

STUDY OF WATER POLLUTION AND REJUVENATION OF RIVER GANGA

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Abstract: This study has been undertaken to investigate the reasons for the pollution of Ganga- water and its purification measures. Water is very important to life; It need not be spelt out, exactly how important water is. It is a matter of concern in this paper that the Ganga-water is polluted and is being used for drinking. What measures were taken by the Government and Social Activists to remove the pollution from Ganga- water ? Did Ganga become pure through these efforts? Trying to find out the answers to these queries. See how effective the efforts of the Social Activists and Government in purifying the Ganga.

Index Terms: Ganga-water, Water-pollution, Purity-efforts.

I. INTRODUCTION

The Ganga begins from Himalayas as a Crystal Clear River in the mountains, but Pollution and excess usage transforms it into toxic sludge on its journey through cities and industrial hubs. As the Ganga-River flows into more populated areas, it gets filled with runoff and sediment from the surrounding cities. Untreated sewage flows directly from drain pipes into the river, beyond sewage, piles of garbage are dumped directly into the river, especially in urban areas. Water pollution is any biological, chemical or physical change in the quality of water that has a harmful effect on any living thing that drinks or uses it and lives in it. When humans drinks polluted water it often has serious effects on their health. Water is the most key resource required to sustain the life on this planet [1]. The River Ganga is the most important River system in India. Due to the copious availability of water throughout the year, it has played a major role in the growth of Indian Civilization and economy [2]. It account for 25% of India's water resources. The Ganga is the thirtieth longest river in the world, covering a basin area of 861,404 km² [3]. The Ganga basin is among the most heavily populated areas in the world with an average density of 520 persons per km² [4]. Major pollutants found in water [1] include volatile, biodegradable and recalcitrant organic compounds, toxic metals, plant nutrients, suspended solids, microbial pathogens and parasites[5-7]. Among the pollutants, toxic metals are of serious concern because they accumulate through the food chain and create environmental problems [8 ,9]. Higher concentrations of heavy metals can form harmful complex compounds, which critically effect different biological functions [10]. The presence of heavy metals in the waste water of industry is a potential risk to aquatic ecosystem, animal and human. High concentrations of heavy metals often pose a serious threat to biota and the environment of any ecosystem [11]. It means that if there is pollution in the Ganga-water, then it is a matter of great concern. Sometimes soil pollution can contribute to the pollution of water. This occurs through surface runoff, often when it rains and polluted soil is carried to nearby bodies of water. Just as polluted water can infect soil, polluted soil can infect water.

