

**“Ganga can always survive and purify herself
simply because she is a Goddess”
Representation of Spiritual practices in the
Ganges River Pollution Problem**

By

Amanda Wickramasekera

A Thesis Submitted in Partial Fulfillment of a Degree in Environmental Studies

Lewis and Clark College

May 8, 2013

Advisor: Prof. Elizabeth Safran

ABSTRACT

This thesis aims to explore how the contribution of spiritual practices to pollution of the Ganges River is represented in national and international sources. The Ganges River is one of the most polluted rivers in the world, it runs through five major states of India and is the most holy and sacred river to all Hindu followers. I will explain how such a spiritually valuable and loved river has become so polluted. I will then analyse people's perceptions about what factors have led to the current polluted state, and how general citizens of India who use the river and government leaders perceive this problem. Based on my analysis I argue that it is a widely recognized perception that spiritual practices are contributors of pollution to the Ganges River in non-scholarly writings. On the other hand, scholarly writings perceive industrial and municipal waste as the major sources of pollution to the Ganges River. These perceptions of blame for Ganges pollution may misdirect clean-up efforts.

ACKNOWLEDGMENTS

I would like to express my very great appreciation to professor Liz Safran who supported and guided me in the right direction throughout the whole semester to write this thesis paper. I am very thankful to Nadini Wijesooriya who conducted the interviews in Varanasi, India and who devoted long hours into conducting the interviews for me. I must also thank the helpful staff in Watzek library that assisted me throughout this process. I would also like to thank my parents and my sisters who endlessly supported me. A special thank you goes to Thomas Wilson who encouraged me to write my thesis on this topic area. I am very grateful for all the support you have given me without whom this project would not been a success.

INTRODUCTION

Pilgrimage sites around the world have a well known sacred recognition by their followers. The concern in most cases is many of these pilgrimage sites are known as places that put pressure on natural resources. Mount Fuji, Lumbini, Sri Pada, Bodh Gaya and especially Ganges are some sacred sites that are facing this pressure today. In all of the above cases people hold the resource in high regard as it has some relation to a god, goddess or spirit. However, people have been distracted and have forgotten to view the site as a natural resource that has a certain limit on how much pressure it could handle. This is the situation of the Ganges River. People regard the river as a holy site, but have failed to recognise the pollution that is affecting the river and the people. In this thesis I address River Ganga because it is known as the most polluted river in India as well as one of the ten most polluted river basins of the world (Daftuar 2011).

Ganges River pollution is a very sensitive topic. During the past three decades there were many Ganges River clean-up projects that were initiated but failed to continue. Lots of funding that was supposed to be directed to the project was never fully accounted for and reasons for why the project wasn't completed weren't given. The topic has been a sensitive and controversial one due to the fact that the Hindu religion plays a significant role in how the river is viewed, and therefore the focus of the issue about cleaning up the river has been ignored. Differing perceptions about the real problem have distracted people from taking meaning action on the matter.

This led me to focus my research on how exactly the contribution of spiritual practices to the pollution problem is represented. Naomi Oreskes's study *Beyond the Ivory Tower: The Scientific Consensus on Climate Change* showed how 75% of scholarly peer reviewed work agreed that global warming is happening and 25% of politicians, economists and journalists disagreed or were confused whether or not global warming is happening (Oreskes 2004). This motivated me to look in to how the Ganges River Pollution problem is represented in scholarly and non-scholarly writings.

To all Hindu followers Ganges is their lifeline.

“The Ganges, above all, is the river of India which has held India's heart captive and drawn uncounted millions to her banks since the dawn of history. The story of the Ganges, from her source to the sea, from old times to new, is the story of India's civilisation and culture...” (Kishor 2006, xxvi)

wrote India's first Prime Minister Jawaharlal Nehru. Not only Nehru, but millions of Hindu Indians view the Ganges as a mother goddess. Therefore it is a river that is dearly loved. India's great civilisations and history began at this river. Between the early 2000 and 1500 B.C.E the indo European immigrants who settled in northwestern parts of India moved to the areas around the Ganges River (Shattuck 1999, 19). The great Indian civilisation began by the Ganges basin where all aspects of people's lives depended on this motherly river Ganga. The Ganges River has been at the core of sacred Hindu lore and tradition since ancient times. Ganga is known as the goddess Vindhyavasini in Hinduism (Hawley & Wulff 1996, 10). Ganga's water is said to be the “sustaining immortal fluid of mother's milk” (Hawley & Wulff 1996, 137). It is a commonly held belief that a dip in the river is believed to wash off sin, heal diseases and impurities,

and a sip of the water is believed to cleanse your soul. Upon death, if one's ashes or body is floated in the river, Hindu's believe that the soul will rise to the heavens (Carpenter 1986).

Yearly there are many festivals that take place along the Ganges River. Magh mela is the biggest festival followed by Kumbh Mela Chhath Puja, Ganga Mahotsav, Dussehra and other pujas. Death ceremonies also take place every day. All these festivals celebrate a god or multiple gods in Hinduism and are visited by millions of pilgrims.

The river is well respected and worshiped. However, the river is at the most extreme level of pollution. Despite the high levels of pollution, many pilgrims still bathe and drink the water to as a part of their traditions. During the pilgrimage season millions of liters of untreated sewage run directly into river. Millions of pilgrims visit Ganges and during this season, the contribution of pollution of Varanasi is unimaginable (Dartuar 2011). Even though people believe that that they are being purified when they bathe in the river, research carried out on bio monitoring and water quality monitoring proves that Ganges has the highest rate of pollution as well as the highest bacterial contamination when compared with the other major rivers that run through India (Bhardwaj 2005).

