ASSESSMENT OF STATUS OF OIL SPILL CONTINGENCY MANAGEMENTAND FUNDING ARRANGEMENT FOR OIL SPILL PREPAREDNESS IN THE SOUTH ASIAN REGION

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Increasing marine transportation of oil inevitably results in accidental oil spills. The safety and preventive measures introduced internationally and nationally were able to reduce the number of spills and amount of accidental releases to the sea in the past decades. However, recent incidents show that marine oil spills are unpredictable events that may cause significant damage to the environment, wildlife and coastal communities.

This paper assesses the status of oil spill contingency management in the South Asian region. A comprehensive analysis of factors, which contribute to oil spill risks of each country, is investigated. Measures taken to reduce and control oil pollution risks are examined. Especially, existing oil spill preparedness measures and the legislative arrangements in each country to reduce, and control accidental oil pollution were taken into account when analyzing the oil spill control mechanisms in each country in the region. In addition funding mechanism for oil spill contingency management adopted by countries in the region evaluated.

The oil spill response capabilities of the regional countries are comparatively examined, using three main standard practices taking into account oil spill contingency practices; oil spill response equipment and support resources; and legislation and regulations adopted by each country. The exposure and preparedness index is used to examine the level of oil spill preparedness with comparison to oil pollution exposure of the country. Oil spill exposure and oil pollution preparedness levels are measured using parameters which give numerical values for oil spill exposure and oil pollution preparedness. The existing sustainable funding mechanisms for preparedness of oil spills are reviewed critically analyzing positive and negative points of available funding methods with a view to identify sustainable funding mechanisms for South Asian countries.

The paper critically analyzes existing oil spill response capabilities of the countries and recommends a number of measures to improve oil spill combat capability in the South Asian regional countries.

Key words: Oil Spill, Contingency Planning, Preparedness, Combat capability, Sustainable funding

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Background

Oil is the dominant and the most important primary energy source in the world. The availability of crude oil and its refined products are a key economic driver behind all economic activities undertaken by society today (Burgherr, 2007). Fossil fuels provide more than 90 percent of the world's transportation and commercial energy needs of most of the countries in the world (Smil, 2000). Although oil is very critical to the economic growth, oil reserves are not equally distributed among the countries of the world. According to the British Petroleum Statistical Review Report (2010), 54.4 percent of the world's proven oil reserves lie in the countries of the Middle East. These countries produce 30.3 percent of the total oil production while the United States, the European Union, and China account for half of the world's total oil consumption. The geographical isolation of oil producers and oil consumers necessitates that crude oil and refined products be transported across great distances from the producer to the consumer markets (Burgherr, 2007).

Over the years, the amount of oil transported by ships has significantly increased as the world economies have expanded. In the past few decades, the safety and preventive measures introduced both, internationally and nationally, have reduced the number of spills and the quantity of accidental releases into the sea. The recent oil spill data also shows that the amount of oil spilled from ships has decreased. However, recent incidents show that no one can predict an oil spill; yet, when it happens, its consequences can be far reaching. Marine oil spills are unpredictable events that may cause significant damages to the environment, the wildlife, and the coastal communities. Oil transportation has historically been responsible for many of the larger marine oil spills. More recently, there has been an increasing number of major oil spills occurring due to offshore exploration and production. The coastal states concerned, therefore, are mandatory required to take the necessary measures to respond to oil spills in an effective manner to reduce and minimize the environmental, economic, and social impacts of oil spills. The South Asian region comprises of five maritime nations including, Bangladesh, India, Maldives, Pakistan and Sri Lanka. The South Asian countries not only import much of oil for domestic consumption, but India, Maldives, Pakistan, and Sri Lanka lie close to the main shipping route that connects the Middle East to the Far East (ITOPF, 2005). Additional maritime oil spill risks arise from non-tanker shipping, carriage of refined products, offshore explorations and production operations. The South Asian region can be identified as a fast growing economic region and because of this; demand for goods as well as oil consumption, has rapidly increased recently. As a result, oil spill risks have also reached alarming rates here.

Considering these risk factors, a South Asian Regional Oil Spill Contingency Plan was drafted under the auspices of the IMO in 2000 (SACEP, 2000). However, the Memorandum of Understanding (MOU) has not yet been signed. Therefore, in the event of a major oil spill, it would be difficult to obtain assistance from neighboring countries. The Tasman Spirit oil spill in Pakistan, in 2003, revealed the possibility of an oil spill occurring in the region and impacting the areas affected both, socio- economically and environmentally. After that accident, the countries in this region have taken several steps to strengthen their capabilities to combat and, if possible, prevent oil spills. However, the oil spill contingency management process is more reactive than proactive. At this juncture, in order to minimize the possible environmental and socio-economic impacts due to oil spills, it is necessary to ascertain proper ideas regarding the levels of preparedness, combat capabilities, as well as the constraints and weaknesses of aforementioned five countries. It is deemed that any plan of this nature will be helpful in improving oil spill combat capabilities, as well as expedite planning of the process to overcome all possible impacts due to oil spills. Also, it is difficult to obtain adequate funding from the government to strengthen a country's oil spill combat capabilities. It is, therefore, essential to develop a sustainable funding mechanism using the Polluter Pays Principle (PPP).

The objectives of this research paper are to: study and evaluate the present status of oil spill contingency arrangements of maritime nations of the South Asian region, to analyze the oil spill preparedness capabilities of the countries in the South Asian Seas and study the present funding mechanisms for oil spill contingency management and suggest sustainable funding mechanisms for effective implementation of oil spill contingency management process.

Research Methodology

The information related to individual countries' oil spill response arrangements was collected and analyzed, using a set of criteria to measure individual countries' oil spill response capabilities in comparison with other countries in the region. The Exposure and Preparedness Index was used to evaluate the adequacy of oil spill preparedness to face exposure to oil spills.

The sustainable funding mechanism is one of the major requirements for an efficient oil spill combat system, to be put in place. The available funding mechanisms for oil spill preparedness measures were collected and analyzed with the purpose of assessing the strengths and weaknesses of the different systems. The author collected extensive data to fulfill the objectives of the research. The data were collected using different methods: the basic data was collected using the literature survey and after that, in order to fill the data gaps, a structured questionnaire was used to collect data from the five countries. Other than that, personal interviews were carried out to gather other information relevant to oil spill combat capabilities of South Asian countries.

Comparative Assessment Oil Spill Preparedness of South Asian Countries

The author identified three areas that affected the different countries' levels of oil spill preparedness and response. In order to assess each factor identified, a set of best practices was identified and scores were

assigned for each standard. The analyzed results were presented in graphical form to give a clear picture. Three elements were selected for assessment.

These were:

- Contingency planning practices.
- Response equipment and supporting resources
- Legislation and regulation

After that, in order to measure the adequacy of oil spill preparedness levels with regard to a country's to exposure of oil spill risks, the author used the Exposure and Preparedness Index. A Set of parameters was used to measure the magnitude of exposure and the level of preparedness.