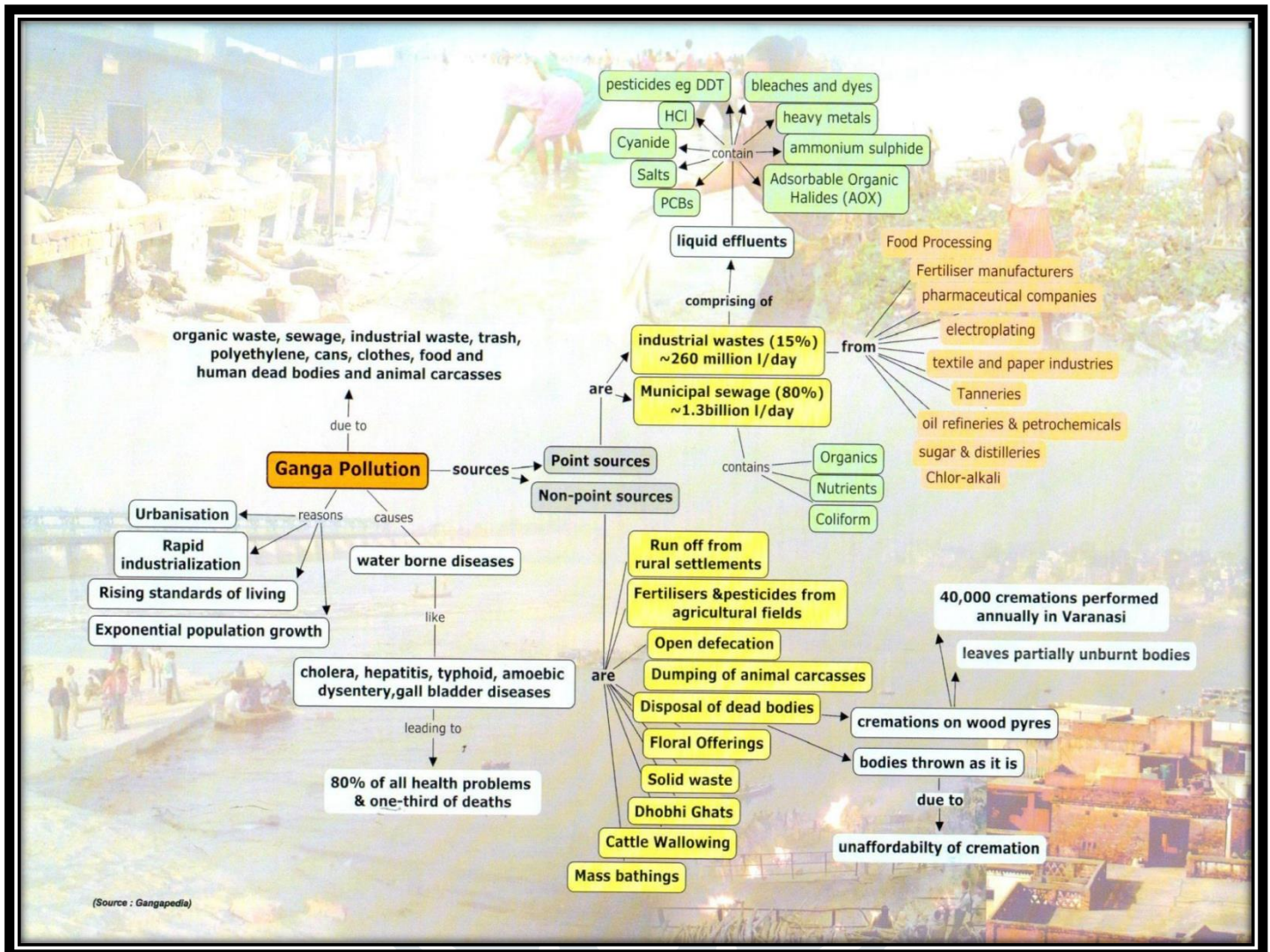
II.METHODS

Samples of water are analyzed for different contaminants and pollutants. Inorganic compounds, microscopic pollutant, organic material and pathogens were also tested. Living organisms such as fish can also be used for the detection of water pollution, changes in their behavior or growth show us, that the water is polluted. The smell or appearance can also indicate water pollution. Contaminated water will emit the smell of rotten eggs. Apart from smell, by looking the colour of water, It can be told whether this water is polluted or not. Cadmium, Chromium, Copper and Lead are among the main pollutant of water resources were also tested. The soil samples were also taken, around the same location from which the water samples were taken and tested like nutrient content, composition, acidity or pH level.