The situation is hard to control because the people who use the river do not have to pay any cost for what they use or pollute. During the past three decades, industrialization and rapid urbanization have put unyielding pressure on the sacred river. Irrigation canals siphon off ever more of its water. Rivers like the

Ganges can be life lines of a country's economy and its people, but with the toxic state of the river today it is unfit for human use. Today the concerning topic of pollution is arising inside and outside of India regarding the ecology of the river as well as the humans who are using it.

This thesis aims to look at how the contribution of spiritual practices to the pollution problem is represented. An analysis of the contribution of spiritual practices to pollution of the Ganges was conducted through interviews and contextual analysis of newspaper articles and scholarly journals and books. Here I will describe the setting of my thesis. Firstly, I will provide some background information on religious significance of Ganga and some background on the pollution problem. I will then go in to my methodology section and explain the process of how I collected data. Then I will address the results I found and provide a discussion about the results and finally end with the conclusion.

The Ganges River basin

As shown in figure 1 this project is situated in the Ganges River of India, which is 2510 kilometers from its source in the Himalayan mountains to the Bay of Bengal and runs through many cities, but this project will focus on the spiritual sites of Varanasi, Allahabad, Haridwar and Gangotri. The Ganges River originates as a stream called “Bhagirathi” in the Gangotri glacier at 30 ° 55' N, 79 ° 7' E, 4100 meters above mean sea level. The Ganges River basin is the fourth largest river basin in the world and the largest among river basins in India. The river basin covers a catchment of 861,404 square kilometers.

Currently about half a billion people live within the river basin, at an average density of over 500 per square kilometers, and this population is anticipated to rise to over one billion people by the year 2030. (Srivastava, 2010:2).

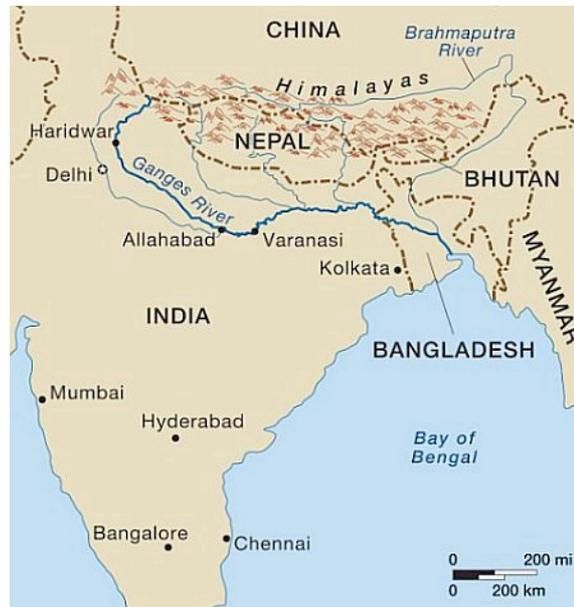


Figure1: Map of India showing the Ganges River

Religious significance of Ganga

River Ganges is known as the Purifying Waters of Heaven. The well known mythology is that “the Ganga came down to earth from the Milky Way through the locks of the god Shiva’s hair... is a generous goddess who gives life to the fields, cleanses the body of disease and the soul of sins and opens the way to the next life” (Hollick 2008, 5). Similar to what is mentioned above many Hindu Puranas/texts emphasize Ganga’s ability of purifying and making human bodies disease free after bathing or drinking the holy water of Ganges. The common belief among followers of Hinduism is that water of Ganga absorbs pollution, but when it is running, like in a river, it carries pollution away as well. (Hollick 2008,

139). The word 'Ganga' means to "to go" and the running, flowing, and energetic movement of her waters are constantly mentioned as one of the major reasons behind her purifying attributes. Ganga that is full of energy is believed to keep people healthy and happy (Hollick 2008, 9).

The religious ritual of floating ashes of a dead person or a dead body is another purifying ritual. People believe that Ganga carries the ashes to the ancestors. When Ganga carries away the mortal remains and flows into the ocean they rest in heaven with their ancestors whether they are virtuous or sinful. (Kinsley 1986,193). “Special hostels for the dying accommodate the thousands of pious Hindus who make a final pilgrimage from all over India to die in the banks of the Ganges” (Kinsley 1986, 192-193). Hindu’s believe that Ganga is the “Great Cremation Ground” as well as “the best place to die in all of India” (Hawley & Wulff 1996, 145). Many bodies and ashes are floated down the river daily as a ritual, and has occurred for centuries.

There are many other religious festivals that are held each year in Ganga as shown in figure 2. Magh mela is the biggest festival followed by Kumbh Mela Chhath Puja, Ganga Mahotsav, Dussehra and other daily pujas. According to recent statistics the Kumbh Mela that was held in 2013 attracted a hundred and twenty million pilgrims to Ganga (Dubey, 2013). During these festivals the riverbanks are crowded with pilgrims and each festival takes place during the festival season from October to March. To accommodate the pilgrims a minimum of 50,000 temporary tents and toilets are built. (Tripathi 2013).