Present Status of Preparedness and Oil Spill Combat Capabilities of the South Asian Countries

The countries in South Asia have already taken a number of measures to minimize the oil spill risk. This chapter discusses the present status of oil spill preparedness and combat capabilities of each country and legal regimes adopted to strengthen oil spill combat capabilities and oil spill liability and compensation.

Oil spill Preparedness and Response in India

India runs a substantially higher risk for oil pollution than the other countries in the region. In order to minimize oil pollution impacts, India has taken several measures. As all other countries, India has established a maritime administration in order to regulate the shipping sector. The principal agency dealing with shipping, Director General Shipping (DG Shipping) was established under the Merchant Shipping Act 1958. The DG Shipping is responsible for implementation of regulations regarding safety and environmental issues and regulatory measures related to shipping. All administrative matters related to marine pollution from ships are handled by DG shipping. India is party to the most of the IMO conventions on safety of ships, marine pollution and the compensation related conventions. Most of the above conventions have been implemented through the Merchant Shipping Act of India. (Kumar, 2007). However, considering operational capability ICG, all aspects concerning marine pollution and control was delegated to the ICG by DG Shipping under the special Gazette notification in 1986 (OSMPRMC, 2003). First NOS-DCP was drafted by ICG in 1988 as per delegated power by the Merchant shipping Act (ICG, 2006b). The ICG has been nominated as a lead agency for overall coordination while the plan identifies the requirements of cooperation among various agencies and delineation of their responsibilities. The NOS-DCP was approved in 1993 by the Government of India and the Director General of ICG was designated as the Central Coordinating Authority to implement the plan (OSMPRMC, 2003). The entire marine area around the Indian coast including islands is divided into three regions; West, East and Andaman and Nicobar and 3 Response Centers were established namely, Mumbai, Chennai and Port Blair (ICG, 2006b). There are three ROSDCPs to respond to oil spills in each

region. ROSDCP need to be implemented if tier-2 oil spills occurs; the oil spill contingency plan should be implemented (ICG, 2006).

The India oil spill response is arranged according to tiered responses. India has well developed NOSDCP with considerable amount oil spill response equipment and trained personnel. The National Plan integrated with regional Plans and local plans were also developed for facility levels. Three Response Centers with equipment stockpiles to combat spills are established to cover the large coastline on regional basis. Also, training and exercises and drills are conducted regularly in order to increase efficiency of the oil spill contingency plan. The Oil spill contingency plan has a properly explained strategy for oil spill response; however, there are no details of response structure and operational details. It can be clearly seen that the contingency plan is mainly focused on the response at sea. The responsibility of response of oil spills onshore has been given to the Central Pollution Control Board and local authorities. A recent oil spill incident offshore Mumbai revealed that it was not possible to contain and recover all the spilled oil in the offshore area. Therefore, strengthening of shoreline response capability is necessary. Further, during the oil spill coordination between shoreline response and sea response is required. Another important aspect of spills is termination of oil spill response which is not included in the plan. Moreover, several international agencies have developed guidelines for oil spill contingency plans and developed the content of oil spill contingency plans. However, the NOS-DCP has some deviations from international guidelines. The group expert also identified same as a weakness of NOS-DCP in 2003 (OSMPRMC, 2003).

Oil Spill Preparedness and Response in Bangladesh

Fortunately, Bangladesh so far has not experienced any large oil spill disasters. There were several small size oil spills in past decades. Considering importance of this the Bangladeshi government has taken several measures to introduce oil pollution control and response mechanisms in Bangladesh waters. There is no comprehensive law directly dealing with vessel source marine pollution in Bangladesh. However, there are legal provisions under various legislations to a deal with marine pollution which cover marine pollution to some extent. The Environment Conservation Act 1995 is the umbrella legislation for environment protection. The provisions of this act can be used to protect marine environment to some extent. The Environment Conservation Act defines pollution in a broad manner. Therefore the wide definition can accommodate all types of environmental pollution or discharges from vessels. In addition, according to the Act, if any accidental discharge incident occurs, a responsible person has to take measures to control or mitigate the pollution. The pollution incident should also be notified the occurrence or the likelihood of such occurrence to the Director General, Department of Environment (Karim, 2009). The Merchant Shipping Ordinance (MSO) 1983 is the umbrella law for regulating shipping in Bangladesh. The Merchant Shipping Ordinance established the Department of Shipping and other relevant government bodies pertinent to shipping. The Department of Shipping is responsible for regulating shipping and implementing IMO conventions. However, the Merchant Shipping Ordinance deals with a ship registration surveying and safety related

matters. There is no provision to deal with marine pollution. Another important organization related to marine pollution response is Bangladesh Coast Guard (BCG). It was established under the Coast Guard Act 1994. The BCG is empowered to take measures against marine pollution in the exclusive economic zone of Bangladeshi waters. However, the Coast Guard has no powers to enforce any international conventions. Further, the port related law has given some powers to prevent marine pollution within the port area. Two commercial ports in Bangladesh have been established under the separated ordinances. The Chittagong Port Authority Ordinance 1976 has provisions to deal with marine pollution inside the port. According to Ordinance causing pollution of the port area shall be punishable by fines. Similar provisions are included in the Mongla Port Authority Ordinance 1976 (Karim, 2009). It is noteworthy to mention that Bangladesh is not party to any liability and compensation related international convention. Also, there is no national law to deal with the aforementioned matter. Therefore, any spill occurs in Bangladesh waters, the cost of damages and cleanup cannot be obtained. The Department of Shipping drafted the Marine Environment Conservation Act in 2004. The drafted Act aimed at conserving and preventing marine pollutiin in Bangladesh. According to sections 14 and 15 of the draft Act, ships shall fitted with the necessary equipment to prevent pollution and deal with pollution incident. Any ship which is not complying with these provisons shall be detained. Also part iii of the Act comprises provisions relevant to civil liability for maritime caualties (Karim, 2009). Moreover, the section 35 of the Act has provided provisons regarding oil spill contigency plan requirement at national and local levels. The Act has given authority to the head of the contignecy planning to aquire any servies such as persons, materials, and equipment required for the oil spill response. In addtion, the draft Act provides provisions to give effect to seven conventions. Bagaldesh is not party to the “OPRC Convention” yet, but relevant provisions have already been incoporated to the Act. Therefore, Bangaldesh will be able to ratfy this convention in the future

The National Oil Spill Contingency Plan of Bangladesh was formulated in 2002 under the oil spill impact and response management programme funded by the Asian Development Bank. However, so far the plan has not been approved by the government. The Department of Shipping is the responsible agency for implementation of the plan, but may delegate these powers to BCG in the event of an oil spill (ITOPF, 2010b). The scope of the plan is to delineate responsibilities for the operational responsibilities to marine pollution incidents. The plan provides the framework for coordination of an integrated response by government agencies to protect the marine environment from spillage of oil. Four committees have been established under the plan. The National Marine Pollution Management Council (NMPMC) comprises senior members from relevant Ministries. The committee is responsible for policy formulation and coordination of marine pollution contingency planning and combat at national and zonal levels (ADB, 2002).