III.RESULTS AND DISCUSSION

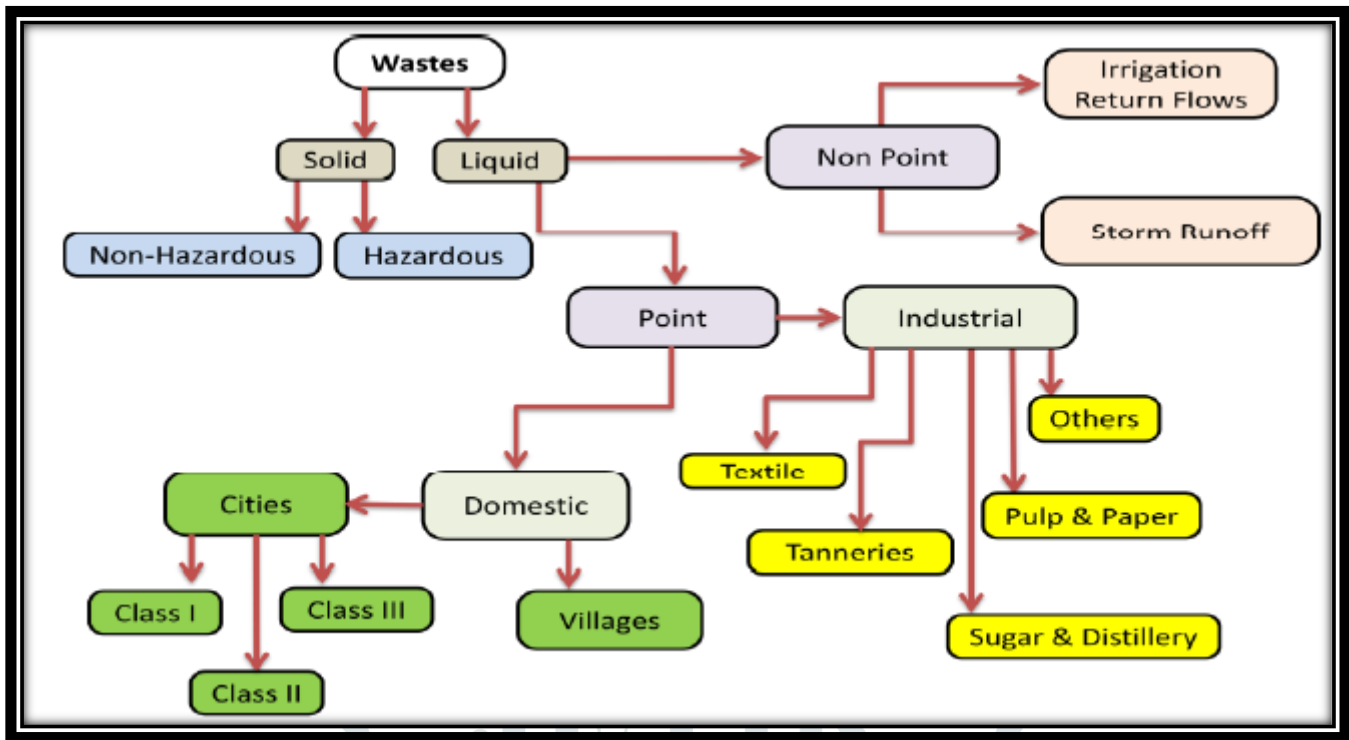
How does water pollution affect humans? Try drinking direct normal water, your body will immediately react to it, This prove that the Ganga water is polluted. As a result it seems to me that there are water pollution due to so many reasons. Due to the Food processing industries, Fertilizer manufactures, Pharmaceutical companies, Electroplating, Textile industries, Paper industries, Tanneries, Oil refineries, Petrochemicals, Sugar plant, Distilleries and Chlor-alkali creates Industrial waste. This waste give many chemicals (DDT,

HCl, Cyanide, Salts, PCBs, Bleaches, Dyes, Heavy metals, Ammonium sulphide and AOX. The reasons for which the Ganga is getting polluted are being tried to incorporate in the following figure [12].



