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PUBLIC PERCEPTION REGARDING POLLUTION OF THE RIVER GANGA: CASE STUDY AT DAKHINESWAR

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Abstract

The River Ganga 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. The purpose of this study is to analyze public perception about what factors have led to the current polluted state, and how general citizens of India who use the river perceive this problem. Total 250 randomly chosen respondents from Dakhineswar which is a well-known pilgrimage site in West Bengal, were interviewed through close-ended questionnaire. Out of 250 respondents, 120 are local residents of Dakhineswar who live along and near the river Ganga and rest people visit Dakhineswar temple for religious purposes. It is a widely recognized perception that sewerage system and industrial waste are contributors of pollution to the Ganges and less emphasis has given on ritual practices. The respondents have identified that imposition of strict fines on people and industrial agencies for throwing waste into the water to be the most favoured solution to improve the condition of the river. Despite everything,

Key Words:
Public perception;
Pilgrimage site;
Sewerage system;
Industrial waste;
Strict fines.

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they are optimistic about the success of "*Swachh Bharat Abhiyan*" in improving the water quality of the river. However, the astonishing fact is that, many respondents believe in drinking and bathing in this sacred river is not injurious to their health simply because 'she' is a goddess and she has the ability to purify herself and can cure all their problems.

1. 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 (Wickramasekera, 2013). 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 (Kishor, 2006). 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 km. Currently about half a billion people live within the river basin, at an average density of over 500 per square km, and this population is anticipated to rise to over one billion people by the year 2030 (Srivastava, 2010).

Millions of Hindu views 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 the Indo European immigrants who settled in north-western 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). Ganga's water is said to be the "sustaining immortal fluid of mother's milk" (Hawley & Wulff, 1996). 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. All 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 litres of untreated sewage run directly into river. 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 (Bilgrami, 1998). 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. The Ganga 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).

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) 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 litres (Hollick, 2008). According to the GAP both point sources and non point sources were identified as polluters to the Ganges River (Srivastava, 2010). 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. The municipal sewage includes wastewater from fast growing urban areas, organic waste, sewage, trash, food and animal remains (Trivedi, 2010). The non point sources of pollution were also considered in GAP. Non point source pollution is waste that is 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. 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. Aluminium 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). 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). 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). Polluted river water can also affect the aquatic life and ecosystem (Dubey, 2012).

2. Methodology

Since this research study involves public perception, the method to collect the data is based on a quantitative approach, namely a questionnaire. The questionnaire is divided into two parts, part A (demographic profile) and part B (public perception regarding pollution of the river Ganga). The study has conducted at Dakhineswar, a well known pilgrimage site of West Bengal. Total 250 respondents have randomly chosen and interviewed. Out of 250 respondents, 120 are local residents who live along and near the river Ganga and rest people visit Dakhineswar temple for religious purposes. To interview people, here I have applied 'close-ended' approach. However, respondents' own opinion regarding pollution problem have also emphasized.

3. Result and Discussion

The entire study can be divided into two parts, demographic profile of respondents and their perception regarding pollution of the river Ganga.

3.1. Demographic Profile of Respondents

Table 1. Age-Sex Structure of Respondents

Age Group	**Male**	**In %**	**Female**	**In %**
< 20	5	4.13	4	3.10
21-30	29	23.97	27	20.93
31-40	53	43.80	59	45.74
41-50	20	16.53	22	17.05
>50	14	11.57	17	13.18
Total	121	100.00	129	100.00