The plan clearly laid down procedures for notification and alerting. After notification of an oil spill, According to the plan On-Scene Commander should be nominated as per direction of the committees. The On-Scene commander should activate the plan. A pollution response activity at sea is coordinated by BCG

while land response activities are coordinated by the Divisional Environmental Authority. Shoreline cleanup responsibilities outside port limits have been given to local authorities. Bangladeshi oil spill response system uses a tier concept and tier-1 is defined as a small local minor spill within the facility or port area; tier-2 is a medium spill that requires other agencies support. When tier-2 spill occurs the zonal plan should be implemented. Tier-3 is a large oil spill and all agencies support is required and the national oil spill contingency plan should be implemented (ADB, 2002).

The plan has described all agencies responsibilities and established response organization for oil spill response involving all the related stakeholder agencies. However, so far Department of Shipping failed to obtain government approval. Therefore, it is difficult to implement the plan in any event of an oil spill. The contingency plan has provided details of response strategies as well as sensitive areas.

Oil Spill Preparedness and Response in Pakistan

As Pakistan experienced a major oil pollution incident in 2003, several measures have been taken to minimize and control marine pollution threats. This section will discuss regulatory and oil spill preparedness measures and weakness in the present system.

There is no comprehensive piece of legislation dealing with marine pollution but there are several agencies with some regulatory powers to prevent and control marine environment pollution. The Pakistan Environmental Protection Ordinance (PEPO) 1983 was the first legislation that focused on environmental protection (UNEP, 1986). The PEPO 1983 was replaced by the Pakistan Environment Protection Act (PEPA) 1997. PEPA is the most important legislation related to environment protection so far. However, it has not covered marine pollution in a comprehensive manner. There was no policy or legislation which directly addressed oil pollution and oil spill management before 2003, after the catastrophic oil spill incident Tasman Spirit in Karachi Port, the National Environmental Policy 2005 was introduced. This policy put forward the following measures to address oil pollution due to accidental spills, formulation of a national oil spill contingency plan, adoption of mitigatory measures impact caused due to oil pollution, establishment of a Marine Pollution Control Commission and also emphasis on the implementation of international conventions and related matters (MOEP, 2005).

Moreover, Pakistan Merchant Shipping Ordinance, 2001 is the main legislation related to ship based pollution. As per Ordinance, Pakistan Maritime Administration has established and given authority to flag state administrations as well as port state control. This agency is responsible for executing international conventions associated to vessel safety, and marine environmental protection from ships. The Maritime Security Agency Act (1994) is one of the pertinent legislation to marine pollution prevention. The Pakistan Maritime Security Agency (PMSA) is responsible for assisting and coordinating, prevention and control of the effects of marine disasters including pollution and implementation of international agreements and conventions in Pakistani waters (Mian & Benett, 2009). Further, the Port Act of Pakistan has included

provisions related to prohibition of discharge of ballast or rubbish into port waters to ensure safety of ships. The prevention and control of pollution inside the port limits has been given to the Port Authority under the amended Karachi Port Ordinance 1994. When analyzing the related Act and Ordinance, it is clear that there is no comprehensive legislation to deal with oil spills and oil pollution prevention. None of the agencies has legal provisions to deal with marine pollution incidents and several Acts were given to different authorities and different agencies. For instance, Pakistan Merchant Shipping Ordinance has given authority to the Director General of Ports and Shipping, while Maritime Security Agency Act 1994 authorizes the Director General of Maritime Security Agency (Mian & Benett, 2009). Moreover, Pakistan is party to the MARPOL Convention and OPRC Convention even before the Tasman Spirit oil spill occurred in Pakistan in 2003. The MARPOL Convention has been given effect through Merchant Shipping Ordinance in 2001. Although Pakistan became a party to the OPRC Convention before the Tasman Spirit, there was no approved national Oil Spill Contingency Plan when the spill occurred. Even after eight years of major oil spill, provisions in the OPRC Convention have been not incorporated to the National legislations. (Mian & Benett, 2009). As a result of impact of the Tasman Spirit oil spill incident Pakistan became party to the Civil Liability Convention 1992 and included oil spill management in the environmental policy of 2005 (Mian & Benett, 2009). However, even after seven years of high profile oil spills, Pakistan has not yet taken action to become party to the Fund Convention.

The catastrophic Tasman Spirit oil spill in Karachi resulted in some changes in oil spill preparedness activities in Pakistan. Subsequently PMSA drafted a National Oil Spill Contingency Plan. In the meantime there was a requirement of a comprehensive NMDCP to cater for all types of marine disasters. As a result, a comprehensive NMDCP Plan was proposed which included pollution from oil, search and rescue and salvage operations. The National Oil Spill Contingency Plan was incorporated as part of this comprehensive plan. The NMDCP was approved by the government in 2007 (PMSA, 2009). The Pakistan Maritime Disaster Management Board is responsible for taking policy decisions while the Maritime Disaster Response Committee (MDRC) is responsible for execution of the plan. The PMSA has been nominated as a designated body for operational activation of plan and overall coordination of oil spill response activities. Although shoreline cleanup responsibilities have been given to the respective provincial governments, in the event of an oil spill, provincial governments need assistance from PMSA (ITOPF, 2010a).

The PMSA is the designated agency for formulation and update of the plan. Also, the plan uses all agencies' support in the event of oil spills and includes all private agencies' details related to the plan. The plan defines the tired concept and accordingly responsibility of response to small oil spill has been given to potential polluters. However, responsibilities given in the plan for various institutions are not realistic, because most of the agencies do not have sufficient capacity to carry out delegated tasks in the event of an oil spill.

Oil spill Preparedness and Response in Sri Lanka

Sri Lanka has taken several measures to prevent and control oil pollution. The marine pollution from ship based sources is manly covered by the Marine Pollution Prevention (MPP) Act 1981. The Marine Pollution Prevention Authority (MPPA) was established under the same Act in order to implement the Act. The MPP Act underwent major revision in 2008 and the Marine Pollution Prevention Act no 35 of 2008 came into force in 2009. The name of the MPPA has changed to the Marine Environment Protection Authority (MEPA) who is responsible for formulating and implementing National Oil spill Contingency Plan.

Further, the section 38 of the mentioned that it is a duty to report oil or other pollutant discharged into under the Sri lanka waters. Accordingly polluter should report incident with out delay to the MEPA. In addtion, section 39 of the MPP Act, MEPA has power to direct all persons incharge of ports, habours, terminlas, and repair yards to submit oil spill contignecy plans. All these provisions are in the OPRC Convention. Although Sri Lanka is not yet party to the OPRC Convention, the legal provisions relevant to the OPRC Convention were already incoporated to the MPP Act. Moreover, Part VIII of the act contains provisions for prevention of pollution caused by discharge or escaped of oil, harmful substance or other pollutant into the territorial waters of Sri Lanka or any other Maritime zone. According to this section discharge or escaped oil or other pollutants into the sea from a ship, or other sources shall be guilty of an offence. However, in order to implement these provisions, it is necessary to prepare detailed regulations.