Figure 2: Festivals and pujas that take place in Ganga

Name of the Festival	How long is the festival	# of people & How its celebrated	Significance of the festival
Magh Mela followed by Kumbh Mela (Kumbh Mela happens only every 12 years)	55 Days	80-100 million Taking holy dips throughout the day	A devotee overcome the sins in his/her previous birth and escapes the circle of birth and karma actions
Chhath Puja	4 Days	50 million Taking holy dips and offering food to Ganga by floating them down the river in plastic plates and bags	Performed in order to thank Surya for sustaining life on earth and to request the granting of certain wishes.
Ganga Mahotsav	7 Days	70 – 80 million Floating oil lamps, flower bags and other sculptures and statues down the river	Very touristic festival to celebrate the culture and history of Varanasi
Dussehra	10 Days	80 – 100 million Burning and floating statues down the river. Fire festivals all along the Ganges River.	Celebrates the good over evil
All other daily pujas	Every year of the day	Unknown number For death ceremonies (floating bodies or ashes), floating flowers, oil lamps and different sculptures	Celebrates different types of events

Background on the Pollution Problem

In 1986 Rajiv Gandhi, Prime minister of India launched the Ganges Action Plan (GAP) to take measures to solve the Ganges River pollution problem with the objectives to “improve water quality, to conserve biodiversity and develop an integrated river basin management approach” (Srivastava 2010, 5). The rush

with which the plan was implemented led to a failure. The sewage treatment plants were built to handle the sewage of 1986 and not years into the future, therefore the facilities were inadequate. The committee had agreed upon largely meaningless criteria to measure the pollution of the river which showed low rates of pollution that met no international standards (Hollick 2008, 74). The plan lacked coordination. “Our limit is five milligrams. We cannot adopt WHO limits. They are for developed countries. India is a developing country. So we’ve set limits that work here” said a government official rejecting the WHO recommended maximum permissible limit in water of 1 milligram of pollution per thousand liters (Hollick 2008,74).

Funding was wasted due to various flaws in the system. The money funded from other governments to implement GAP in all possible areas were ineffective mismanagement. But the problem wasn’t limited to sewage treatment plants. If waste was to be cleaned up in the river then waste from industries like tanneries and agricultural waste which is dumped everyday had to be dealt with. Therefore recovery plants had to be built but since this was a very money intensive project with little organization structure it fell through. It was not just a duty of the government to solve the problem. The general public was also responsible. Crematoriums were built to reduce the amount of bodies that are floated down the river. But since the facilities had to be maintained people were charged for every cremation. This caused a problem because many people could not afford it, and were reluctant to change their ritual of floating the bodies down the river. Therefore, since there wasn’t enough money coming in to maintain the crematoriums, they eventually quit working, and the pollution problem persisted

(Hollick 2008, 87). Overall, the problems identified were never addressed and the decisions taken were never enforced as a result of mismanagement, corruption and incompetence.

According to the GAP both point sources and non point sources were identified as polluters to the Ganges River (Srivastava 2010, 11). The plan suggested industrial pollution and municipal sewage as the point source pollution because the waste that is dumped in the Ganges River enters the river at specific sites. The industrial waste comes from tanneries, sugar and paper industries, textile industries, carpets, locomotives, coalmines, thermal power plants, fertilizer and chemical industries and more (Trivedi 2010, 349). The municipal sewage includes wastewater from fast growing urban areas, organic waste, sewage, trash, food and animal remains (Trivedi 2010, 248).

The non point sources of pollution were also considered in GAP. Non point source pollution is waste that does not enter the river from a specific source. According to GAP non point source waste includes disposal of dead bodies, animal, waste from religious events, runoff from medical waste, fertilizers from agricultural fields and cattle wallowing. (Srivastava 2010, 11). During the festival season the temporary tents and toilets that are built and all the waste that comes out of those facilities are also sometimes dumped in the river. Aluminum and clay statues and millions of plastic bags that are taken by pilgrims to carry flowers for the rituals are also dumped in the river (Srivastava 2010, 2). These all fall under the category of non point source pollution.

The ecology of the river as well as human health is at a major risk. According to research conducted compared to the 1960's plankton and 265

different fish species have sharply declined both qualitatively and quantitatively (Sinha & Khan 2001, 500). The water is used not only for religious practices but also for household purposes. Washing, drinking and cooking is all done using the unhygienic water of the Ganges River. The majority of the people who live along the Ganges River are very poor and uneducated. These people are unaware of the health risks they face now and that they will face in the future as well as the damage they are contributing to. Water borne diseases, diarrhea, helminthic infection, skin diseases and respiratory tract infection are increasing among the people along the river (Srivastava 2010, 23). The death rate around the area of Varanasi is increasing, but people still believe that they can adapt to the polluted surroundings and use of unhygienic practices. Therefore they do not consider the pollution problem an important issue. "In the minds and hearts of her devotees, the solution to the riddle is simple: what's the problem if we pour our garbage into the river or suck her dry? Ganga can always survive and purify herself, precisely because she is a goddess" (Hollick 2008, 9).

METHODOLOGY

This project engages in two types of methodologies to collect data. Structured and semi structured interviews were conducted to gather data from people who have a spiritual relationship with the Ganges River and to analyse how they perceive the Ganges River pollution problem. Next I conducted a contextual analysis by using scholarly and non-scholarly writings to interpret the representation of the problem through these writings.

Firstly, interviews were conducted with people who fall in to four categories: people who live very close to Ganges River (less than a mile away from the river), people who live far away from Ganges River (from a different, city, state or country) and people who use Ganga for only religious purposes and priests. Three people from each of the above four categories were interviewed. Each interview conducted lasted for about half an hour to forty-five minutes. The interviewer was a colleague of mine who studies in India. The interviews were conducted in Hindi, the national language of India and were later translated into English. The interview responses were hand written while conducting the interview. Altogether there were structured and semi structured interviews with the different interviewees. Structured interviews consist of five main questions and some guiding questions for the respondents if they want more clarifications about the questions. The semi-structured interviews were conducted by asking a question to begin with and spontaneous follow-up questions were asked in order to continue the conversation.