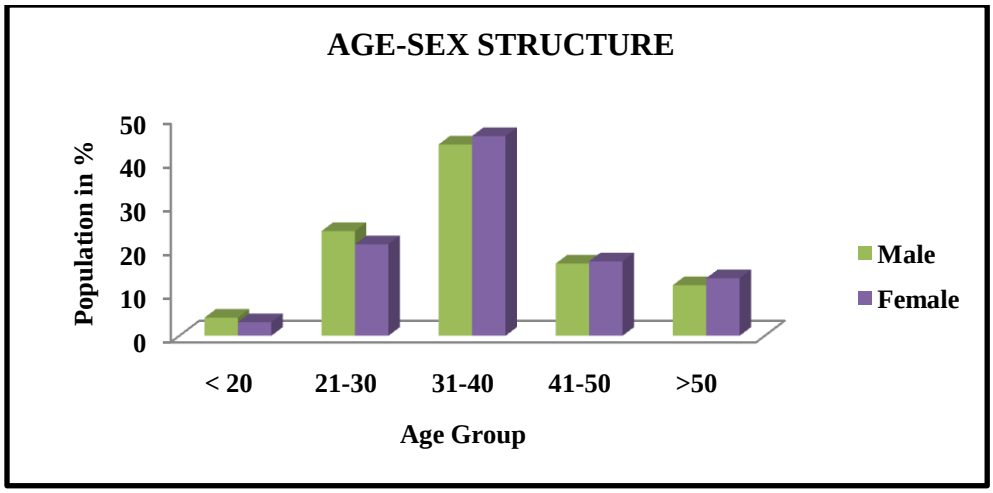

Figure 1. Age –Sex Structure of Respondents

Table 2. Educational Level of Respondents

Educational Level	**Male**	**In %**	**Female**	**In %**
Illiterate	13	10.74	20	15.50
Primary	29	23.97	27	20.93
Secondary	26	21.49	24	18.60
Higher Secondary	26	21.49	32	24.81
Graduate	18	14.88	15	11.63
Post Graduate	9	7.44	11	8.53
Total	121	100.00	129	100.00

Table 3. Occupational Status of Respondents

Occupation		**Male**	**In %**	**Female**	**In %**
Unemployed		36	29.7	55	42.6
Employed	Government	17	14.0	21	16.3
	Private	36	29.7	25	19.4
	Self-Employed	32	26.5	28	21.7
Total		121	100.00	129	100.00