The first NOSCP was prepared by the MPPA in 1995 and was revised in 1998. The NOSCP received approval of the Cabinet of Ministers in July 2000. After that the plan was amended comprehensively and obtained approval of the government in 2004 (MEPA, 2009b). The MEPA is responsible as a lead agency for the implementation of the plan. The tier concept was incorporated to plan. Accordingly, Tier-1 defined as an oil spill less than 50 tonnes, Tier-2 oil spill 50 to 100 tonnes and Tier-3 oil spill more than 100. All oil handling agencies and ports should formulate oil spill contingency plans for response tier I oil spills. When oil spills occur more than 50 tonnes, NOSCP should be implemented. The director of NOSCOP is responsible for taking initiatives to implement the contingency plan. In the event of a major oil spill the procedure is laid down in the plan to declare environmental emergency through the National Disaster Management Center (See Figure 23).

Sri Lanka NOSCP has used the Incident Command System (ICM) in oil spill contingency management. According to ICM a response organization was established and responsibilities were given to each team. Further Environment sensitivity maps were developed around the country with environmental sensitivity index. However, non availability of oil spill response equipment and trained human resources to implement the contingency plan is the main issue.

Oil spill Preparedness and Response in the Maldives

The Maldives is an archipelagic island situated very close to main international shipping routes and is therefore prone to medium risk of oil pollution. There are few existing policies and legislation on marine pollution and pollution control in the Maldives (BOBLME, 2010). The existing mechanism for pollution control is not adequate. There are a few agencies that vested powers to prevent and control marine pollution. The Environment Protection Agency (EPA) of the Maldives is the main regulatory authority, which has the mandate to protect the environment from pollution. However, EPA mainly focuses on land based pollution not on ship based pollution (BOBLME, 2010).

The Transport Authority under the Ministry of Transport and Communication is responsible for dealing with sea transportation and maritime safety. The Transport Authority has implemented various regulations and ratified several international conventions to protect the marine environment. The Maldives has ratified several international convention related to marine pollution prevention from ships, although incorporation of legal provisions in international conventions to the national legislation is limited. So far, there is no comprehensive legislation to deal with marine pollution from ships. In addition, the Maldives Coast Guard has the mandate for the oil pollution response in the country. Coast Guard has in house oil spill contingency plan and a limited amount of oil spill combat equipment. It is only sufficient for responding to small oil spills. There is no plan to response oil spill with incorporation of other agencies (ITOPF, 2010c). The major port under the control of the Maldives Ports Limited and established under the Presidential Decree in 1986. Ports Limited is responsible for prevention of pollution within the harbour area. In order to minimize pollution, the port carries out vessel inspection inside port waters. If any vessel is found not in compliance with environmental standards, it will not be given permission to enter to port. However, Port does not have equipment or oil spill contingency plan to respond oil spills. In the event of an oil spill port authority notifies to Coast Guard and accordingly the Coast Guard has to respond. The oil pollution legislation and policies in the Maldives to control and prevent marine pollution is feeble and limited (Ali, 2010).

There is no operational National Oil Spill Contingency Plan the Maldives at present. The formulation of a National Oil Spill Contingency Plan is currently going on under a special project and it will be finalized in 2013. The Coast Guard has been identified as a designated agency for pollution response. The Coast Guard has their own oil pollution contingency plan and which has been formulated as per US and Indian national plans. However, the Coast Guard does not have sufficient combat capability to respond to major oil spills due to limited oil spill combat equipment (BOBLME, 2010).

Comparative Assessment of Oil Spill Preparedeness Combat Capabilities in the South Asian Countries

Countries in the South Asian region have adopted various prepardness measures to respond to problems arising out of oil spills and resultant pollution in their waters. As illustrated in earlier chapters, there are differences in terms of the levels of oil pollution preparedness within these five countires. Some countries have adopted efficient systems to manage the risks oil pollution, others have not taken adequate measures. It

is necessary to comparatively assess all these countries' abilities to prepare and respond to oil spills, which will give a better picture regarding their strengths and weaknesses with regard to the available combat-ready systems. Accordingly, countries can improve their oil spill preparedness systems.

However so far there seems to be no internationally accepted criteria for assessing oil spill combat capabilities of different countries The International Oil Spill Conference Guidelines was introduced 28 elements under the six broad categories for oil spill response planning and assessment (IOSC, 2008). The IMO introduced five main elements to the assessment fo the level of oil pollution preparedness (IMO, 2010). After studying other criteria, considering the data and other available resources, the author selected three main elements to assess the countries' oil pollution preparedness levels to deal with oil pollution incidents. These were contingency planning practices,response equipment and supporting resources, legislation and regulations . In order to measure each element, a set of indicators was first identified. As indicators the author used the variables or standards and according to the levels of adaptation of variables, scores were assigned to give quantitative value for each indicator. A value is assigned to each indicator, considering each factor's importance and the level of adoption. If adopted variables are in an operational stage, then they are assigned high scores (4), and level of adoption of variobles is lower a lower score will be assigned: (3), (2), (1). If there is no adoption of considered best practice, the score assigned is (0). The mean value was used to compare oil spill combat capabilities of each of these countries'. It is clear that the validity and reliability of the result depends mainly on the data collected from the questionnaires, the literature review, and the interviews.The result was useful to classify the countries combative capabilities with regard to oil pollution preparedness levels into different groups and to help identify gaps within the oil pollution preparedness systems in each country

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Criteria to Assess Countries' Contingency Planning Practices

- Approval of plan,
- Multilevel plans,
- Review and update of plan,
- Role and responsibilities of competent authorites and stakeholders,
- Environmentally sensitive areas,
- Identification of response resources,
- Sustainable funding,
- Trainings,
- Exercises

Criteria to Assess Countries' Response Equipment and Supporting Resources

- Ability to monitor and evaluate oil spill,
- Ability to use different response methods,
- Availability of equipment for response at sea,
- Ability to use oil spill dispersants and availability of dispersant usage policy,
- Availability of oil spill combating expertise

Criteria to Assess Countries' implementation levels of relevant International Conventions

- Implementation of the Marpol Convention,
- Implementation of the OPRC Convention,
- Implementation of the CLC Convention,
- Implementation of the Fund Convention,
- Implementation of the Bunker Convention

Results of the Comparative Assessment of Countries' Oil Spill Contingency Arrangements