When randomly picking interviewees a general conversation was conducted with that person and based on his or her friendly atmosphere they were asked whether they would like to be part of an interview that will be analysed for a university class essay. All respondents were informed that the interviews will not be part of any government data or will not be used for any other purposes. The interviewees were asked whether they would like to speak in a private area away from people, but most of them were comfortable talking around people. Prior to each interview it was determined that the interviewees didn't have any kind of connection with other interviewees.

The next method of data collection was through analysis of scholarly journals, books and newspapers regarding Ganges River pollution. When collecting data through these writings I looked at newspaper articles, texts and journals written from the past three decades from the 1980's to 2013. I selected this time period because it was around the time that Ganges River clean-up efforts were being considered and implemented.

I selected newspaper articles by typing the phrase "Ganges River pollution" on Google search and picked articles from both Anglophone news sources as well as Indian news sources. By searching the term I made sure that the subject matter was indeed related to Ganges River pollution. I didn't specifically pick a newspaper source but selected eleven Anglophone articles and nine Indian newspaper articles through Google search. I decided to look at Anglophone and Indian articles because I wanted to get a different perspective about what the national news papers and the international newspapers have to say about the pollution problem. I read all the twenty newspaper articles and counted every time there was a line, phrase or word that is related to any of the four categories: spiritual practices and events, industrial pollution, agricultural waste and municipal waste. I then tallied the number of times these were mentioned.

To select scholarly journal articles and books I used the Lewis and Clark Watzek library website and I searched the phrases "Ganges River", "Ganges River pollution", "Ganges River water issues" or "Ganges River water problem" and altogether picked ten sources. For books I picked a certain chapter and selected the quotes, lines and phrases to support my data. I used data from all these sources including interviews and contextual analysis through scholarly and

non-scholarly writings to analyse how the pollution problem is represented.

RESULTS

Interviews

In the interviews with the four categories of people who live less than a mile away, people who visit for religious purposes, pilgrims who use the river for religious purposes and priests all mentioned that the river is polluted only because of the development that the area is undergoing and due to poorly constructed sewage systems that add waste to the river. This is seen from the interviewees perspective as the main cause of health problems among people who are using the river daily. But as one pilgrim said, “No matter how polluted Ganga is she can purify herself because she is a powerful goddess. I have never gotten sick and I use the river every day.” Of the pilgrims that were interviewed two who do not live in India anymore and one pilgrim from another state mentioned the fact that religious practices are also a part of this pollution problem because there are millions of people who are using the river during festivals and almost all of their waste during the festival time is dumped in to the river. One student mentioned,

Most of these people who come here don't really know what's in this water. People don't even go to school so there's no way that they will know about the pollution problem. I wish the government could do more to inform these people about the situation of the river. This is the first time I ever visited Varanasi and even though I am a Hindu follower this pollution here scares me. I just watched what people are doing in the river and said to myself, how are these people drinking this water thinking that it will cure all their problems?

People who are more educated on the issue seem to know what is happening in the river and are willing to agree with the reality of the problem that exists.

Out of the twelve interviews conducted five of them mentioned that pollution is not an issue in this river and the pollution does not affect the river or their lives in anyway. Four of the people interviewed were aware that pollution exists but they only mentioned the point source pollution and did not know what kind of waste is released from the pipe except for raw sewage. Out of the twelve interviewees only three mentioned that industrial waste, municipal waste, agriculture and religious festivals and practices are part of this pollution problem.

Even though the interviews represent a very small percent when compared to the majority of people it shows that most people are unaware and unwilling to agree that the river pollution is a real issue and that it negatively affects the ecology and the health of the people using it.

Representation in written material

I now turn to look at the results of the contextual analysis I conducted.

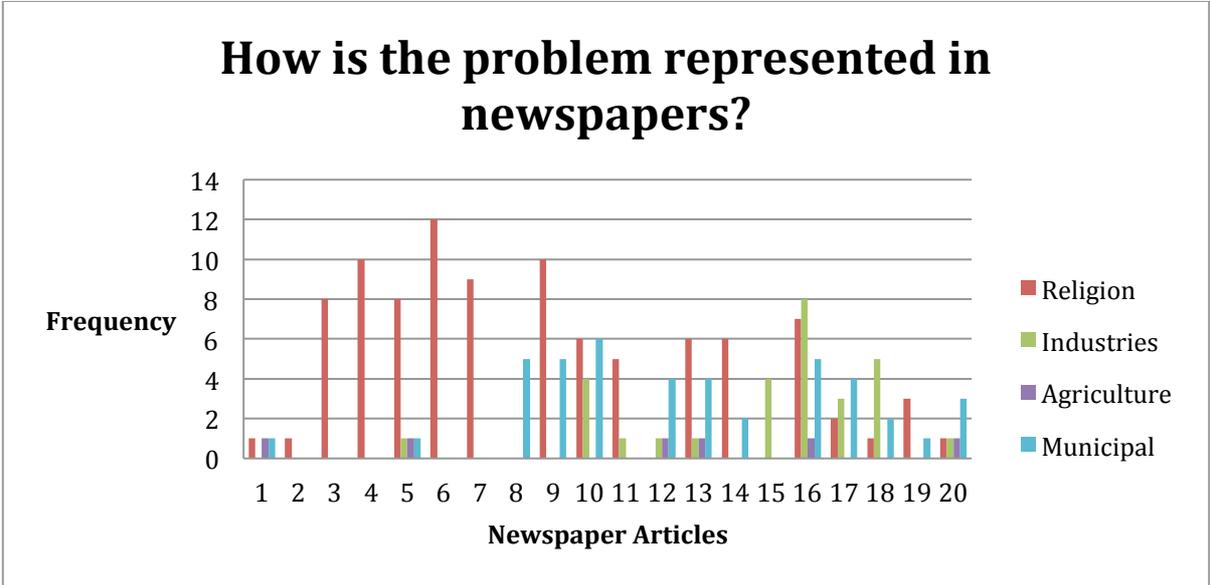


Figure 3: The four coloured bars show the frequency of how many times the article mentions the four different categories of pollution.