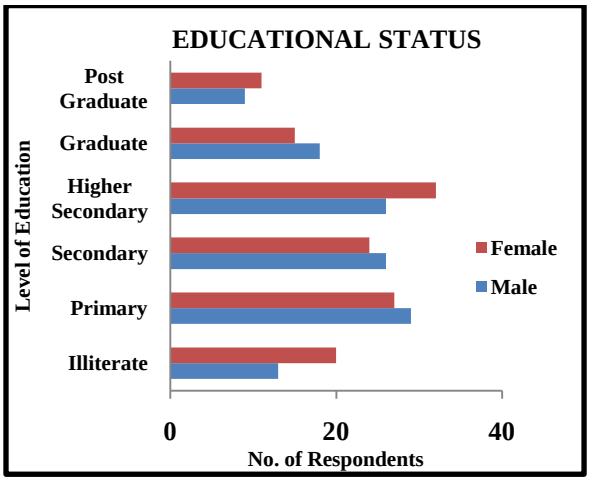

Figure 2. Educational Status of Respondents

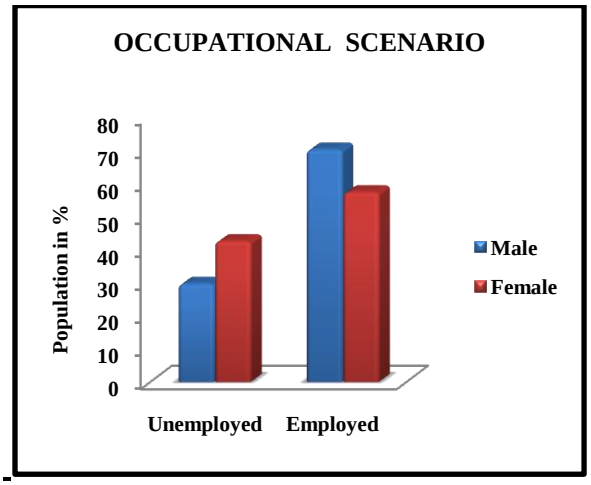

Figure 3. Occupational Scenario of Respondents

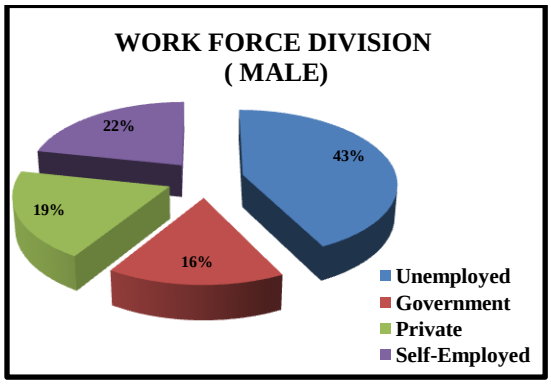

Figure 4. Male Work Force Division

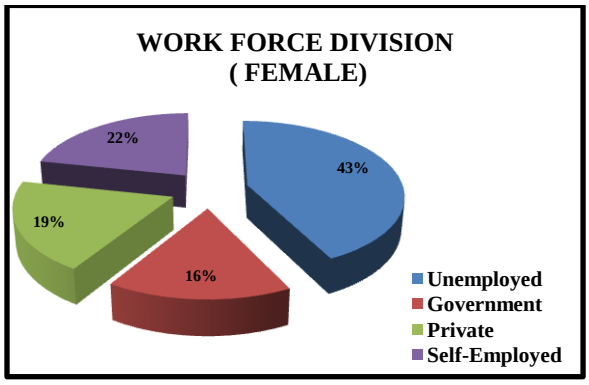

Figure 5. Female Work Force Division

Table-1 and Figure-1 represent the detail information regarding the age-sex structure of respondents. Among 250 respondents, 121 are male (48%) and rest of them are female (52%) and a majority of respondents belong to the age group of 31-40 years with the number of 112 (44.8 %). 9.2% respondents are illiterate (Male-13 & Female-20).Most of them have only continued their study until higher secondary level (164 or 65.6%). Very few of them have able to

complete graduation & post-graduation studies (4.7%). Table 2 and Figure 2 have clearly depicted the educational status of respondents. Lots of respondent are unemployed (36.4%) and most of the employed respondents are self employed or working in private sectors. Only 15.2% of them are engaged in government sector. Table 3 and Figure 3, 4 & 5 have thoroughly sketched out the occupational scenario of respondents.

3.2. Public Perception regarding pollution of the Ganga at Dakhineswar

Table 4. Basic Environmental Perception

Serial No.	**Category**	**Yes**		**No**		**Not Sure**	
		F	**%**	**F**	**%**	**F**	**%**
1	Water is the habitat of aquatic life.	239	95.6	6	2.4	5	2
2	Evaporation of polluted water from river will cause air pollution (bad odour).	97	38.8	91	36.4	62	24.8
3	River water pollution weakens soil structure and causes erosion and sedimentation of river basin.	143	57.2	39	15.6	68	27.2
4	Polluted water in the river causes disease, cause aquatic animals to die.	109	43.6	98	39.2	43	17.2
5	Water pollution can cause the loss of soil nutrients and will affect the plant species.	125	50	37	14.8	88	35.2
6	Polluted water in river can affect the ecosystem.	120	48	81	32.4	49	19.6