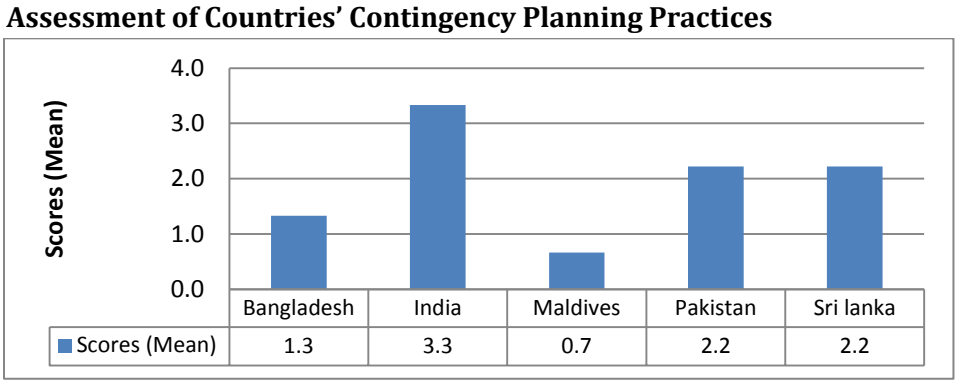

Figure1: Mean value of scores obtained by each country for the contingency planning practices

As can be seen in Figure 1, India has a high score. Pakistan and Sri Lanka, however, have medium-level low scores, while Bangladesh and the Maldives have very low scores. Indian scores are significantly high because India has a comparatively better contingency plan in practice compared to the other countries. India regularly conducts exercises. It has a very concrete and sustainable funding mechanism for preparedness activties. Further, one of the significant features of Indian system is availability of multi-level plans. Therefore, Indian scores are higher than the those for the other countries. There are no approved National Oil Spill Contignecy Plan in place in Bangladesh and the Maldives. However, Bangaldesh has drafted a national plan, but the Maldives' plan is still at the drafting stage.

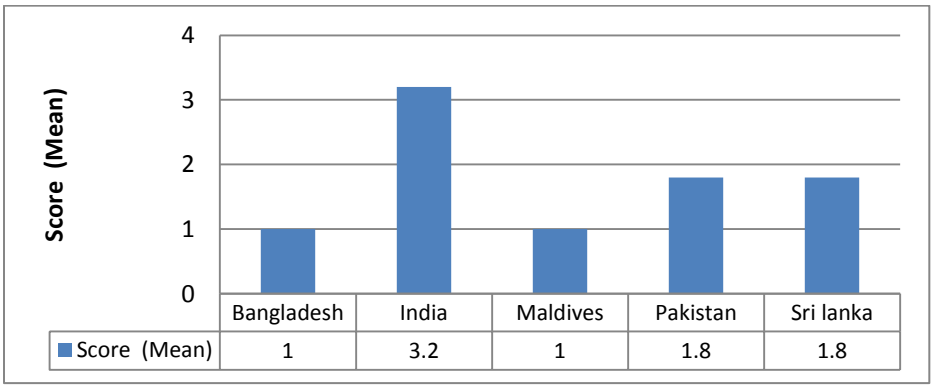

Figure 2: Mean value of the each country obtained for the oil spill response equipment and supporting resources.

Figure 2 shows that except for India, the four other countries' scores are very low, which means that there is not enough oil spill response equipment and other supporting resouces in Bangladesh, Pakistan, Maldives, and Sri lanka. India has an oil spill dispersant usage policy and also dispersant testing protocol. However the other four cuntries do not have a proper oil spill dispersants usage policy so far. Pakistan and Sri Lanka have approved National Oil Spill Contingency Plans, but the equipment available for oil spills combats is

insufficient. The condition of Bangladesh and the Maldives is even worse.The equipment available in these two countries is inadequate to respond to even a small oil spill.

Assessment of Countries' Legislation and Regulations Pertaining to Oil Pollution Preparedness Response and Compensation for Damages

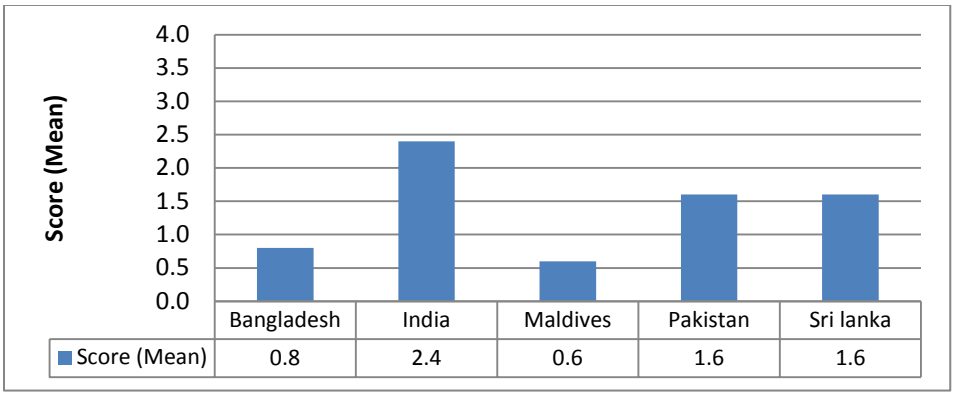

Figure 1: Mean value of scores each country obtained for the legislation and regulations adopted pertaining to oil pollution preparedness and compensation.

Figure 3 shows that India's score (2.4) is higher than that of the other four countries. However, the Indian score is not very high. India has good contingency practices, oil spill combat equipment, and other resources; however, India has not taken enough measures to improve its legislative arrangements. None of the countries in the region is party to the Bunker Convention. India has ratified most of the Conventions related to marine pollution and compensation. It is noteworthy that there are not enough national regulations to implement the measures adopted by International Conventions.The legislation relevant to marine pollution and compensation in Bangladesh and the Maldives' is very weak.

Comparison of Oil Spill Preparedness and Exposure to Oil Pollution Risks

It is easy to comparatively assess each country's level of preparedness to combat oil pollution incidents. However, countries should develop oil spill combat capabilities according to the oil pollution risks faced by them. The above results only gave a comparative assessment using the strengths and weaknesses of each country, which can be identified as per the available best practices, equipment and legislation. However, it is always better to assess a country's preparedness level, accoriding to the risks faced, only then can risks be managed at an acceptable level. To measure the exposure to oil spills and the levels of preparedness in terms of combat abilities, the author used the and Preparedness Index. Exposure of each country to risks of oil spills preparedeness level to oi spill can be assessed using the following parameters.

Exposure to oil spills	preparedness in terms of combat abilities
Number of vessel movements per year	Operational national oil spill contingency plans
Number of oil tanker movements per year	Well-defined roles and responsibilities
Total quantity of oil handled per year	Integrated contingency plans at different levels.

