



Assessing the Economic Impact of Water Pollution – A Case Study of Musi River Hyderabad, India

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Abstract

The Millennium Development Goals measure 'access to improved drinking water using an indicator that defines access as the presence of an improved water source within 1 kilometer of a person's dwelling. Water Pollution is one of the major problems in the urban and peri-urban areas in the world; it shows the positive and negative effect on the environment as well as human. The main source of pollution of the river is untreated or partially treated domestic and industrial wastewater from the urban area of Hyderabad. This paper mainly focuses on the four villages under Musi river downstream villages namely pratapa singaram, Enkiryala, surapally and Aroor among these four villages. Here I am using two sets of questionnaires one is household and second village questioner and ten percent of the random sampling in each village. The people spend more income on buying of fresh water. In Pratapa Singaram the annual expenditure is Rs.1,08,000/-, Enkiryala is Rs. 7,79,640/-, Surapally is Rs. 6,33,600/- and Aroor is Rs. 16,92,000, total water expenditure in the selected villages is Rs.- 32,30,000, in this selected villages most of the households were daily engaged on fetching of water from various locations of the nearby villages, the income pattern of the selected villages were indicate that their income spend more on buying fresh water this shows that the negative impact on the downstream villages people income.

Keywords: Water cost, water pollution, income distribution.

Introduction

Two million tons of waste per day are discharged to receiving waters human waste industrial wastes and chemicals agricultural wastes. An approximate estimate of global wastewater production is about 1,500 km³ per day¹. A large populace still does not have access to safe water. The planning commission has budgeted USD 26.5 billion in the 2012-2017 plan for providing safe water to all urban and rural Indians. Treatment of waste water, sewage treatment and solid, liquid and chemical waste, water technology, environmental services, desalination companies, consulting and engineering are some services that India will require to tackle the water problem. India spends less than USD 5 per person as compared to USD 28 in US Per capita availability of fresh water in India has dropped from 5,177 cubic meters in 1951 to 1,820 cubic meters in 2001². Fetching water is an extremely risk the amount of time and energy individuals – typically women, male and children – must spend on this chore limits opportunities for obtaining education, becoming more economically productive and even relaxing and socializing at home³, for further most of the physical effort required in transporting heavy loads of water over distance often has a substantial negative impact on a person's physiological and nutritional health⁴, the water consumption patterns in rural communities⁵, the gender role in the developing world⁶. The time/energy costs of domestic life in the developing world⁷.

To examine water fetching exclusively, in detail, and with a broad examination of the associated consequences on individual and community health are few and far between⁸.

The Hyderabad city discharges about 600 million liters per day untreated sewerage water into Musi River. Additionally, 14 industrial estates in Bollaram, Jeedimetia, Saroor nagar, Uppal, Nacharam, Mushirabad, Azamabad etc drain their untreated industrial effluents into Musi near Uppal. There is an effluent treatment. The water in Musi is now having high degree of effluents like heavy metal, phenols, oil, grease, alkaline, and acids. Consequently, the people in the down stream are receiving dangerous toxic chemicals directly from the river. The drinking water in entire area is brought from distant places, by spending lots of money. There are at least 30 villages with a population of 1.00.000 that are directly affected in this region. Moreover, besides the members, many of the industries transport the toxic wastes away from their locations and dump them somewhere roadside, which pollute the entire ground waters in the vicinity. The problems became more acute with chemical effluent joining the sewerage. The surface water pollution finally polluted the groundwater and consequently affecting drinking water. According to the Irrigation department information the number of villages affected by groundwater pollution are 6 villages in Ghatkesar Mandal, 13 villages in Pochampaliy Mandal, and 12 villages in Valigonda Mandal of 31 villages, spread in two districts

namely, Ranga Reddy and Nalgonda. These villages are located placed within a distance of 50 km from the city.

