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Environmental pollution issues in inland waterway transportation

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Abstract
The issue of transportation and the environment is paradoxical in nature since transportation conveys substantial socioeconomic benefits, but at the same time transportation is impacting environmental systems. From one side, transportation activities support increasing mobility demands for passengers and freight, while on the other, transport activities are associated with environmental impacts. Further, environmental conditions have an impact on transportation systems in terms of operating conditions and infrastructure requirements such as construction and maintenance (see Transportation and Space for a review of these constraints). The growth of passenger and freight mobility has expanded the role of transportation as a source of emission of pollutants and their multiple impacts on the environment. These impacts fall within three categories: Direct impacts, indirect impacts, Cumulative impacts.

Keywords: inland transportation, pollution, waterway traffic

1. Introduction
The vast river and ocean environment, however, is vast, and our little actions also contribute to environmental pollution. It is necessary to further raise the awareness of everyone involved in boat trips on the protection of the marine environment when navigating. To support the development of inland waterway transport, the Ministry of Transport is encouraging all economic sectors to participate in transport business. SOEs only hold a market share of around 10-15% to ensure a leading role, focusing on major flows, some key commodities. Inland navigation can contribute to making transport more sustainable, particularly where it substitutes for road transport, but inland shipping and especially the development of waterways for navigation can have considerable environmental impacts. Waterways for inland navigation can have significant impacts on the ecological value and water quality of water bodies. Water pollution or damage caused by the inland vessels, dredging pose a threat to aquatic environment. Waterway transportation is more efficient and environmentally friendly than other modes of transport. But alongside these advantages, the waterway rotation still has a major impact on the quality of the water environment. It needs to see a limitation to find a way to prevent widespread pollution. Waterway traffic control is closely linked to the protection of the water environment. Water pollution treatment systems in rivers and seas seem to be very rare, sewage sucking activities, sewerage ... will not be used. Another significant threat to the environment is caused by operational discharges of mineral oil and lubricants, as well as organic substances (mainlyPAHs) due to shipping operations. The nature and extent of the impacts depends on the vessel types and on the characteristics of the water body itself. The kinds of mitigation techniques that can be employed can also differ markedly, for example between sections of river with rocky bed and banks, and reaches with sandy or muddy bottoms situated in flood plains. In some cases new works for navigation can be designed to improve water quality or biodiversity and create valuable habitats. Altering the shape of river courses to improve navigation affects bottom and bank characteristics and the dynamics of sediment transportation. Effects can spread up- and downstream over many years. Without careful attention, alterations can interfere with communication between the main channel, side branches and backwaters.

Permanent changes to water levels and flows affect the whole river valley bottom and notably the ecology of floodplains. This can affect the habitats and biodiversity. The greatest attention in the paper is paid to the oil spills and oily-based liquid spills into the water environment and possibilities of negative effects mitigation. To operate the system of ships at sea, the river requires full supply of raw materials such as petrol, oil, grease ... No one can guarantee these materials do not leaking out pollution. Incidents such as oil spills into the sea are not rare, and green seawater poisoned by too much oil will affect marine habitats. Submarine sewers are still maintained and operate when there is a waste incineration. In addition, the discharge of toilet water in the deck of the ship, discharge of lacquer solution directly into the sea also causes widespread pollution. The consequences of it leave no small, do not think the vast ocean, it is only too small things, you are wrong. Each day, each day it will accumulate into large black spots pollution. Then the source of water where the ships operate will be polluted, and the activities of the cruise will be affected.