When we just take a glance at the graph in figure 3 it clearly shows that the frequency of red, which is the number of times the article mentions anything regarding contributions to pollution through religious practices & festivals seems to be widely cited compared to the rest of the pollution sources in newspaper articles. The contribution of municipal waste is the next highest mentioned in newspapers followed by Industrial waste and agricultural waste. Starting from 1986, religious practices, industries, agriculture and municipal waste have been recognized as contributors to pollution according to the newspaper articles. Seventeen out of the twenty articles mentioned religious practices as a contributor in the Ganges River pollution problem. Ten out of twenty mentioned industries as a contributor to pollution, six out of the twenty articles mention

agriculture as a contributor to pollution and thirteen out of twenty articles mentioned municipal waste as a contributor to pollution.

In the seventeen articles that mentioned religious contributions some of the common themes that occurred were ¹'Ganges is the holiest funeral destination for Hindus and the disposing of human bodies is contributing to major threats', 'millions monthly visit for ritual baths', 'thousands of tents and 40,000 temporary toilets were built with pipelines directed to the Gages River', 'Biochemical Oxygen Demand (BOD) levels are increasing, 7.4mg per liter at the main bathing place', 'Plastic bottles and plastic bags, idols, statues and human waste is overwhelming.' In the ten articles that mentioned industrial waste contributions some of the repetitive themes that occurred were 'effluent from thousands of industrial zones spill carelessly into the river's flow', 'Gangetic plain is a hub of industrial activities, pulp, paper, textiles, tanning, oil refineries, steel, paint, varnish, rubber and jute plants, chromium and hazardous waste that flows through the drains contribute to pollution of the Ganges River.' In the six articles that mentioned agricultural waste contributions some of the themes were 'agricultural runoff has fouled Ganges waters for decades', 'farm pesticides and fertilizer chemicals are present beyond limits'. In the thirteen articles that mentioned municipal waste contributions some common themes were 'untreated sewage causing a lot of threats', 'surface runoff from solid waste landfills, dumpsites and humans waste continue to flow in to the river at more than two dozen discharge points.'

¹ Refer to the appendix for all the sources.

Now I turn to compare how the problem is represented in Indian newspaper articles and Anglophone newspaper articles.

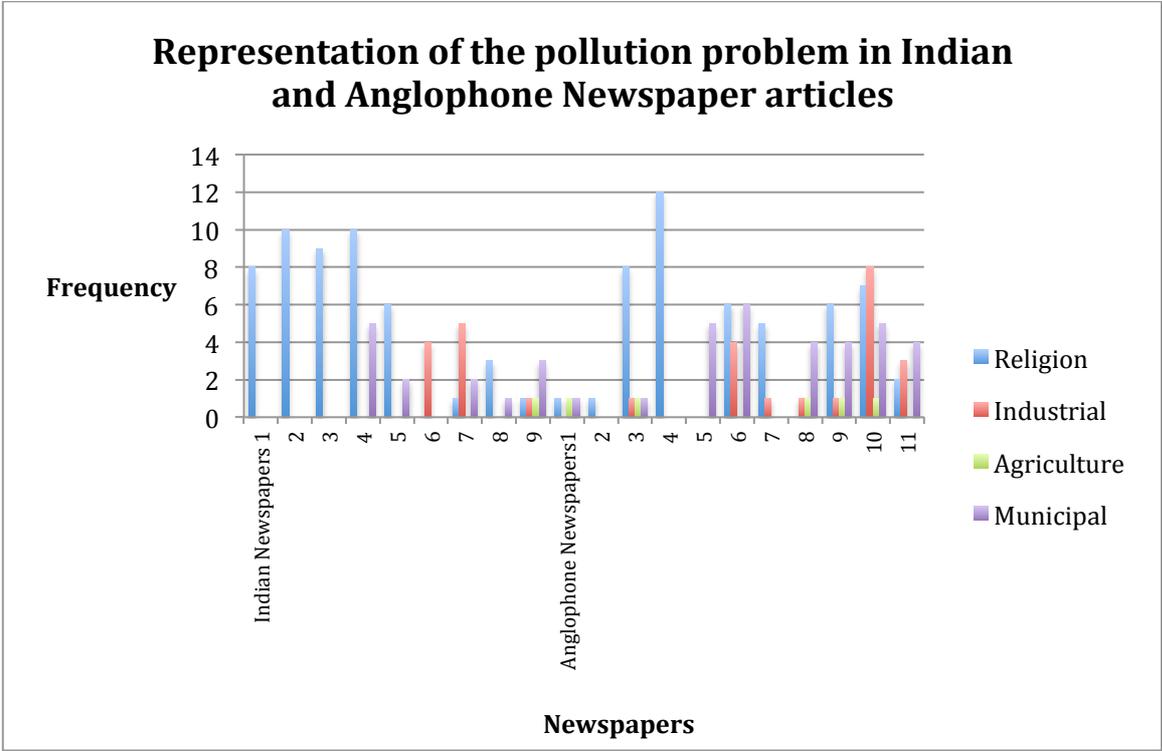


Figure 4: Shows representation of the pollution problem in Indian newspaper articles and Anglophone newspaper articles.