Research Methodology

We propose to take four villages, one at head reach, second at middle reach, third and fourth at the tail-end. We propose to study the impact in four villages namely, Pratapa Singaram (located 15 Km away from Amber Pet Treatment Plant), Enkiryal (30 Km away from Amber Pet Treatment Plant), Surapally (45 Km away from Amber Pet Treatment Plant), and Aroor (60 Km away from Amber Pet Treatment Plant) The study can bring out the impact on various economic activities in the process. The study has two sets of data from each village. One is at village level, we call it village survey, and second one is household survey. The total number of households in the study area is 2,385. The sample for the present study consists of 10 percent random sample of total households in each village. The coverage has brought out the extent and nature of problems at different points. The study covered all castes, all types of traditional and non-traditional occupational households⁹.

Results and Discussion

The population in the selected villages were stratified into OC, BC, SC and ST. From each group a ten percent sample was selected randomly. Among the sample households, BC households were more and the OC households were less in number. The entire sample together, there were 240 households selected for the study. Out of the selected villages, Enkiryal has highest sample of 92 households and lowest in Pratap Singaram. The details of the village wise selected sample households were given in the table-1

Table no-2, shows that 15 percent of the respondents were earning below Rs.10,000/-. The data shows that the poverty is less among the respondents, to compare with the respondents earning below Rs.40, 000/- were more than the respondents earning above Rs.40, 000/-, In Pratapa Singaram, due to para grass cultivation, demand for agricultural labour, the respondents in the group of Below Rs.10,000/- were less in number. In Enkiryal, due to death of fish and pollution related problems which are more when compared to others, the percentage in below Rs. 10,000/- category was more. Next in order comes Surapally in below Rs.10, 000/- group.

Table-1
Caste Wise Distribution of Sample Households in the Selected villages Under Musi River

Caste	Pratap Singaram		Enkiryal		Sur pally		Arooru		Grand Total	
	T.H.H	S.H.H	T.H.H	S.H.H	T.H.H	S.H.H	T.H.H	S.H.H	T.H.H	S.H.H
OC	10	1	110	11	20	2	35	4	175	18
BC	320	32	500	50	70	7	410	41	1300	130
SC	105	11	300	30	130	13	100	10	635	64
ST	10	1	10	1	250	25	5	1	275	28
Total	445	45	920	92	470	47	550	56	2385	240

Key: T.H.H= Total Households S.H.H= Selected Households Source: Field srvey, 2009

Table-2
Income Distribution Of The Respondents In Sample Villages (Rs./

Name of the Village	Below 10,000	10,000-20,000	20,000-30,000	30,000-40,000	40,000-50,000	50,000-60,000	60,000-above	Total No
Pratapa Singaram	2 (4.44)	13 (28.8)	11 (24.4)	6 (13.3)	5 (11.1)	3 (6.6)	5 (11.1)	45 (100)
Enkiryal	18 (19.56)	21 (22.82)	17 (18.47)	19 (20.65)	1 (1.86)	6 (6.52)	9 (9.78)	92 (100)
Surapally	9 (19.14)	10 (21.27)	13 (30.95)	6 (14.28)	4 (9.52)	2 (4.76)	3 (7.14)	47 (100)
Aroor	7 (12.5)	11 (19.64)	16 (28.5)	7 (12.5)	5 (8.9)	5 (8.9)	6 (10.7)	56 (100)
Total	36 (15.0)	55 (22.9)	57 (23.7)	38 (15.8)	15 (6.25)	16 (6.6)	23 (9.5)	240 (100)

Key: Rs/-= Rupees in Indian Currency Brackets in percentage Source: Field Survey 2009

Table-3
No of Persons Engaged in Fetching of Water in Various Places of the Selected Villages

Name of the village	Fetching Of Water (<18 Years)	Fetching Of Water (>18 Years)	Total No. Persons Engaged In Fetching Of Water
Pratapa singaram	1	2	3
Enkiryala	35	48	83
Surapally	15	26	41
Aroor	11	36	47
Total	62	112	174