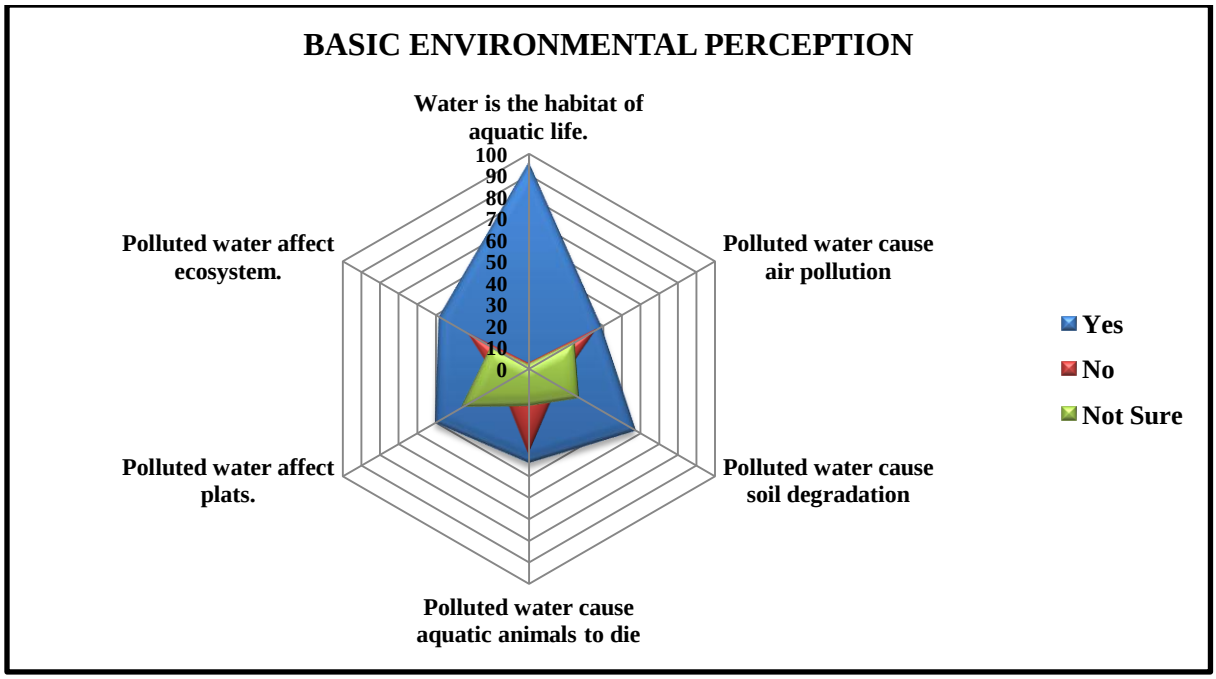

Figure 6. Basic Environmental Perception of Respondents

Table 4 and figure 6 depict the basic environmental perception of the respondents. Most of the respondents strongly agree that water is the habitat of aquatic life (95.6%). When a river is polluted, it can cause disease, poisoning, and death in aquatic animals, and become a habitat to dirty animals (43.6%). So, a majority of respondents strongly agreed that polluted water in river will affect the ecosystem (48%). At the same time, evaporation of polluted water from the river will cause air pollution (38.8%). On the other hands, polluted water can cause the loss of soil nutrients and weaken the soil structure, which can lead to erosion and sedimentation of river basin (57.2%) and affect the plants species (50%).

Table 5. Perception about the water quality of the Ganga

Questions	All figures in %				
Do you think river Ganges is polluted?	YES – 90.2			No – 9.8	
How do you mainly	Visual	Fisher	Educatio	Friends &	Social

know about the pollution of river Ganges?	perception	men	nal Institutio n	Family	Media
	63.7	34.3	16.1	17.5	41.2
What are the main sources of pollution?	Municipal Waste	Human Waste	Industria l Waste	Dumping site near river	Religious practices
	71.2	35.4	75.4	65.9	33.8
Water quality compared to 10 years ago	Better	Worse	Same	Don't know	
	8.8	39.4	29.7	22.1	
Since when the River Ganga has been contaminated?	No contamina tion	< 5 year	5-10 year	>10 year	No Idea
	9.4	23.2	28.4	30.4	7.6

Table 5 has depicted the public perception about the water quality of the river Ganga. Most of the people have agreed that the Ganga River is polluted (90.2%). Majority of respondents have come to know about the Ganges pollution from visual perception of river water and social media. They have identified municipal waste (71.2%), industrial waste (75.4%) and dumping site near the river (65.9%) are vulnerable for the water quality of this sacred river. There was no clear consensus among those who said the water quality has gotten better as to why it has improved. More than one third respondents have claimed, water quality of this river has worsened day by day and contamination of the Ganga has taken place more than ten years ago.