Figure 4 shows that contributions to pollution through religious practices are mostly widely cited followed by municipal waste, industrial waste and agricultural waste in the Indian newspaper articles. Similarly in the Anglophone articles contributions of religious practices are most important, followed by municipal, industrial waste and agricultural waste.

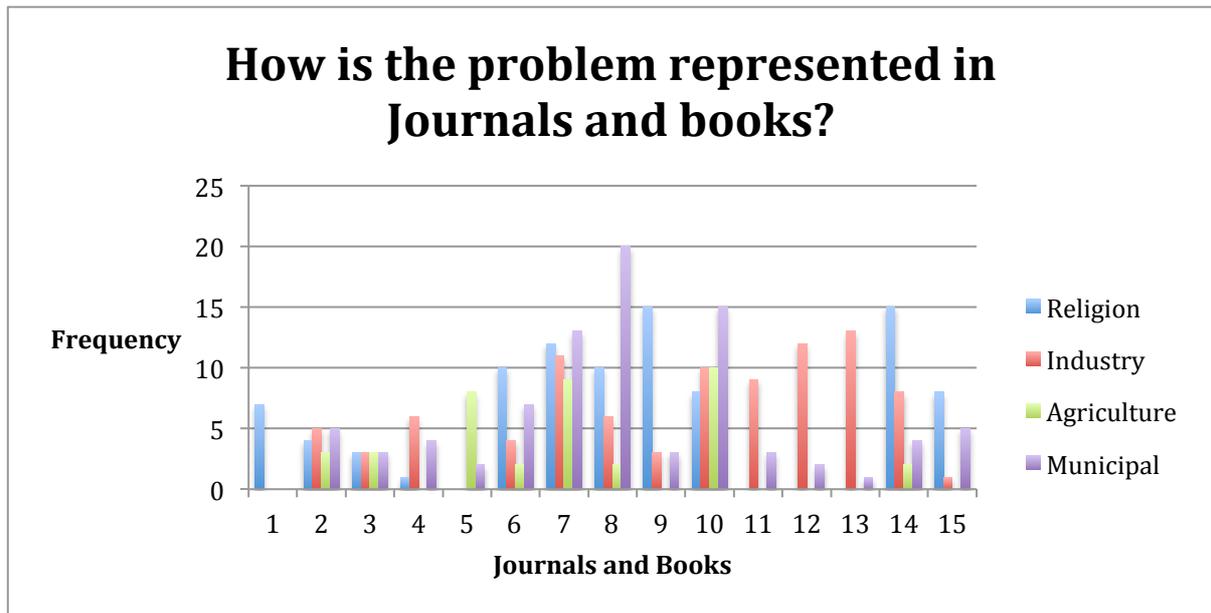


Figure 5: The coloured bars show the frequency of how many times the article/book mentions the four different categories of pollution.

As shown in figure 5 the most commonly occurring type of pollution is municipal waste, which fourteen out of fifteen articles cite. Industrial waste is cited thirteen times, religious practices eleven times and agricultural waste eight times.

Newspaper articles seem to emphasise that the contribution to pollution through religious practices is a main issue in the pollution problem whereas in the scholarly journals pollution through municipal waste release and industrial waste seem to represent the contributions of most of the pollution.

DISCUSSION

By analysing the interviews it mainly showed that people are very much focused on what they do daily to survive. They fail to realise that practices they continue to do are contributing to the pollution of the river. Most of those

interviewed failed to realize that religious practices contribute to pollution. The idea that there are other kinds of pollution that is contributing negatively to the Ganges is considered by the interviewees more than the idea that religious practices are a part of the pollution equation. When asked from an interviewee “which pollution source do you think is polluting river Ganga the most?” most of their answers were, Ganga is a goddess so no matter what kind of pollution she can purify herself and that is why we have faith in her.

People are mainly focused on how the river provides them for rituals, washing, cooking and drinking. But some interviewees who were on pilgrimage from abroad and know more about environmental education were aware of the problem. This is where the focus of the pollution problem shifts. Progressive economic wealth causes human values to shift. When societies undergo a transition toward stability and modernity, individuals of society begin to be more aware of the needs and wants beyond their material needs. People begin to understand their surroundings better, the environment they live in and nature. Thus environmental concern can be found in wealthier nations while some developing countries like India that have significant levels of poverty don't have the luxury to care about the environment as much (Tilt 2010). With globalisation people are moving beyond traditional practices and in India, people who are educated and moving towards adopting western values about the environment are beginning to realise the problems that need to be changed in order to progress.

As the results show above newspaper articles exaggerated the religious festivals and practices as a main contributor to the Ganges River pollution problem. This can be because India is going through the stage of developing the country and these traditional practices are not in alignment with and they are creating more political complications. Even though newspaper articles are not scholarly enough they attract people's attention to an underlying problem that has remained unspoken by people, as it is a sensitive topic. The fact that religion is emphasized more can be a call for more people's attention in pointing out what the Indian government can change to consider the river as a natural resource which needs more attention rather than a spiritual goddess who can purify itself.

In further analysing it is evident that scholarly articles proved that the main contributors of pollution are municipal and industrial waste. Scholarly peer reviewed journals and books have more evidence and contain a lot more research and observations. Based on the information they get journals or books are written therefore it can be said that the contribution of religious practices is not a major issue and the focus of the problem should be aimed at finding a solution to solving municipal and industrial waste problem. Scholarly evidence can of course be wrong but in general scholarly evidence is believed as more true. This suggests that the Ganges River pollution problem is diverged from the actual pollution that is happening and the perceptions about what is contributing to pollution. In reality we have to follow what is proved by evidence. Therefore, it is the duty of the government and officials of India to not get distracted from the reality of the issue that needs protection for continued use.

