million tons of solid waste each year. Specifically, in the provinces from Quang Ninh to Quang Binh, over 37,000 hectares have been exploited and used for aquaculture (accounting for 30-35% of the area of salt water). Most of the establishments have come into aquaculture on an industrial scale, resulting in the habitat of living creatures, spawning grounds, breeding grounds, and diseases.

The second cause of pollution is due to the adverse effects of social development. The society is developing more and more and at the same time, the demand of the people has been improved, and the tourism industry has grown tremendously. However, tourism is increasingly developed, it means that the marine resources are over-exploited leading to the exhaustion of marine resources and also waste a small amount of waste into the sea. And another small cause is the oil spill. Economic growth speeds up the consumption of oil. The economic benefits associated with over-exploitation of oil, which causes large amounts of oil to leak into the oceans, pollute the sea, and fish die from not having enough oxygen to survive, causing great damage. For the marine environment and aquaculture areas. The marine pollution due to oil spill is shown in Fig.2.



Fig.2: The marine pollution due to plastic waste

Vietnam has hundreds of wells for exploration and exploitation of oil and gas. In addition to waste water and oil in large quantities, this activity generates 5,600 tons of oil and gas waste each year, of which 20% Up to 30% of hazardous solid waste has no dump and place of disposal. That is not to mention the oil pollution caused by the exploitation and transportation of oil and gas on the sea constantly increasing. Every year, over 100 rivers in our country emit 880 km³ of water and 270-300 million tons of silt, pulling substances that can pollute the sea like organic substances, nutrients, heavy metals and many substances. Hazardous from concentrated residential areas, industrial and urban areas, coastal aquaculture and agricultural production areas. In 2010, the amount of waste has increased dramatically in coastal waters, of which oil is about 35,160 tons / day, total nitrogen is 26-52 tons / day and total ammonium is 15-30 tons / day.

2.2. Impacts

Pollution of the marine environment leads to very serious consequences. It directly damages human health and gradually loses its marine resources such as seafood, marine tourism, etc. A 2008 study found that Vietnam lost about \$ 69 in industry revenue annually Travel because of poor sanitation. The polluted marine environment also reduces the attraction to tourists. In order to contribute to the protection of the environment in general and the marine environment in particular, everyone needs to raise their awareness and responsibility for environmental protection such as not littering the sea or organizing many field trips and Beach cleaners. State management agencies also need to strengthen management to reduce the amount of harmful waste in the marine environment to keep the natural landscape from being robbed under the death hand and allowing people to live on. The sea is less hard about the rice paddies. Although the waste collection and treatment in coastal areas has been concerned by all levels, sectors and local authorities, it has not been properly invested. All sources of waste from rivers, lakes, residential areas ... are dumped into the sea causing serious marine environment pollution. Solid waste is not collected and treated

thoroughly, affecting sea water quality, life of people living in coastal areas and causing damage to economic sectors associated with the sea. Although the waste collection and treatment in coastal areas has been concerned by all levels, sectors and local authorities, it has not been properly invested. Currently, Vietnam's sea is facing high risk of pollution in the future, with great challenges requiring effective and proper investment measures. The immediate cause is due to the impact of climate change, besides the economic difficulties and inconsistent policies affecting the resolution of unexpected natural incidents. And an important cause is pollution of rivers from the mainland. All of the rivers flow into the sea, bringing with it a source of pollution from the mainland such as industrial, agricultural, chemical, rubbish, waste and untreated sewage. Besides developing the tourism industry based on the diversity and abundance that the sea brings, the problem of waste water and waste treatment is still an unsolved problem. Accompanied by a lack of awareness of the people in the exploitation of marine resources, destructive fishing, unreasonably developing economy and industries, the massive exploitation of titanium adversely affecting the marine environment. Air pollution also has a strong impact on the marine ecological environment. An increase in CO₂ concentration in the air will cause an increase in the amount of CO₂ in seawater, leading to changes in the habitat of marine plants. That will make the extinction rate happen faster and faster. Currently, 90% of coral reefs in the sea of Vietnam are under threat of destruction. One of the other causes of negative impacts on the marine environment is that oil spills occur quite frequently in coastal areas of Vietnam due to the large number of ships passing by. The oil spills were largely caused by ship accidents, which poured into the sea from tens to hundreds of tons of oil, causing significant damage to the economy and the environment. In addition, oil and gas exploration and exploitation activities, activities of fishing boats, especially small boats with outdated machinery and not installing water and oil separators are also one of the sources of pollution. Oil pollution in our country's waters.