Climate change, sea level rise will increase the area of flooding, causing difficulties for drainage, increasing coastal erosion, affecting coastal construction works such as dykes, roads, The harbor. Hurricanes, floods, droughts, storm surges ... many road, sea, air, and air traffic systems are affected. According to the United Nations Development Program, climate change has a major impact on transport works. As the sea level rises, it will affect the foundations of coastal airports at the height of 5 m or less. According to the assessment, there will be six airports accounting for about 20% of Vietnam's airports affected with damage estimated at $ 0.52 billion. Climate change and sea level rise have caused subsidence and floods in many roads; Increased slippage, erosion of the surface, road infrastructure causing traffic, traffic jams, increased traffic accidents. Roads are cut off many sections, many local roads after the floods weekly floods are still flooded, congested, traffic difficult to travel. In the rainy season, many of the harbors were flooded, reducing the height of the canals affecting the mining ability of the building. The dry season drowns the flow of water that is affecting navigation. The phenomenon of salinity intrusion will increase, the trade travel in the difficult areas, the daily life of the local community is shrinking rapidly. Infrastructures, especially ports, will be hit hard, even if they have to be rebuilt, renovated, upgraded or relocated. In aviation transportation, aviation activities have been and are having factors. Affects the atmosphere in the wrong direction and also reacts to climate change. Aviation industry has bad impact on the environment and is also heavily affected by climate change. According to the International Civil Aviation Organization (ICAO), nearly 20% of aviation accidents in the world are related to climate and weather and account for 8% of deaths. Weather phenomena such as rain, wind, hail, thunderstorms, thunderstorms, etc. are all challenges to flying safety.

2. Solutions

While air pollution is the most visible and studied environmental consequence of transportation system, water pollution and wetlands issues are also of crucial importance in the transportation and environment nexus. Fuel, particle, and salt-laden runoff from streets, highways, and storage facilities results in damage to public water supplies, ponds, lakes and surface streams, roadside soil, vegetation and trees, and infrastructure and vehicles. The role of wetlands in water purification, the management of surface water runoff, and wetlands as habitat preserves for numerous species are all being closely studied.

Roadways tend to bisect watersheds. Water quality impacts attributed to erosion, sedimentation, and polluted runoff associated with highway construction, operation, and maintenance may be limited to the adjacent streams. But in the watershed downstream, the impact from the road may also contribute to other forms of water pollution. Watersheds are therefore both directly and indirectly impacted by transportation. It is for this reason that a watershed approach has become the most widely accepted direction of study of most water and transportation research. The main federal legislation concerning water quality is the Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act (CWA) of 1977. This act along with its amendments regulates discharges of pollutants from both point and non-point sources. The Environmental Protection Agency (EPA) and many States have issued regulations implementing the CWA goal of achieving and maintaining a high standard of water quality in surface and ground waters. The CWA also recognized the importance of wetlands.