Most of those interviewed failed to realize that religious practices contribute to pollution. The idea is that there are other kinds of pollution that is contributing negatively to the water quality of the Ganges. Only, 35.4% respondents have agreed that religious practices are also responsible for Ganges pollution. 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.

Table 6. Use of the Ganges water

Do you use the Ganges water regularly?	Yes - 36.4		No – 63.6	
Do you face any problem due to use of the water?	Yes - 51.2		No - 48.8	
If yes, what are the types of problem?	Water born diseases	Diarrhoea	Skin diseases	Respiratory infection
	61.6	53.6	65.2	21.8

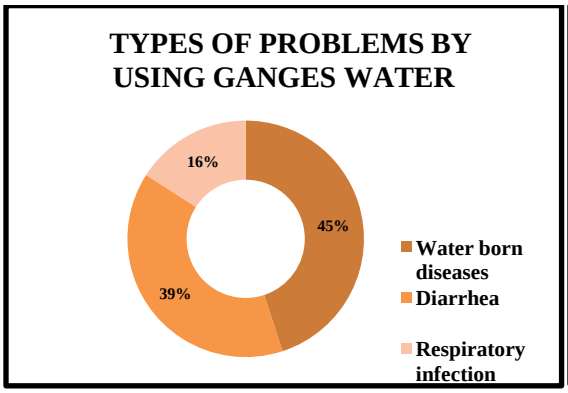

Figure 8. Problems for Using Ganges Water

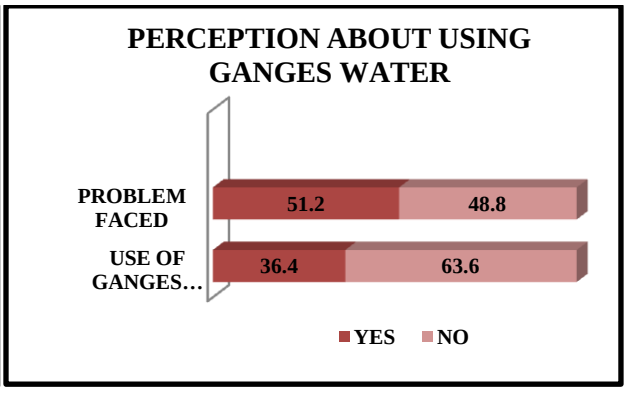

Figure 9. Perception about Using Ganges Water

Table 7. Perceived Safety of River Ganges Water at Dakhineswar

Serial No.	Category	*Figures in %*			
		Very Safe	Somewhat Safe	Unsafe	No Idea
1	Domestic use/ Daily use	14.3	22.5	61.6	1.6
2	Bathing/ Swimming	49.2	35.8	12.2	2.8
3	Drinking	7.2	10.6	76.4	5.8
4	Consuming fish	69.8	23.7	3.1	3.4