3. Solutions for reduction of marine pollution

To protect the marine environment, Vietnamese government has carried out some solution such as: Promote dissemination and awareness raising for all levels, sectors, localities, economic sectors and the entire population on the sustainable management and use of marine resources; To attach importance to preventive and preventive work in combination with efficient treatment of pollution and improvement of the marine and coastal environment. Strengthen the implementation of the Law on Environmental Protection, especially for acts of damaging the marine environment. To continue well performing the integrated management of the sea and islands so as to ensure multi-sectoral, multi-purpose and multi-benefit development between the State, the private sector, the concerned parties and the local communities. Phoenix; Limit conflicts of interests between parties in the process of exploitation and use of marine resources and environment. Pay close attention to strict control of the marine environment, especially the use of relevant legal instruments in controlling and assessing environmental standards and impacts; Monitoring - warning identify "environmental hot spots" or pollution, ... to take measures to handle in time. The State shall soon develop and promulgate economic instruments in the management of the marine environment, in particular details of the extent of violations and penalties; to intensify consultations with concerned parties and create positive changes in the management and protection of the sea and islands of the Fatherland. At present, marine pollution sources in maritime, aquaculture, tourism, oil and gas, etc., are related to the diverse and complicated use of marine resources. These are the sources of oil pollution (from oil used for fuel, lubrication, hydraulic for ships, to oil shipped by ship); Liquid chemicals on board; Dangerous goods (explosives, radioactive substances, inflammables, toxins ...) carried by train; trash; wastewater; Antifouling paint used for hull; Toxic materials used for shipbuilding (asbestos, heavy metals, chemicals); Pollution caused by the movement of aquatic species through ballast water; Communicable diseases spread through the maritime route; Operation of old ships demolition, exploration and exploitation of oil and gas on the sea. Ship operations (including fishing vessels and cargo ships) are one of the artificial sources that contribute significantly to air pollution. The quality of Vietnamese ships is not high, many means are too old, obsolete, low fuel burning efficiency and no exhaust gas treatment system ... so they emit more toxic gases such as SO₂, CO₂, CO, NO₂, C_xH_y. Currently, Vietnam has over 1,700 transport vessels, with the number of fishing vessels of nearly 130 thousand ships, corresponding to the amount of gasoline fuel consumed about 4 million tons per year. It can be said that this is the source of pollution to the sea, coastal areas and many places, seriously affecting the marine ecosystem, destroying marine resources, endangering human health. US environmental experts say that ships' vehicles are a major source of pollution to the environment, particularly in port cities and coastal areas because of their use of poor quality bituminous fuel, It has high emissions such as nitrogen oxide (NO), sulfur dioxide (SO₂). In addition, these wastes also produce acid rain and tiny particles of soot in the air. The US Environmental Protection Agency (EPA) has released the information, which is intended to

prevent approximately 8,300 deaths each year in the United States and Canada from inhaling fumes and toxic gases from ships. According to US government statistics, ships accounted for two-thirds of SO₂ emissions in the transportation sector in 2002, and the lack of controls could lead to a higher proportion of SO₂ emissions. In addition, the US and Canadian governments have set new emission standards for large vessels, with new ships falling to 96% of SO₂ by 2015. Compared to today. Similarly, ships built after 2016 will have to cut 80% of their NO emissions. According to the European Union's report on the effects of ship emissions on the health of the European Union, toxic emissions from ships are killing about 39,000 people each year in Europe, with Britain Suffered the most heavy losses. Lead researcher Janusz Cofala of the Applied Systems Analysis Institute in Austria said that the acceleration of international trade and the number of ships that are mostly from China has increasingly. He was most affected because of the long sea route and also the busy market, the bustling traffic. The study also shows that the average life expectancy of West Coast residents will be reduced by 20-30 months from 2020. The EU is currently planning to establish the first low-emissions areas, minimizing pollution from thousands of cargo ships moving through the seas each year. The EU requires governments to assist maritime companies to meet strict SO₂ standards. In support of EU solutions, the International Maritime Organization (IMO) agrees to limit the SO₂ content of the ship's fuel to ships passing through the emission control area (effective Meanwhile, shipping companies will face the potential to meet low SO₂ emissions and cleaner fuel costs, which have raised ocean freight rates. The EU accepted IMO's proposal to reduce the sulfur content of marine fuels, with the sulfur limits for all ships cutting to 0.5% by 2020 (currently at 3, 5%), and the limits for all ships in the Baltic and North Sea (called "controlled area emissions") will be cut to 0.1% from 0.5% by 2015. Instead of using low sulfur fuel, Ship operators can also use alternative treatment technologies to clean the emissions of ships to minimize pollution. In order to properly control the emissions of ships in maritime activities, Vietnam should have policies, legal documents, regulations, and state regulations for fishing vessels and transports. Reduce emissions - especially greenhouse gas emissions, ship science and technology, ship engines, waste gas collectors. For transport vessels, Vietnam should soon consider fully participating in Annex VI - "Regulations for the prevention of air pollution caused by ships" of MARPOL 73/78. At the same time, the development of IMO Energy Efficiency Design Indicators (EEDI) sets is an indispensable indicator for the calculation of vessel design parameters. This index is a means for fleet owners to compare the efficiency of the same ship designs with the same size of many different shipyards. In addition, human resource training, awareness raising on marine gaseous emissions and climate change should be organized for marine, fishery and marine economy stakeholders. The technology of building marine ships according to the standards of marine navy needs to be renew in order to reduce the emission of engines - ship engines, incinerators. The policies on taxation and collection of charges for ship gases should be promulgated; Cooperate and exchange experience with international maritime-environment organizations in the field of marine emissions; Researching,