You can see in above figure, There are many reasons for Ganga Pollution like organic waste, sewage, industrial waste, trash, polyethylene, cans, cloths, food, human dead bodies, animal carcasses, due to that diseases are causing like water borne diseases, cholera, hepatitis, typhoid, amoebic dysentery, gall bladder diseases etc

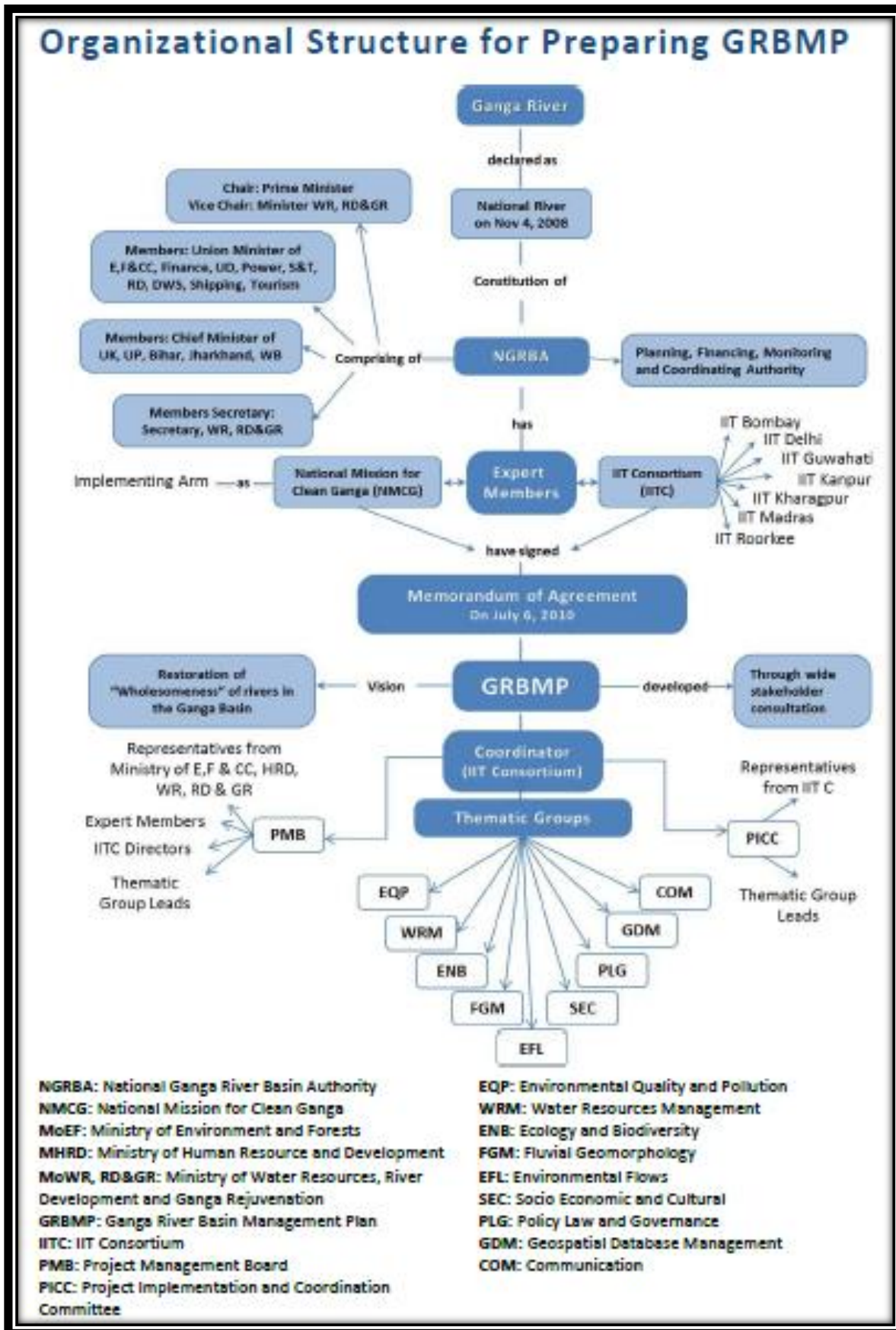
Anthropogenic waste disposed in the Ganga River System graphically shown in given below given Figure [13], include both solid and liquid wastes of hazardous and non-hazardous types generated from domestic, industrial and agricultural sources. Liquid wastes from large urban centers and industries are major point sources of pollution, while surface runoff containing agrochemicals and entrained solid wastes are some major non-point pollution sources [13].