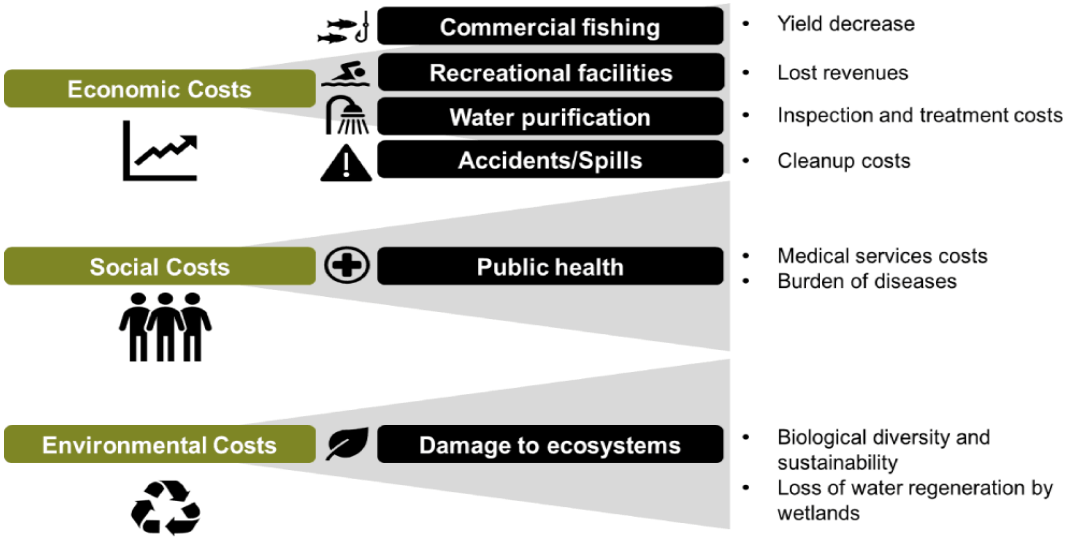

Fig. 1: Effect of waterway transportation on Economy, society, and environment

The Clean Water Act gives states the responsibility to monitor and assess their waters and report the results to the EPA. Monitoring is also done to fulfill specific regulatory requirements, such as those of the National Pollutant Discharge Elimination System (NPDES) permitting process. The Federal Highway Adminstration (FHWA) and the Environmental Protection Agency (EPA) are intended to be proactive leaders working in partnership with the states and local governments and resource agencies to develop joint training sessions, research, and information clearinghouses. Considerable progress has been made in the last two decades in reducing some of the most obvious water-related impacts of transportation, including leaking fuel, petroleum from underground storage tanks, and solid waste. Yet serious and new challenges remain. In order to alleviate the vulnerability of climate change, the sector needs to make adjustments in the development of energy and transport development plans, taking into account the elements of Climate Change. Upgrading and rehabilitation of transport facilities in areas often threatened by floods and sea level rise, ensuring the management of energy demand on the basis of high energy efficiency, Energy management; Developing a response strategy and adapting to abnormal weather conditions ... To build a complete system of sea dykes, when the whole country has 2,800 km of sea dykes in provinces and cities. The complete construction of the sea dike system in Vietnam not only protects the security of the country, but also protects the transport infrastructure in order to reduce the impacts of climate change, reduce storms, floods and water. The sea devastates the coastal provinces and cities and transport works. On the other hand, complete construction of sea dykes that prevent saltwater from entering the mainland, destroying transportation works. The transport sector should plan and redesign the transport infrastructure system on land, sea and coastal areas, ports, warehouses, canals, inland waterways, especially in Coastal and mountainous plains; Develop technical standards and norms appropriate to climate change. In the planning or construction of roads, especially rural transport, attention should be paid to the impacts of climate change, with emphasis on measures to strengthen sea dykes and drainage when flooding, especially in stormy season, Flood ... Implement the integration and protection of environmental resources in strategies, planning, plans and projects for development of transport; To concretize the implementation of the policy on solutions to cope with climate change and the protection of natural resources and environment; To popularize and thoroughly grasp the Party's and State's undertakings and policies on response to climate change and the protection of natural resources and the environment. The industry should focus on strengthening human resources, facilities and techniques for the state management, training, research on Flood and Storm Prevention and Fighting. To review, supplement and amend the land law system along the direction of prioritizing the use of land for development of transport infrastructure; to step by step develop transport towards less greenhouse gas emission, focusing on developing mass transit in Hanoi and Ho Chi Minh City. Ho Chi Minh (urban railway, fast bus) and increase the proportion of freight by rail, inland waterway and coastal. In addition, the transportation sector has also focused on developing and implementing incentive and incentive policies to motivate organizations and individuals to use vehicles that are less likely to emit greenhouse gases. Good environment; Use alternative fuels, renewable fuels. The sector has asked the agencies and units to coordinate with the concerned agencies to step up the inspection, propagation, dissemination and education to raise the awareness of environmental protection, the use of energy saving and Effectively, responding to climate change for cadres, civil servants, employees and laborers. Building and implementing plans, using energy economically and effectively, actively responding to climate change; Develop and implement a scientific plan to promote the research, development and application of climate change adaptation technologies.

In addition, it is necessary to step up research and application of scientific and technological advances, diversify and combine resources, expand international cooperation on climate change, resource management and protection environment. Mekong River is a very valuable and potential resource for great navigation. For centuries, water transportation in the Mekong was the main mode of transportation between the coastal communities wave. With the advantage of low cost, it is possible to carry large quantities of cargo today. Along with the rapid economic development, the navigation system on the Mekong system has also rapidly developed with the rapid increase in the number of vessels, ports and infrastructure to meet the needs. Transportation of goods, passengers and tourism, etc.... When the waterway transportation activities of economic sectors become bustling, it is also the inadequacies affecting traffic safety and environment. Schools such as the poor safety of vehicles, especially when transporting toxic goods, signal systems, signs asynchronous, waste from vehicles into the river, oil spills, etc. increased. The initial cause of the accidents indicates that the area of operation of the vehicle is not in line with the range of activity allowed or exceeds the allowable wind limits. Particularly, for VR-SB marine vessels when operating beyond the allowable sea limits and failing to comply with the regulations governing the licensing, cargo loading, safety equipment on board and The number of people on board does not match the actual declaration. In order to ensure the safety of navigation and safety of inland waterway traffic in the coming time, the Minister of Communications and Transport shall direct the schools' heads to perform the following tasks:

The Vietnam Maritime Administration, Vietnam Inland Waterways Administration shall direct port authorities to intensify the work of monitoring VR-SB ships and waterway vessels operating in the managed water area. Particularly, to attach importance to supervising the loading and unloading of goods, assuring that goods are loaded and tied up in strict accordance with regulations and with the right loads; Seafarers shall ensure that they have at least the safety margins and have adequate professional certificates; Crew members and passengers on the means of transport shall be in accordance with the declared quantity when carrying out the procedures of travel and arrival and in accordance with the arrangement of the means of life saving of the means.

Promote the dissemination of maritime laws and inland waterways to enterprises, shipowners and crew members to raise awareness of maritime safety and inland waterways. Strengthen the inspection of Vietnamese vessels operating on domestic routes, VR-SB-class vessels carrying out

safety equipment, and training crews to respond to emergency situations; Resolutely resolutely handle violations, not allowing means to leave the port when there are serious defects affecting the safety has not been overcome. The Vietnamese Register has instructed the registry offices to pay more attention to improving the quality of ship registration, VR-SB vessels and other waterway facilities to limit technical incident meetings. Strengthen the inspection of the performance of duties of the registrars in the work of registration, to strictly handle the violations. To study the amendments and supplements of technical regulations to ships and waterway vessels in the direction of raising safety standards for crewmembers and passengers and step by step approaching the minimum requirements of the International Convention that Vietnam Nam is a member of maritime safety, maritime security and prevention of environmental pollution. Strengthening the guidance of enterprises and ship owners on the regulations related to maritime safety, maritime security and prevention of pollution of the sea environment. Ship owners, companies managing and operating sea-going ships and waterway means shall strictly observe the law provisions on maritime safety, maritime security and prevention of environmental pollution; Instruct the ship's captain to uphold the responsibility, perform his duties seriously ...Port enterprises shall only be allowed to load cargo on board the ships and vessels permitted to carry them; Goods are loaded onto the right vessels and vessels as prescribed; The goods are lashed and tied in accordance with the regulations, guidelines on packing and tying goods before the ship leaves the port. The provincial / municipal Communications and Transport Services shall intensify the inspection and raising of the quality of training and testing activities and the professional certificates of crew members and riders; approve and strictly manage the business of passenger transport by fixed routes, passenger transportation under contract and transportation of tourists. The Legal Department reviews and synthesizes new behaviors and violations of VR-SB inland waterway vessels and port owners to supplement the draft decree on sanctioning administrative violations in the field Maritime and inland waterways. The Traffic Safety Department shall assume the prime responsibility for, and coordinate with the Inspectorate, the Legal Department and concerned units in, organizing periodical or extraordinary inspections of agencies and units on the implementation of this Directive. The task of ensuring maritime safety and safety of inland waterways is one of the key tasks of the Ministry of Transport and Communications, the Minister requests the Heads of agencies and units to seriously implement perform.

Pollutants to water from transportation take two different forms. The pollutants are either directly leaked into the natural water system, or pollutants are air-borne and then deposited. Runoff pollutants from vehicles include particulates and heavy metals from exhaust fumes, copper from brake pads, tire and asphalt wear deposits, and drips of oil, grease, antifreeze, hydraulic fluids, and cleaning agents. Indirectly, vehicles also contribute to polluted runoff by carrying solids from parking lots, urban roadways, construction sites, farms, and dirt roads.