There are some limitations in my methodology because I haven't conducted statistically significant tests to prove the significance of my data. Also when selecting the Indian newspaper articles the time period of the articles selected were not widely spread like the Anglophone articles. These limitations can be improved in further research to improve the significance of my data.

CONCLUSION

Ganges River is currently facing a lot of pollution that needs to be mitigated soon but who can we blame? When the faults of a problem are complicated the action that needs to be taken to solve a problem gets distracted. What needs to be done is to direct people to the actual problem that needs to be solved immediately and can later focus on the perceptions that are still lingering around the problem.

BIBLIOGRAPHY

- Beg K.R, and Ali S. 2008. "Chemical Contaminants and Toxicity of Ganga River Sediment from up and down Stream Area at Kanpur." *Am. J. Environ. Sci. American Journal of Environmental Sciences* 4 (4): 362–366.
- Bilgrami, K.S, and Sanjib Kumar. 1998. "Bacterial Contamination in Water of the River Ganga and Its Risk to Human Health." *International Journal of Environmental Health Research* 8 (1): 5–13.
- Carpenter, Richard A. 1986. "The Ganges: An Example of Environmental Incongruity." *Environment: Science and Policy for Sustainable Development* 28 (8): 32.
- Crandall Hollick, Julian. 2008. *Ganga: a Journey down the Ganges River*. Washington, DC: Island Press.
- Daftuar, Swati. "Polluted Flows the Ganga." *The Hindu*.
<http://www.thehindu.com/todays-paper/tp-features/tp-youngworld/polluted-flows-the-ganga/article2294996.ece>.
- Davidson, Linda Kay, and David Martin Gitlitz. 2002. *Pilgrimage: From the Ganges to Graceland : An Encyclopedia*. ABC-CLIO.

- Dinar, Ariel. 2007. *Bridges over Water : Understanding Transboundary Water Conflict, Negotiation and Cooperation*. New Jersey: World Scientific.
- Dolnick, Sam. 2011. "Hindus Find a Ganges in Queens, to Park Rangers' Dismay." *The New York Times*, April 21, sec. N.Y. / Region. <http://www.nytimes.com/2011/04/22/nyregion/hindus-find-a-ganges-in-queens-to-park-rangers-dismay.html>.
- Dubey, Sagarika. 2013. "India's Kumbh Mela Festival Draws 120m." *NewsComAu*. <http://www.news.com.au/breaking-news/world/indias-kumbh-mela-festival-draws-120m/story-e6frfkui-1226594339841>.
- Dubey, Vineet Kumar, Uttam Kumar Sarkar, Wazir Singh Lakra, Wazir Singh Lakra, and Wazir Singh Lakra. 2012. "The Influence of Habitat on the Spatial Variation in Fish Assemblage Composition in an Unimpacted Tropical River of Ganga Basin, India." *Aquatic Ecology* 46 (2): 165–174.
- Francis, Elliott. 2012. "£1bn down the Drain in Failed Attempt to Clean up Holy River; India." *The Times*, November 1, 1 edition, sec. News.
- Gandhi, Kishor. 2006. *India's Date with Destiny: Ranbir Singh Chowdhary : Felicitations Volume*. Allied Publishers.
- Gies, Erica. 2009. "Water Wars: Is Water a Human Right or a Commodity?" *World Watch*, April.
- Hamilton, Lawrence S. 1987. "What Are the Impacts of Himalayan Deforestation on the Ganges-Brahmaputra Lowlands and Delta? Assumptions and Facts." *Mountain Research and Development* 7 (3): 256–263.
- Hammer, Joshua. 2007. "A Prayer for the Ganges." *Smithsonian* 38 (8) (November): 74.
- Hamner, Steve, Anshuman Tripathi, Rajesh Mishra, Nik Bouskill, Susan Broadaway, Barry Pyle, and Timothy Ford. 2006. "The Role of Water Use Patterns and Sewage Pollution in Incidence of Water-borne/enteric Diseases Along the Ganges River in Varanasi, India." *International Journal of Environmental Health Research* 16 (2): 113–132.
- Hansson, Sidsel. 2001. "Not Just Any Water : Hinduism, Ecology, and the Ganges Water Controversy". Lund.
- Hardin, Garrett James. 1969. *Population, Evolution, and Birth Control: a Collage of Controversial Ideas*. San Francisco, Calif.: W. H. Freeman.
- Hawley, John Stratton, and Donna Marie Wulff. 1996. *Devi: Goddesses of India*. Berkeley: University of California Press.
- Maclean, Kama. 2008. *Pilgrimage and Power: The Kumbh Mela in Allahabad, 1765-1954*. Oxford University Press.
- Mahr, Krista. "At the Largest Gathering of Humanity, Who Takes Out the Trash?" *Time*. <http://world.time.com/2013/02/12/at-the-largest-gathering-of-humanity-who-takes-out-the-trash/?iid=gs-main-lead>.
- Markandya, Anil, and M. N Murty. 2000. *Cleaning-up the Ganges : a Cost-benefit Analysis of the Ganga Action Plan*. New Delhi; New York: Oxford University Press.