Key: No= number Source:Field survey 2009

Above table shows that the number of persons engaged in the fetching of water daily, they are totally loss of their work efficiency due to fetching of water, and also the burden of the family they are not engaged in any other work. In pratapa singaram village most of the households not buying of water due to the municipal water of Krishna goes from this area. Less than 18 years are engaged to fetching of water is only one person, plus 18 years were two, total three persons were engaged in the fetching of water daily. In Enkiryala village most of the people were buying water for the drinking as well as other usage purposes, but the water plant is not nearby their households, they are going by walk and getting the water in their head, so this is very painful, and the every household one person must be involved in the fetching of water daily, 83 persons were engaged daily fetching of water, so this is negative impact on the household income of the people and also very high burden of the family. In surapally viallge water plant away from two kilometers of the village, so it also difficult to buying the water, but 43 households engaged in fetching of water daily, this is also negative impact on the family. In Aroor Village the water plant in not nearby village, it is locate 6 kilometers away from the village, some of the persons are purely engaged on the fetching of water, actually 20 liters water bottle in the water plant is Rs.5/- , but whose are engaged in the fetching water they take commission for each 20 litters bottle Rs.2/- so the total cost of the 20 liters water bottle is Rs.7/-, regularly 47 persons engaged fetching of the water from water plant. The overall picture shows that the people most of them were engaged fetching of water from different locations in their villages.

In Pratapa Singaram, water from Krishna River is coming. That is why; purchase of water is less in this village (6.6%). The purchase of water is only for drinking water and the quantity is 20 liters. The annual expenditure for drinking water was Rs/- .10, 800. Among the caste groups, OC and BC are purchasing water BC are 6.65 pre cent purchasing SC and ST are not purchasing water. The details were given in table no-4.

The water problem is conspicuous in Enkiryala village. 90 percent of the respondents are purchasing drinking water and 21 percent of the respondents are purchasing water for cooking purpose. The data shows that the affordability also varies among the caste groups. It was cent percent in OCs for drinking purpose. It also shows the level of compulsion to

purchase water. The annual expenditure Rs.79, 640/- shows the burden on the families to purchase water. SCs are very less percent to purchase the drinking water (13.33). Here the water price of 20 liters are only Rs.3/-. Unfortunately nobody bothers to purchase water for the livestock which is supplementing their income. The details were given in table no-5.

The water problem is acute in Surapally village also. The data shows the pressing need for purchase of water. Here also the respondents purchase drinking water and for cooking purpose. The overall expenditure on the drinking water in the village respondents are Rs.63, 360/-, drinking water are purchased 87.22 percent and also cooking purposed were 19.14 percent. OC are sent percent purchase drinking water and cooking purpose is only 50 percent of the respondents, here also there is no purchase of water for the cattle. The details were given in table no-6.

The water problem is conspicuous in Aroor village. 83.92 percent of the respondents are purchasing drinking water and 12.5 percent of the respondents are purchasing water for cooking purpose. The price of water for 20 liters is Rs.10/-, it is very high to comparatively other selected villages. That is more burden to the village people they are spending on water for annum is Rs. 1, 69,200/-.The details were given in the table-7. The data shows that the affordability also varies among the caste groups. It was cent percent in OCs for drinking purpose. It also shows the level of compulsion to purchase water. ST are not purchase the drinking water. Unfortunately nobody bothers to purchase water for the livestock which is supplementing their income. The details given in table no-7.

Overall picture shows that there is a pressing need for fresh water and due to water pollution people are over burdened with expenditure on water. In Pratapa Singaram the annual expenditure is Rs.1, 08,000/-, Enkiryala is Rs. 7, 79,640/-, Surapally is Rs. 6, 33,600/- and Aroor is Rs. 16, 92,000/-.. Aroor spent more expenditure on water, followed by Enkiryal, Pratapa Singaram and Surapally. Total expenditure of the water in the selected villages is Rs./- 32,30,000, this indicate over burden on the people in this villages, according to income distribution of the villages are very less but they are spending water cost is very high it come down the status of the people

of the downstream villeges. The variation of water expenditure in four villages, they are unable to purchase drinking water but forced to do so. There is no other alternative. Few are purchasing water for cooking purpose also. The cost of water is varying in the sample villeges. So there is variation for the

same 20 liters in the annual expenditure if compared. The variation is also due to filter stations in Enkariyala and Surapally. The details were given in table explanation of the details was given in table -9.