Number of terminals	Availability of adequate oil spill response equipment.
Number of offshore drilling rigs	Availability of adequate geographical coverage of response centers.
Number of offshore production facilities and locations	Requlrity of exercising of oil spill contingency plans including equipment deployment.
Number of oil tankers passing close to the coast and distance from coast to shipping routes	Trained man-power availability.
Total length of oil-carrying pipelines	Availability of support tools for response and preparedness.
Length of sensitive coastline	Regional level assistance integrated with plan.
Probability of impacts	Funding mechanism for response and preparedness

To assess each parameter, the author used a scoring procedure. The scores have been given according to the evaluation criteria, and the final scores were calculated for preparedness and exposure for each country. Scoring procedures and scores were obtained from each country for exposure and preparedness.

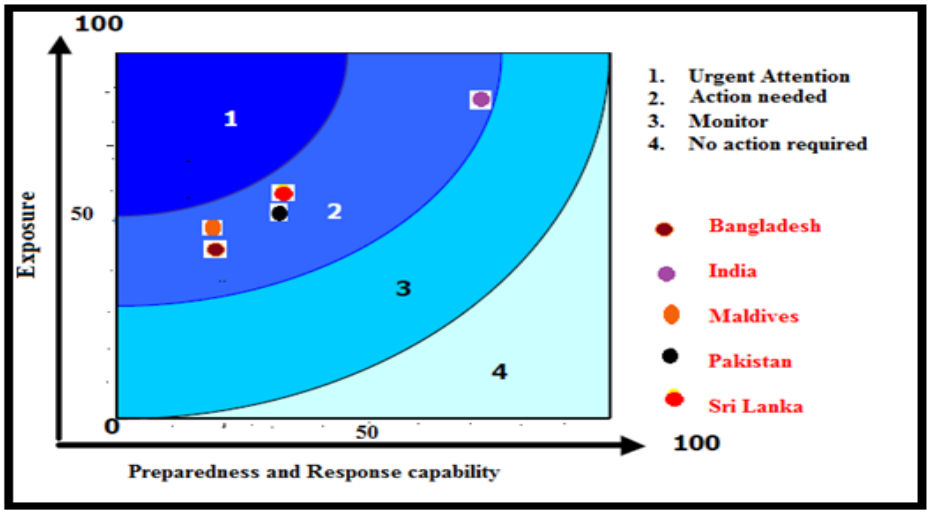

Figure 4: Oil spill Exposure and Preparedness Index of the five countries

Figure 4clearly shows that India's exposure to oil pollution incidents is higher than that of the other countries .However, India has taken measures to improve its oil spill combat capabilities. Although the preparedness level need further improvement. Also the other four countries need to improve their preparedness. The Maldives and Bangladesh's preparedness and response capabilities are very low to compared to the risk for oil pollution. There is no approved National Oil Spill Contignecy Plan so far in Bangladesh or the Maldives. It is necessary to take some concrete action to introduce oil spill preparedness measures in these two countries . Sri lanka and Pakistan are also need to improve their oil spill prepareness capability.

Funding Mechanism for Oil Spill Contingency Management

It is imperative to adopt the necessary measures to prevent and control oil spills wherever possible, and undertake effective response measures if oil spill do occur. This mandates a huge amount to be invested in preparation to effectively respond to oil spills. Most of the developing countries are often in the throes various forms of crisis, which explains why it is difficult for them to invest the requisite fund in the activities that will help counter oil spills and make combating it effectively.

Funding Mechanism for Oil Spill Pollution Damages and Oil Spill Response Preparedness

A great percentage of the costs incurred cleaning up and combating the consequences of oil spills including clean up and spill consequences costs may be recovered from the International Liability regime established through the CL Convention, the Fund Convention and the Bunker Convention. The CLC covers the costs of the oil spill from the oil tankers but up to a certain level, while the Fund Convention covers the rest comparatively larger extent. However, there is an upper limit for the damages cited above. In order to compensate for the damages caused by bunker oil spills, the Bunker Convention offers to cover the costs of oil spills. Through these Conventions, The cost can be recovered only if the costs directly generated due to oil spills. The Polluter Pay Principle is used only for the recover cost of oil spill not for the preparedness for oil spills. Therefore, it is very clear that the cost of oil spill preparedness cannot be recovered through the present International Liability regime. In addition to that, if the deployed cleanup method is not technically feasible, the cleanup costs also may not be recovered. Therefore, countries are required to establish their oil spill preparedness systems not only to reduce the possible adverse impact but also to recover oil pollution costs including the clean-up costs. Presently, there is no international legal regime for funding oil spill preparedness measures: hence, individual countries have to develop a funding mechanism that will take into account the principle of environmental laws and the other applicable international laws.

The Polluter Pays Principles and Polluter Pays Principle to Potential Polluters

The Polluter Pay Principle (PPP) is a recognized and widely-used principle in International Environmental law. The Organization for the Economic Cooperation and Development (OECD) adopted PPP as an environmental principle for environmental policy through a council recommendation (OECD, 1972). It is emphasized that the PPP is an economic principle, which can be used for "allocating costs of pollution prevention and control measures". Further, it states that the PPP paves the way for encouraging sustainable use of natural resources and avoids the distortion of international trade and the investment. In 1974 and 1980 the OECD adopted second and third recommendations with regard to the implementation of the Polluters Pays Principle along with certain financial aspects recommended by the public authorities to prevent and control oil spills, respectively. After that OECD adopted fourth recommendation in 1988, which introduced the concept of Potential Polluter (Veiga & Wonham, 2001). It stated that polluter would have to bear the costs of accidental preparedness.

The Agenda 21 included PPP as a principle in the Article 17.22. (UNESD, 1992) In addition to that, Agenda 21 accepted the Precautionary Principle for Mitigation of Pollution. It is clear that Agenda 21 and the OECD accepted not only a PPP but also Potential Polluter should pay for the pollution preparedness. Therefore, polluters would henceforth be asked to pay for the costs of preparedness activities to mitigate pollution.

Moreover, the United Nations Conventions on the Law of the Sea 1982 (UNCLOS 82) is the umbrella convention and includes the general principle for all activities regarding seas. Article 235 clearly states that the polluter must pay the cost of damages caused because of pollution. According to Articles 192 and 194 of the UNCLOS 82, member states are obliged to take measures to protect and preserve marine environment and to prevent, reduce, and control marine pollution from any source. It is clear that according to the above mentioned Articles, countries should establish measures with regard to pollution control preparedness. However, the UNCLOS 82 has not indicated the funding arrangement for such measures (Fosund, 2004).

The OPRC Convention is a major IMO Convention related to oil pollution preparedness. The preamble of this Convention affirmed that the PPP should be taken into account as a general principle of international environmental law. Also, the convention enforced strong obligations upon the members of the Convention. Accordingly, members were required to prepare a national oil spill contingency plan and maintain sufficient amounts of oil spill response equipment. But, it was not clear whether the OPRC Convention accepted use of the PPP to fund activities regarding oil spill response preparedness. Basically, it is clear that international law accepts not only a PPP but also Potential Polluter Pay Principle for activities leading to pollution preparedness. There are many countries which are already using this mechanism for funding oil preparedness measures. However, the use of PPP varies from country to country because of the risk of oil pollution and the required levels of preparedness which also varies from one country to another.