- Nelson, Lance E. 1998. *Purifying the Earthly Body of God: Religion and Ecology in Hindu India*. Albany, N.Y.: State University of New York Press.
- Oreskes, Naomi. 2004. "The Scientific Consensus on Climate Change." *Science* 306 (5702) (December 3): 1686. Academic OneFile.
- Sharma, Bharat, Upali Amarasinghe, Cai Xueliang, Devaraj de Condappa, Tushaar Shah, Aditi Mukherji, Luna Bharati, et al. 2010. "The Indus and the Ganges: River Basins Under Extreme Pressure." *Water International* 35 (5): 493–521.
- Shattuck, Cybelle T. 1999. "Hinduism." <http://site.ebrary.com/id/10062768>.
- Singh, M. 2001. "Heavy Metal Pollution in Freshly Deposited Sediments of the Yamuna River (the Ganges River Tributary): a Case Study from Delhi and Agra Urban Centres, India." *Environmental Geology -berlin-* 40: 654–671.
- Sinha, and Khan. 2001. "Impact of Environmental Aberrations on Fisheries of the Ganga (Ganges) River." *Aquatic Ecosystem Health & Management* 4 (4): 493–504.
- Srivastava, V. K. 2010. "Indian Rivers Pollution-Critical Analysis: Ganga Action Plan." *Indian Chemical Engineer* 52 (2).
- Thakur, Praveen K., Chalantika Laha, and S. P. Aggarwal. 2012. "River Bank Erosion Hazard Study of River Ganga, Upstream of Farakka Barrage Using Remote Sensing and GIS." *Natural Hazards* 61 (3) (April 1): 967–987. doi:10.1007/s11069-011-9944-z.
- Tilt, Bryan. 2010. "The Struggle for Sustainability in Rural China Environmental Values and Civil Society." <http://site.ebrary.com/id/10433224>.
- Tomalin, Emma, and Julian Crandall Hollick. 2002. "Making a Radio Documentary Series About the River Ganges." *Contemporary South Asia* 11 (2): 211–226.
- Trivedi, R. C. 2010. "Water Quality of the Ganga River An Overview." *Aquatic Ecosystem Health & Management* 13 (4): 347–351.

APPENDIX

- Alter, Stephen. 2001. *Sacred Waters : a Pilgrimage up the Ganges River to the Source of Hindu Culture*. New York: Harcourt.
- Anon. 2009a. "Varanasi Notebook: Race to Save the Ganges." *BBC*, November 24, sec. South Asia. http://news.bbc.co.uk/2/hi/south_asia/8375609.stm.
- Das, Subhajyoti. 2011. "Cleaning of the Ganga." *Journal of the Geological Society of India* 78 (2): 124–130.
- 2009b. "World Bank in India Ganges Loan." *BBC*, December 3, sec. South Asia. http://news.bbc.co.uk/2/hi/south_asia/8392118.stm.
2012. "The Ganges and the GAP: An Assessment of Efforts to Clean a Sacred River." <http://dx.doi.org/10.3390/su4081647>.
- 2013a. "Kumbh 'Raised Ganges Pollution'." *BBC*, January 24, sec. India. <http://www.bbc.co.uk/news/world-asia-india-21175890>.
- 2013b. "India's Kumbh Mela Ends." <http://blogs.wsj.com/indiarealtime/2013/03/10/indias-kumbh-mela-ends/>.

- “Ganga Continues to Shift Away from Patna.” *The Times Of India*.
http://articles.timesofindia.indiatimes.com/2013-04-02/patna/38217092_1_river-ravindra-kumar-sinha-ganga.
- “Ganga The River Goddess - Tales in Art and Mythology.” *Exotic India*.
<http://www.exoticindia.com/article/ganga/>.
- “Ganga: Goddess of the Holy River.” *About.com Hinduism*.
<http://hinduism.about.com/od/godsgoddesses/a/ganga.htm>.
- “Hindu Festival Brings 70 Million to Ganges.” *The Independent*.
<http://www.independent.co.uk/news/world/asia/hindu-festival-brings-70-million-to-ganges-430613.html>.
- “Inequality Gap Between Rich and Poor Widens.” *NDTV.com*.
<http://www.ndtv.com/article/india/inequality-gap-between-rich-and-poor-widens-250651>.
- Kartha, D.K.M. 2009. “THE DESCENT OF THE RIVER GANGES Anonymous | Hindu.” *Parabola -new York*- 34 (2): 56–73.
- Kumar, Hari. 2013. “Massive March for Yamuna River Nears Delhi.” *India Ink*.
<http://india.blogs.nytimes.com/2013/03/11/massive-march-for-yamuna-river-nears-delhi/>.
- Kumar, Nitin. 2003. “Ganga The River Goddess Tales in Art and Mythology.” *Exotic India*.
- McDougall, Dan. 2012. “THE RIVER THAT LOST ITS SOUL; The Ganges, India’s Most Sacred River - and the Very Symbol of the Sub-continent - Is Dying. Its Waters Have Suffered Appalling Pollution While the Government Turns a Blind Eye to Industries Pumping in Lethal Chemicals as the Indian Economy Takes Off.” *The Sunday Times*, July 29.
- Morrison, Karen E. “A River Runs Through It.” *Latitude*.
<http://latitude.blogs.nytimes.com/2012/05/21/ganges-cleanup-will-cost-tens-of-billions-of-dollars-but-is-a-great-idea/>.
- Najar, Nida. 2011. “India Aims \$1 Billion at Sacred but Filthy Ganges.” *The New York Times*, June 14, sec. World / Asia Pacific.
<http://www.nytimes.com/2011/06/15/world/asia/15ganges.html>.
- “Plan to Clean Holy River Fails to Stem Tide of Filth - New York Times.” *New York Times*. <http://www.nytimes.com/1994/10/18/science/plan-to-clean-holy-river-fails-to-stem-tide-of-filth.html?pagewanted=all&src=pm>.
- “Rampant Use of Plastic at Varanasi Ghats.” *The Times Of India*.
http://articles.timesofindia.indiatimes.com/2013-04-02/varanasi/38216949_1_ghats-vmc-purifiers.