Table-4
Purpose Wise Purchase And Cost Of Water By The Respondents in Pratapa Singaram

Caste	S.HH	Purchased Water		Water Cost				Not Purchased						
		Drink ing	Cook ing	Qunt .litters	Pries (20 lts)	Monthly Expnd.	Annual expend.	Drink ing	Cook ing	Bath ing	Wash ing	Clean ing	Live stock	Others
OC	01	01	-	20	10	300	3600	-	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)
BC	32	02	-	20	10	300	7200	30 (93.75)	32 (100)	32 (100)	32 (100)	32 (100)	32 (100)	32 (100)
SC	11	-	-	20	10	-	-	11 (100)	11 (100)	11 (100)	11 (100)	11 (100)	11 (100)	11 (100)
ST	01	-	-	20	10	-	-	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)
Total	45	03 (6.60)	-	-	-	-	10800	42 (93.33)	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)

Key: S.H.H= sample household, expnd = expenditure Source: Field Survey 2009

Table-5
Purpose wise purchase and cost of Water by the respondents in Enkiryal

Caste	S.H H	Purchased water		Water cost				Not purchased						
		Drinking	Cooking	Qunt .litters	Pries (20 lts)	Monthly Expnditure	Annual expenditure	Drink Ing	Cook Ing	Bath ing	Wash Ing	Cleani ng	Live stock	Others
OC	11	11	06 (54.54)	20	03	90	11880		05 (45.45)	11 (100)	11 (100)	11 (100)	11 (100)	11 (100)
BC	50	46 (92)	10 (20)	20	03	90	49,680	4 (8)	40 (80)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)
SC	30	25 (83.33)	4 (13.33)	20	03	90	27,000	5 (16.6)	26 (86.66)	30 (100)	30 (100)	30 (100)	30 (100)	30 (100)
ST	1	1	--	20	03	90	1,080	-	-	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)
Total	92	83 (90.21)	20 (21.73)				79,640	9 (9.78)	72 (78.26)	92 (100)	92 (100)	92 (100)	92 (100)	92 (100)

Key: S.H.H= sample household, brackets=percentage Source: Field Survey 2009

Table-6
Purpose Wise Purchase and Cost of Water by the Respondents in Surapally

Caste	S.HH	Purchased water		Water cost				Not purchased						
		Drinking	Cooking	Qunt .litters	Pries (20 lts)	Monthly Expnd.	Annual expend.	Drink Ing	Cook ing	Bath Ing	Wash ing	Cleaning	Live stock	Others
OC	2	2 (100)	1 (50)	20	4	120	2880	--	1 (50)	2 (100)	2 (100)	2 (100)	2 (100)	2 (100)
BC	7	6 (85.71)	2 (28.57)	20	4	120	8,640	1 (14.28)	5 (71.42)	7 (100)	7 (100)	7 (100)	7 (100)	7 (100)
SC	13	11 (84.61)	1 (7.69)	20	4	120	15,840	2 (15.38)	12 (92.30)	13 (100)	13 (100)	13 (100)	13 (100)	13 (100)
ST	25	22 (88)	5 (20)	20	4	120	36,000	3 (12)	20 (80)	25 (100)	25 (100)	25 (100)	25 (100)	25 (100)
Total	47	41 (87.22)	9 (19.14)				63,360	6 (12.76)	38 (8.85)	47 (100)	47 (100)	47 (100)	47 (100)	47 (100)

Key: S.H.H= sample household, brackets=percentage Source: Field Survey 2009

Table-7
Purpose wise purchase and Cost of Water by the Respondents in Aroor

Caste	S.HH	Purchased water		Water cost				Not purchased						
		Drinking	Cooking	Quant .litters	Pries (20 lts)	Monthly Expnd.	Annual expend.	Drink Ing	Cook Ing	Bath Ing	Wash Ing	Cleaning	Live stock	Others
OC	4	4 (100)	1 (25)	20	10	300	14,400	--	3 (75)	4 (100)	4 (100)	4 (100)	4 (100)	4 (100)
BC	41	36 (87.80)	5 (12.19)	20	10	300	1,29,600	5 (12.19)	36 (87.80)	41 (100)	41 (100)	41 (100)	41 (100)	41 (100)
SC	10	6 (60)	1 (10)	20	10	300	21,600	4 (40)	9 (90)	10 (100)	10 (100)	10 (100)	10 (100)	10 (100)
ST	1	1 (100)	----	20	10	300	3600	--	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)	1 (100)
Total	56	47 (83.92)	7 (12.5)				1,69,200	9 (16.07)	49 (87.5)	56 (100)	56 (100)	56 (100)	56 (100)	56 (100)