building and setting up a number of "emission control" or "special" sea-going areas in seaports near sea areas of special ecological value in Vietnam's sea areas. Accordingly, all large vessels with excess emissions exceeding the permitted standards will be restricted from landing or under special pilot regimes. This "Emission Control Zone" can be established in two coastal areas of Quang Ninh - Hai Phong and Vung Tau - Ho Chi Minh City. Ho Chi Minh. According to observations and assessments of environmental experts, nowadays, not only in Vietnam, but in some countries in the world, plastic and plastic products are still used as everyday items. In everyone's daily life. However, its utility is also a major factor affecting the environment and human health. In addition, it affects the sea and marine life when many people are not conscious of protecting the marine environment; Abuse of plastic goods is one of the hot issues of society. According to a ranking published by Japan as well as the United Nations environmental programs, Vietnam is ranked fourth among the countries that discharge plastic waste to the marine environment the most with 0.28 - 0.73 million tons of plastic waste each year and accounts for 6% of global plastic waste, including 80% of plastic waste originating from the mainland and flowing into the ocean through 112 estuaries. Plastic waste that goes into the ocean cannot decompose and causes marine life to die from eating the wrong plastic. The problem shows that, the ocean danger because of plastic waste is inevitable. Vietnam has also issued many legal documents on environmental protection in general and the marine environment in particular, such as the Law on Natural Resources and Environment of the sea and islands providing for the control of marine environmental pollution from activities on the sea, from the mainland and across borders. Many solutions, many campaigns to limit the use of disposable plastic waste have taken place in many localities, which have received a lot of responses from organizations, businesses and people. However, all are still just the beginning, there are still many difficulties and shortcomings ... ahead. In particular, the Vietnamese government must aggressively tighten the import of plastic waste, including resolving to re-export plastic waste like some other countries have applied, so the target is not a reality until 2025.

4. Conclusion

According to the law, marine environmental pollution treatment is the responsibility of waste generators, state agencies and competent entities. In addition to remedying pollution and restoring the current state of the marine environment, entities that violate environmental laws may also be legally responsible. Depending on the severity of the law, the subject may be subject to various legal responsibilities such as administrative, criminal, civil and disciplinary. In fact, in recent years, the marine environment in Vietnam has been seriously polluted and tends to increase. Meanwhile, criminal liability for acts of causing EP, violating the regulations on waste management, destroying aquatic resources ... has been stipulated from the Penal Code 1999 up to now, even within the Ministry. Criminal law 2015 and amendments to 2017 have applied criminal liability to legal entities that have committed acts of environmental pollution, but so far no individual or organization has been penalized for

behavior. This. Responsibility for compensation for damages on natural resources and environment has been specified in Decree No. 03/2015 / ND-CP of the Government. The decree has determined that the responsibility of claiming damages lies with the competent state agencies, but the reality is still not effective. As for damages to health, life, property and legitimate interests of individuals and organizations prescribed in the Civil Code 2015, Law on Environmental Protection 2014, though so far, it can be seen, no case of environmental damages has been settled in the Court yet; Current legal regulations also cause difficulties for individuals and organizations in the process of claiming damages because it is difficult to prove the causal relationship between the act of causing EP and the damage occurring.

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