Many peoples have contributed a lot to purify the Ganga-water,. Among these there is one who sacrificed their lives while fasting for the purity of the Ganga. An Indian environmental activist has died on the 111th day of a hunger strike to pressure the government to clean the Ganges river. GD Agarwal, a former professor of environmental engineering at one of India's top universities, died on Thursday afternoon in hospital in the north Indian city of Rishikesh, where he had been admitted earlier that day. A spokesman for the All India Institute of Medical Sciences in Rishikesh said Agarwal, 87, had died from a cardiac arrest. Doctors at the institute told local media he had a hernia, high blood pressure and a coronary artery disease, all of which were exacerbated by the fast. Agarwal, who also went by the monastic name Swami Gyan Swaroop Sanand, had been fasting since 22 June 2018 to protest against the government's inaction in cleaning the Ganges river .(theguardian.com/environment/2018/oct/12).

The birth of the Ganga Action Plan (GAP) can be linked to public outrage regarding pollution. In 1985, environmental lawyer M.C. Mehta filed a public interest litigation in the Supreme Court of India holding the government and industries responsible for the alarming rise in pollution in the Ganges. The Ganga Pollution Cases ultimately resulted in pollution fines and the closure of several industries that were found guilty of not complying with environmental legislation [14, 15]. That same year, the Central Ganga Authority (CGA) was created within the Department of Environment. The CGA developed the GAP, a massive program designed to control pollution in the Ganges and its tributaries. The objective was to establish a series of sewage treatment plants near the main urban centers, renovate all existing sewage pumping and treatment stations, provide wastewater sub-pumping stations at the mouths of open drains not yet linked to existing sewer systems, expand existing sewer networks by connecting unserved areas, and construct electric crematoriums to address the issue of improperly cremated human remains along the *ghats* [14, 15].

In exercise of the powers conferred by sub-section (1) and (3) of section 3 of the Environment Protection Act-1986 (29 of 1986), the Central Government constituted the National Ganga River Basin Authority (NGRBA) as a planning, financing, monitoring and coordinating authority for strengthening the collective efforts of the central and state Government for effective abatement of pollution and conservation of the River Ganga. One of the important function of NGRBA is to prepare and implement a GANGA RIVER BASIN MANAGEMENT PLAN (GRBMP). A consortium of seven IITs was given the responsibility of preparing the GRBMP by the Ministry of Environment and Forests, Government of India New Delhi. A memorandum of Agreement was therefore signed between the 7 IITs (Bombay, Delhi, Guwahati, Kanpur, Khargpur, Madras, Roorkee) and Ministry of Environment & Forest for this purpose on 06 July 2010[16].



The Union Cabinet chaired by the Prime Minister approved the flagship “NAMAMI GANGE” programme which integrates the efforts to clean and protect the Ganga-River in a comprehensive manner. Marking a major shift in implementation, the Government is focusing on involving people living on the banks of the river to attain sustainable results. Dawning from the lesson learned from the

previous implementation, the program also focuses on involving the states and grassroots levels institutions such as urban local bodies and panchayati raj institutions in implementations. The program would be implemented by the National Mission for Clean Ganga (NMCG) and its counterpart organizations i.e. State Program Management Groups (SPMGs). NMCG will also establish field offices wherever necessary [17]

IV.CONCLUSION

Despite all the efforts of purity, It is concluded from above analysis that Ganga-water is not drinkable, but the River-Ganga is also considered sacred and is personified as the Goddess-Ganga that's why the Ganga-water is considered pure for the people who believe that bathing in the River-Ganga causes the remission of sins and facilitate Moksha. The efforts made by Government and Social activists are expected to make the water of Ganga drinkable in future. Efforts to rejuvenate the Ganga are going on continuously for a long time, lots of money has also been spent in this work, Today peoples are looking forward to the hope that after so much expenditure, the water of Ganga may become drinkable in future.

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