Key: S.H.H= sample household, brackets=percentage Source: Field Survey 2009

Table-8
Purpose Wise Purchase of Water and Cost of the Water by the Respondents in selected villages (Pratapa Singaram, Enkiryal, Surapally and Aroor)

Name of the Village	S.H.H	Purchased water		Water Cost			Not Purchased						
		Drink Ing	Cook ing	Quantity (litters)	Price (20) litters	Annual Expend Rs/-.	Drink Ing	Cook Ing	Bath Ing	Wash Ing	Clean Ing	Live Stock	Others
Pratap singrm	45	03 (6.60)	---	20	10	10,800	42 (93.33)	45 (100)	45 (100)	45 (100)	45 (100)	45 (100)	45 (100)
Enkiryal	92	83 (90.21)	20 (21.73)	20	3	79,640	9 (9.78)	72 (78.26)	92 (100)	92 (100)	92 (100)	92 (100)	92 (100)
Surapally	47	41 (87.22)	9 (19.14)	20	4	63,360	6 (12.76)	38 (8.85)	47 (100)	47 (100)	47 (100)	47 (100)	47 (100)
Aroor	56	47 (83.92)	7 (12.5)	20	10	1,69,200	9 (16.0)	49 (87.5)	56 (100)	56 (100)	56 (100)	56 (100)	56 (100)
Total	240	174 (72.50)	36 (15.0)	-----	----		66 (28.0)	160 (67.0)	240 (100)	240 (100)	240 (100)	240 (100)	240 (100)

Key: S.H.H= sample household, brackets=percentage Source: Field Survey 2009

Table-9
Annual Water Expenditure of Selected Households In the Selected Villages

Name of The Village	Annual Expenditure (Rs/-)
Pratapa Singaram	1,08,000
Enkiryal	7,79,400
Surapally	6,33,600
Aroor	16,92,000
Total	32,30,000

Key: Rs/= rupees in Indian currency Source: Field Survey 2009

Conclusion

It is clear urgent need to pay attention to the problem of water pollution in the downstream area. An scientific study of problem of pollution and its socio economic implications, it should be under taken a massive movement has to be launches to create among the people and to bring pressure on the government to tackle this problem, it may be observed that the problems arising out of pollution of River Musi have to be tackle two levels, and they must taken up simultaneously. The sources of pollution have to be tackling in the Hyderabad Metropolitan city itself, where which is the source of pollution the governments have to initiative urgent effective measure to control pollution

causing industries and set up treatment plants for industrial effluents and there by minimize pollution of river. The drainage and sewerage system also need to be totally modernize for the same reason. To establish the safe food, safe water and safe sustainability

At the village level itself it is necessary to identify the sources of pollution and provide remedial measures. It is necessary to give top priority provision of safe drinking water and improving the medical facilities for the affected people, Similarly measures have to initiative macro and micro level to improve the soil conditions, the quality of irrigation and drinking water provide for growth of lively hood in the non-farming sectors like

poultry, dairy, related village level industries. The overall situation shows that there is a pressing need for fresh water and due to water pollution people are over burdened with expenditure on water. They are unable to purchase drinking water but forced to do so. There is no other alternative. In selected four villages the water quality is not fit for drinking as well as usage of other purposes, so this indicate the burden of the family income to purchase the water, and also most of the people spend their time for fetching of water, this is adversely affect on the income of the selected villages of Musi River. So the government will take immediate action for the control of water pollution, and to motivate the awareness programmes for the people of the downstream villages.

Scope for the Further Research: Water pollution is creating so many problems, when the people getting the pure water for the purpose drinking as well as all other purposes they need not bather, but most the developing countries having less water treatment plants for the treat of the polluted water, that will destroyed the soil and ground water, due to that everyone can affected, so the government can take action to control the water pollution, provide safe drinking water for the people.

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