Use of deicing chemicals facilitates travel during winter weather conditions, and is particularly important for highways and airports. Rock salt is the principal deicing agent used in winter road maintenance throughout the nation. Environmental impacts of road salt include adverse effects to roadside vegetation, harm to soil structure, and potential impacts on drinking water and aquatic life. The actual amount of salt applied to roads nationally is not known, but statistics on road salt sales are available. Approximately 16 million tons of highway salt were sold in 1997. Wastewater is another water quality issue associated with transportation. Facilities such as gas stations, maintenance shops, service stations, and freight terminals impact water quality through runoff of gas, oil, and dirt; spills during refueling; waste releases to sewer systems; and cleaning of freight tank interiors. Truck, railcar, and ship cargo interiors that carry fluids must be washed, resulting in the output of spent cleaning fluids, water treatment system sludge, and tank residues. Deicing is a significant contributor to highway runoff problems, particularly in northern states where cold weather necessitates greater use of de-icing chemicals. Rock salt is a common deicing agent used in winter road maintenance throughout the nation. The use of road salt allows highway travel during snow conditions and is important for delivery of vital goods and services (including emergency support vehicles which save lives) to large segments of the country. Although salt is cheap and effective, it can cause rather serious adverse environmental effects. The environmental impacts of road salt include effects on roadside vegetation, harm to soil structure, and impacts on drinking water and aquatic life. The effect of deicing runoff is not limited to roadside vegetation. In some cases, 90% of the salt applied to the streets enters the city the city sewerage system and then local aquifers and watersheds in general. Aquatic life in those water systems subsequently suffers. According to the Ministry of Transport, inland water transport is one of the five modes of transport in our country play a very important role. Inland waterway transport not only plays a major role in transporting large volumes of goods and passengers, but also creates millions of jobs, contributing to ensuring social security and national defense and security. However, there are still many inadequacies in waterway transportation such as unequal waterway traffic; The phenomenon of exploitation of river resources as planned or Process technology is not as planned (exploitation of sand, gravel, etc.) are common in most rivers and canals in the country. The signaling system is not synchronized between the signal of the inland waterway management unit and the signal of the owner; the handling of domestic goods transportation and inland port management is inadequate; the force of the means of development is fast, uneven but concentrated in some urban areas and industrial parks. Therefore, the Ministry of Transport has proposed a scheme to facilitate the development of a synchronized inland waterway infrastructure linking with other modes of transport; to improve the capacity of the crew and the inland waterway transport crews. To create favorable conditions for inland waterway transportation business with reasonable transportation costs; Improve the quality of water transport services; Ensure safety and environmental friendliness; Make a distinct advantage over other modes of transport. Specifically, will develop, promulgate mechanisms, The policy is to facilitate the development of inland waterway infrastructure; Build and promulgate mechanism, The policy of supporting the development of the fleet has a reasonable structure with a fleet of about

30%, self-propelled ships accounting for about 70% of the total number of inland waterway vessels; To prioritize the development of the container fleet; Inland waterway transportation and training, retraining of human resources for inland waterway transportation

3. Conclusion

The complexities of the impacts have led to much controversy in environmental policy, the role of transportation and mitigation strategies. This is made even more complex by the fact that priorities between environmental and economic considerations shift in time, which can have an impact on public policy. The transportation sector is often subsidized, especially through the construction and maintenance of road infrastructure, which tends to be free of access. Sometimes, public stakes in transport modes, terminals and infrastructure can be at odds with environmental issues. If the owner and the regulator are the same (different branches of the government), then there is a risk that regulations will not be effectively complied to. Total costs incurred by transportation activities, notably environmental damage, are generally not fully assumed by the users. The lack of consideration of the real costs of transportation could explain several environmental problems. Yet, a complex hierarchy of costs is involved, ranging from internal (mostly operations), compliance (abiding by regulations), contingent (risk of an event such as a spill) to external (assumed by the society). For instance, external costs account on average for more than 30% of the estimated automobile ownership and operating costs. If environmental costs are not included in this appraisal, the usage of the car is consequently subsidized by society and costs accumulate as environmental pollution. This requires due consideration as the number of vehicles, especially automobiles, is steadily increasing.

References

1. https://transportgeography.org/?page_id=5711
2. http://www.vlr.vn/vn/news/van-ban/van-ban-moi/2551/nhung-bat-cap-cua-doi-tau-bien-viet-nam.vlr
3. http://cangvinhtan.vn/tin-tuc-su-kien/phat-trien-giao-thong-duong-thuy-noi-dia-de-anh-cho-duong-bo
4. http://www.vietnamshipper.com/?action=news_detail&atcid=33925&chnlid=3
5. http://www.vinamarine.gov.vn/print.aspx?page=detail&id=2028
6. http://acta.fih.upt.ro/pdf/2010-3/ACTA-2010-3-11.pdf
7. http://courses.washington.edu/gmforum/topics/trans_water/trans_water.htm
8. https://en.wikipedia.org/wiki/Environmental_impact_of_shipping