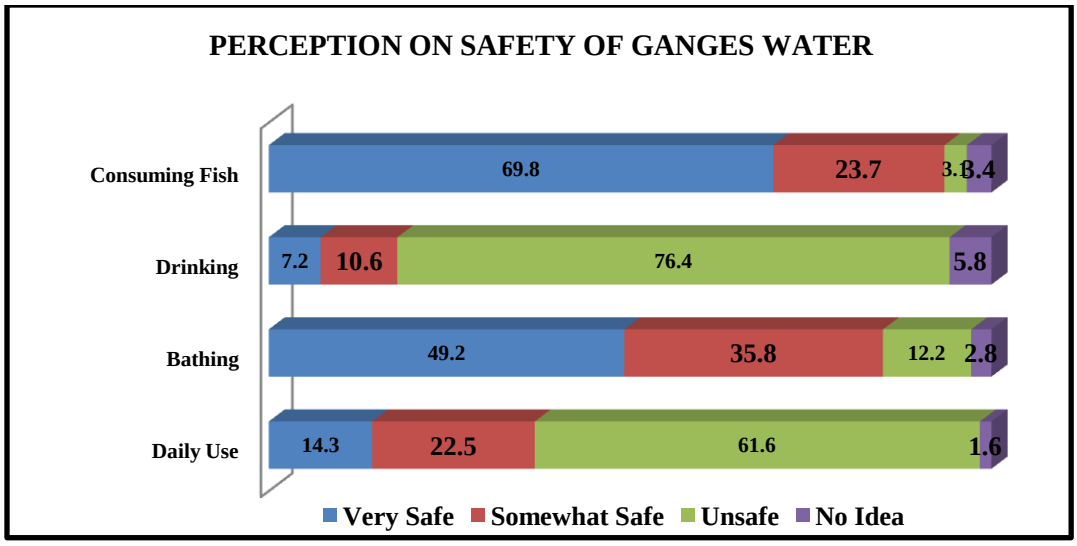

Figure 10. Perception on Safety of Ganges Water

More than one third respondents have used the Ganges water on a regular basis and 51.2% people have faced various problems like water born diseases (61.6%), Diarrhoea (53.6%), skin diseases (65.2%) and respiratory infection (21,8%) due to use of the water. Residents hold mixed views of the safety of the Ganges water at Dakhineswar. A majority of respondents (69.8%) felt it is safe to consume fish from the river. In contrast, over two- thirds of them have identified drinking from the Ganga is very injurious for health. Over half of respondents (61.6%) it is unsafe for daily use but near about half of them have found no risk in bathing or swimming in this river (Table 7 and figure). People are mainly focused on how the river provides them for rituals, washing, cooking and drinking. But few 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).

Table 8. Perception about How to mitigate the problem

Who should take initiative to solve or mitigate the problem?	State Govt.	Central Govt.	Local Authority	Local People	NGO	Joint co-operation
	51.2	67	59.3	48.2	23.2	93.4
How the problem will be decreased?	Awareness of people	Imposing heavy fines	Strict rules & regulation	No dumping at river		
	65.3	70.4	45.8	89.5		
Do you optimistic about the success of "*Swachh Bharat Abhiyan*"	Yes	No	Not Sure	Don't know		
	69.8	11.9	14.2	4.1		

Approximately 90% of respondents have mentioned that not throwing or dumping any waste material to the river will be the most effective measurement to reduce the pollution of river Ganges. When respondents were asked about possible measurement to solve the problem, most of respondents identified imposition of strict fines on people throwing waste into the water to be the most favored solution to improve the condition of the river and they have also emphasized on the public awareness (65.3%) because majority of them have believed that individual citizens were responsible for the current condition of the river. More than 60% of respondents were optimistic about the success of "*Swachh Bharat Abhiyan*"in improving the water quality of the river.

4. Conclusion

The survey aimed to gauge the perception, awareness, opinion and behavior of people towards the Ganges pollution at Dakineawar. The present study has shown that local residents and pilgrims of Dakhineswar are well informed about the water quality of the Ganga. Most of respondents are agreed that Ganges River is polluted due to rapid development on landuse and uncontrolled human activities. When the Ganga is polluted, it affects aquatic animals such as poisoning, death and possible extinction. Pollution will also affect ecosystem, spread various

dangerous diseases, affect the quality of human life through bad odour and acid rain, cause groundwater to be polluted and decrease quantity of freshwater for drinking, affect plant species and weaken the soil structure through causing the loss of soil nutrient, as well as lead to natural disasters for local residents. 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). Therefore, the government, private sector, non-governmental organizations (NGOs), and local residents should work together to protect the river and to mitigate the problem of water pollution.

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