Presently Available Funding Schemes for Funding Oil Spill Preparedness

Today, there are two different types of funding models that exits in the world with regard to funding for oil spill preparedness measures and strengthening of oil spill combat capabilities. Some countries' oil pollution preparedness systems depend entirely on the funding offered by their governments while other countries use PPP. (Veiga & Wonham, 2001). Countries which use the PPP utilized different model to collect funds from all potential polluters. Below discusses the mechanism used to collect funding for such preparedness activities in different countries.

The Australian Maritime Safety Authority is the agency responsible for the formulation and implementation of the National Plan to Combat Pollution of the Sea by Oil and other Noxious Substances (AMSA, 2008) Australia uses PPP to potential polluters for funding of their National Plan. The source of fund is a levy imposed on vessels using Australian ports. The fund for preparedness to tackle oil spill is enriched by using the Protection of the Sea Levy. The levy is used the fund for ongoing development, maintenance and administration of the National Plan, acquisition, storage, and maintenance of the equipments and the training

program. Also, the levy provides funds to cover oil spill clean-up costs where the polluters cannot be found and costs cannot be recovered (AMSA, 2011). The levies are imposed on ships through the two Acts, the Protection of the Sea (Shipping Levy Collection Act) and the Protection of the Sea (Shipping Levy Collection) Act. 1981. According to the Protection of the Sea (Shipping Levy) Act (1981), the levy applies to that ship whose tonnage lengths are not less than 24 meters and which carry more than 10 tons of oil, and which arrive at the Australian ports at any time during a calendar quarter. All levies collected from ships are used entirely for the purpose of strengthening the measures of oil spill response preparedness.

The Oil Pollution Fund was established by New Zealand to fund for the oil spill preparedness. The fund provides funds for preparations for the marine oil spill response and o pays the costs incurred when responding to spills where the polluter is unidentified. As per the section 333 New Zealand Maritime Transport Act of 1994 and Oil Pollution Levies Order 1998, the Pollution Levy is collected from the risk contributing sectors namely, shipping, fishing, oil exploration, and oil production industries along with the oil pipeline at a rate proportional to the risk created by various activities (MNZ, 2010).

Finland has established a special funding mechanism to fund oil spill preparedness activities. Oil Pollution Fund was established using the levy on oil imported or transported through Finland. The amount of levy on each ton of oil imported was 2.20 Finish National Currency. The levy imposes on oil transported doubled if the oil was transported in a single hull tanker (Lampela, 2001). A per the Oil Pollution Compensation Act of 1997, the collection of the Oil Pollution Protection charges is suspended when the total funds available in Oil Pollution Fund reached the Finish National Currency 40 million mark. The collection of charges would be resumed when is reduced to 20 Finish National Currency (Veiga & Wonham, 2001). This fund is used for acquisition and maintenance of municipal oil combating equipment and is also available for other agencies to combat oil spill and engage in response activities (ITOPF, 2000).

Canada also applies the PPP to potential polluters. However, this method is different from what has been discussed earlier with regard to funding mechanisms. Oil spill preparedness and response in Canada is funded and operated by the private sector. The private organizations maintain respond capability to response oil spill up to 10000 tons. The Canadian Coast Guard has set up standards according to which all response organizations operating in Canada should be certified as being operational by Coast Guard. Oil handing facilities and oil tankers more than tanker 150 gross tonnage and other ships more than 400 gross tonnages are required to have an agreement with certified response organization for the provision of a response in the event of a pollution incident. The oil handling facilities and ships pay the fee for have an agreement with response organization (Fosund, 2004). The principle of potential polluters behind this mechanism and oil handing facilities and ships bear the cost of oil spill response and preparedness indirectly. The Canadian Coast Guard also maintains and upholds significant oil spill response capacity of their own. The Coast Guard

is responsible for the certification of oil spill response plans and a fee imposed by the response organization on oil handling facilities and ships.

Malaysia is another country that applies the PPP to potential polluters for the funding oil spill response arrangements. The Environment Quality Act of 1996 established the Environmental Fund. The one of the main purposes of this was to fund the preventing or combating of spillage and discharge or dumping of oil. The contributions for the fund come from several sources and one of the major sources are those involved in the exploration, extraction, refining, production, bulk movement, distribution, or storage of oil. This contribution comes through the levy imposed on industry. The rate of levy depends on formula that based on the particular risk of a spill from their operation. A levy also applied to offshore oil transfer facilities the amount of the levy depends on their location, type or risk profile (David, 1999).

In order to ensure that the funds are available for effective and immediate oil spill response, the fund maintains a minimum balance at all time. The mechanism is also available to review fund regularly, in order to ensure levy is imposed on according to relative risk profile. If the risk profile has changed then the rate of levy imposed on organization's activities will change to reflect their contribution vis-a-vis the risk (David, 1999).

Funding Mechanism Available for Oil Spill Response Preparedness in South Asian Countries

Among the five maritime nations in South Asia only India has a sustainable funding mechanism in place with regard to oil spill response preparedness. India has used the Potential Polluter Pay Principle for ensuring substantial fund .being in place to meet preparedness measures. The fund collection method was established under the Merchant Shipping (Levy of Oil Pollution Cess) Rules, 1988. According to rules, levy is collected at every port in India, and especially stringent on ships which carry oil as cargo. A cess is imposed at the rate of fifty paise for each ton of oil imported by a ship into India in bulk as cargo, and shipped from any place in India in bulk as cargo. The levy is paid by the master, owner or an agent of a ship before the commencement of loading or unloading. However, there is significant difference between India and other countries with regard to fund management. There is no separate fund to handle the above mentioned levy. The levy is collected from the Oil Pollution Cess directly and goes to the Government Consolidated Fund. Therefore, it is not clear whether the collected fund is directly used for oil spill response preparedness. Also, there is no information related to the use of the collected levy. It is unclear whether the money is used for pollution prevention activities or not. India is the fourth largest oil consumer in the world and if the collected levy can be used to finance oil spill preparedness activities, then it may help to improve oil pollution preparedness in India. However, in comparison with other countries in the region India's oil pollution preparedness levels are among the highest. On the other hand, the other four countries mainly depend on government funds to finance oil pollution preparedness. All these countries have identified the non-availability of sufficient funds as the main problem hindering the development of a comprehensive oil spill response preparedness system.

As developing countries, these entities face several other problems and it is, therefore, difficult to allocate sufficient funds solely to combat oil spills. Funding requirements for improvement of oil spill response preparedness has been identified by various countries today; Sri Lanka is required to invest US$ 5 million as the initial fund amount for purchasing combat equipment, training personnel to use this equipment and developing other facilities. Maintaining equipment and other facilities require US$ 45 000 annually. According to estimates available for Pakistan US$ 35 million is required for purchasing of equipment, such as oil spill response vessels, combat equipment and staff training. The governments in the regional countries have other priorities; therefore, it is not possible to allocate the required amounts of money to finance the oil pollution preparedness activities.

