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## Environmental Pollution in Bangladesh by Inland Tanker Operation

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### Abstract

Bangladesh is well known for its riverine network where the Inland Water Transportation is still considered as the major transportation sector. About 80% of petroleum product is transported all the year round through the inland tankers. However, these vessels plying in inland routes make significant marine pollution by direct throwing of bilges, solid waste, oily water and ballast water. Air pollution due to burning of engine oil-lub oil for running engines/ machineries is also contributing significant pollution. In this paper, estimation of pollutants such as bilges, oily water, solid waste and ballast water by inland tanker operation has been made approximately. Amount of fuel burnt by inland tankers operation has also been assessed. An environmental modelling has been done followed by the impacts of pollutants. It has been revealed that the impact of pollutants discharged by oil tanker is much higher than the other type of vessels operating in inland routes in Bangladesh.

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### 1. Introduction

Bangladesh is a riverine country with a network of huge no of rivers, canals, creeks and water bodies, which are occupying about 11 per cent of the total area of the country. Since long, the river network has been regarded as safe and cost-effective route in Bangladesh. The inland waterways comprise a total length of nearly 6000 km of navigable waterways. More than half of the country's total land area is within a distance of 10 km from navigable waterway. Due to cheapest, safest and reachable means, the Inland Water Transportation (IWT) sector has become the one of major means of transport of the country. For that a huge number of different types of vessels are plying in inland routes. The IWT sector carries over 50% of all arterial freight traffic and one quarter of all passenger traffic each year which clearly defines the dependency on this sector [1,2]. The dependency on IWT sector paves the way to increase the number of vessels each year. It is anticipated that this trend is likely to continue in the coming years too largely due to poor condition and huge traffic on road, the increase demand for freight transport and the expected increase in personal mobility. This significant no of vessels plying in inland routes made us vulnerable to significant marine pollution. The inland water ways are getting polluted by discharging of bilges, solid waste, oily water, and ballast water into the water and also making air pollution through burning of fuel while running of engines or machineries [5].

This paper aims at estimating pollutants such as discharge of bilges, oily water, solid waste and ballast water as well as fuel consumption by inland tanker operation. Then quantifications of these pollutants have been used for

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environmental modelling with the help of Eco Indicator 99 (I) of Sima Pro Software. The finding of this study can be used to access the scenarios of pollution by inland tanker vessels and may be useful while making some policy to combat pollution.

## 2. Research Methodology

The present research is primarily based on collecting quantitative and qualitative primary data and information to address the pollution for different types of inland vessels of Bangladesh. This data has been collected and recorded systematically through field study, open ended questionnaires and interviews with technical personnel. The major information collected are as follows:

- Physical dimensions of different types of inland vessels have been collected from DOS, BIWTA, BPC, regional concerned offices and also from on ground survey. These vessels are then categorized for the convenience of estimating different types of pollutants like bilges, oily water mixtures, ballast water etc.
- Engine power for different types of vessels has been ascertained from approved drawings, interviews with ship designers and builders as well as field data.
- Capacity plan along with line plan have been used to verify quantity of bilges and ballast water. Moreover the field study was carried out to find out the tank capacity of various vessels.
- Fuel tank has been calibrated to find out hourly consumption of fuel. Moreover the field study, interviews with engine drivers of different types of vessels and ship builders were consulted to find out hourly fuel consumption.

Secondary data source and information have been explored from related private & government organizations, books, journal, research publication, official record etc. that have been kept in the published or unpublished form. Environmental modelling has been done from calculated pollutants to quantify the emission of compounds which causes damage to human health and ecosystem quality.

## 3. Brief Description of Inland Vessels of Bangladesh

Different types of vessels like passenger vessels, cargo vessels, ferry, oil tankers, dumb barges, speed boats, sand carriers and dredgers are plying in the rivers of Bangladesh. Fig. 1 shows the percentage of different type vessels in inland routes of Bangladesh. Although Oil Tanker constitutes around 3% of the total fleet size of inland shipping,

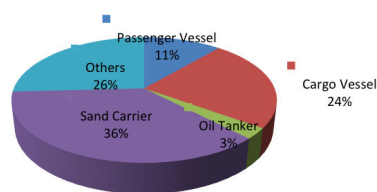


Fig. 1: Percentage of Different Types of Inland Vessels

but its economic impact is very important and significant. Bangladesh Petroleum Corporation (BPC), authorized for the importation of crude oil, refined oil and lubricant for country, import almost entire amount of petroleum products from abroad especially from Middle East countries. They distribute the oil products across the country through different companies namely Padma, Meghna, Jamuna and Standard Asiatic Oil Company Ltd after refining it at Eastern Refiner Limited. BPC has developed a storage capacity of 206,000 tons at its central establishments at Chittagong and approximately 688,000 tons at the other depots of the country [3,4]. Fuel-oil can be transported by road, railways and ships, but more than 80% of fuel-oil is transported by ships in Bangladesh. Coastal and riverine tankers are engaged to maintain supply chain of petroleum products using riverine network all the year round. Normally the fuel distribution

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