However, any investments in this domain need to be weighed against the damages from the potential oil spills. For instances, the estimated cost of damages due to the Tasman Sprit oil spill was pegged at approximately USD 1.5 to 2 billion (Mian & Benett, 2009). This very clearly showed that the damage was significantly higher than the required investments for financing oil spill response preparedness.

Suitable Funding Mechanism for the South Asian Region

It is clear that countries which apply the PPP to potential polluters have two types of oil spill preparedness systems. There are the privately owned Oil Response Organizations which is the system used by Canada. Oil Response Organizations have given authority to enter into agreement with potential polluters and employ oil spill response when the event of oil spill. In the meantime the government has also established an independent oil spill response mechanism response to major oil spills. In order to adopt this type of mechanism, a well-developed private sector as well as well-organized government agency is required specially to monitor and inspect oil spill responses and oil spill response mechanisms of other agencies. However, in the South Asian regional countries, these aspects are markedly lacking. Private sectors agencies do not have sufficient fund or expertise to carry out this business. Moreover, the main risk contributors are the passing ships which travel through the international routes in the South Asian region. If the Canadian system applies to South Asian countries, it may not be applicable to oil pollution incidents caused by these passing ships because these ships have not paid up for the services of privately-owned oil response organizations.

The other system available is the levy on ships and other oil handling agencies. This is in accordance with proportional risk posed by each sector. However, there were some similarities as well as differences between these four countries. The main similarity was in terms of the levy being collected from Potential Polluters which then went in to a separate fund which was used only for oil spill response preparedness activities and always undertook measures to ensure a comprehensive response for oil spills. When calculating the potential polluter pays levy, the risk factor would need to be taken into account. The Australian system did not take this into consideration and therefore the same amount of levy was imposed on oil tankers and all the other ships. Further, other sectors which posed a significant threat in terms of oil pollution were not been taken

into account, for example offshore oil platforms. When we analyze New Zealand's system it is clear that it covers all the risk contributors and accordingly imposes a levy.

India use PPP and collects the levy based on the amount of oil carried by the ship as cargo. However, it is applicable only in oil tankers which arrive at Indian ports and engage in oil loading or unloading activities. On analyzing the past oil spills in Indian waters, it is clear that most of the oil spills occurs from non- tanker ships while most of the ships visiting the Indian ports are general cargo ships. However, the above levy does not cover the risks posed by these vessels. Therefore, the Indian Oil Pollution Levy should be amended to cover other risk factors too. Also, the Pollution Levy should be solely used for its intended purposes in a transparent manner. In order to do this as in other countries, a special fund should be established to deposit the levy collected and the administration of fund should be handed to designated authority in charge of oil spill response.

Conclusions and Recommendations

Conclusions

The South Asian regional countries have taken several measures to prevent and control the impact of a potential oil pollution incident. The manner in which oil pollution legislation was implemented is not very praiseworthy in these regional countries except for India. India has become party to all the international conventions related to oil pollution prevention from ships and has already incorporated relevant legal provisions into national legislation. However, there are several gaps. India is party to the OPRC convention, but so far the necessary legal provisions have not been incorporated into the national legislation. Further, India has not been party to the Supplementary Fund and most of the provisions with regard to the Fund Convention and the CLC have not yet been incorporated to the national legislation. However, among the five South Asian countries, implementation of international conventions is the highest in India.

Pakistan's legislation related to oil pollution still has a lot of gaps, even after a well publicized oil spill in its waters, Pakistan has not taken action to party the Fund Convention and the country is party only to the CLC. Pakistan is also party to the OPRC Convention although it has not yet incorporated the relevant legal provisions to national legislation. Sri Lanka is not party to the OPRC Convention; however, it is party to the CLC and Fund Convention protocol 1992. Further, Sri Lanka has incorporated most of the legal provisions in these two conventions into national legislation. The Maldives is party to the Fund Convention and CLC, but it is not party to the OPRC Convention. Moreover, it is noteworthy to mention that there is no legislation in the Maldives to give effect to all the conventions of which the country is party. Bangladesh does not have sufficient legislation related to oil pollution and not also party to the any of the Liability Conventions nor does it have any national legislation regarding oil pollution liability.

The oil pollution preparedness levels for the four countries except India can at best be termed weak. The National Oil Spill Disaster Contingency Plan is updated regularly and maintains a reasonable amount of equipment while consistently training officers in combat oil spill exigencies. Pakistan and Sri Lanka have approved their National Oil Spill Contingency Plans although the implementation of these plans in an effective manner is highly constrained given the lack of trained human resources and combat equipment. Meanwhile, Bangladesh and the Maldives do not have any approved National Oil Spill Contingency Plans neither do they have the equipment nor trained officers' to combat oil spills. Moreover, there is a marked lack of a regional oil spill contingency arrangement. A regional oil spill contingency plan was drafted in 2000, but this has not reached the implementable stage.

Exposure and Preparedness Indexes clearly showed that all the maritime countries in the South Asian region need to take further action to improve their oil spill preparedness levels to meet required level of preparedness in order to face the relevant oil pollution exposures.

Sustainable funding mechanisms are therefore, required. Furthermore, countries, which has sustainable funding mechanisms in place have better oil spill combat capabilities with sufficient amounts of oil spill combat equipment and trained personnel. However, except India, none of the four countries in the region have sufficient funding from government budgets or sustainable funding mechanism using the PPP system.

7.2. Recommendations

(a). The Maldives and Bangladesh should take the necessary initiatives to establish National Oil Spill Contingency Mechanisms at the earliest to face the risks brought about by shipping and other maritime industries.

(b). Sri Lanka and Pakistan should take initiatives to improve their oil spill combat capabilities to meet necessary requirements. They should maintain an adequate amount of oil spill response equipment and trained personnel with other support resources.

(c). All countries the region should take action to ratify all international convention related to oil pollution and compensation. Further, all countries should incorporate relevant international conventions in the national legislation .

(d). A clear oil spill dispersant usage policy should be introduced with adequate legislation.

(e). It is necessary to establish a sustainable funding mechanisms to improve oil spill preparedness levels using the Polluter Pays Principle. The author especially suggests adopting similar systems like the one taken up by New Zealand to provide funds to finance oil spill preparedness activities.

(f). India National Oil Spill Disaster Contingency Plan should be improved according to international guidelines. The ICM should be introduced to coordinate oil spill responses in the country as is done elsewhere in the world. Further action should be taken to establish response centers in selected locations along the coastline to cover the entire coastline of the country.

(g).The current funding system for financing oil spill preparedness system in India should be changed. A special fund should be established and the fund should be used for oil spill response and preparedness related activities only. Further, the fund should be audited. The amount of levy should be imposed to all potential polluter according to the degree of risks they pose.

(h). All regional countries need to take immediate action and sign the MOU to establish oil spill combat assistance procedures.

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