

A History of Arsenic Pollution Communication in West Bengal in the light of Bengali Print Media (1982-2012)

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Water is essential for the existence of everyone. Now a day's water pollution has been emerging as an important environmental problem. There are two sources of water one is surface and another is subsurface water. In this present research I would like to explore the nature of a subsurface water pollution communication i.e. arsenic pollution communication in the light of Bengali print media of West Bengal (here after W.B).

Arsenic is a natural component of the earth's outer layer and is widely distributed throughout the environment in the air, water and land. It is highly toxic in its inorganic form. People are exposed to elevated levels of inorganic arsenic through drinking contaminated water, using contaminated water in food preparation and irrigation of food crops, industrial processes, eating contaminated food. World Health Organization says that the greatest threat to public health from arsenic originates from contaminated groundwater. Inorganic arsenic is naturally present at high levels in the groundwater of a number of countries, including Argentina, Bangladesh, Chile, China, India, Mexico, and the United States of America.¹ If we go through some statistics related to the global water volume then it can be said that only 0.58% of Global Water Volume is originated from ground water and soil moisture.² But in case of W.B as well as India this source became a crucial source to get drinking water or water for agriculture. For an example mention may be made of the *West Bengal Human Development Report 2004*, where it was clearly mentioned that in the state of W.B the main source of water is rainfall but since 1980s tapping of ground water has been a major activity of rural panchayat (a unit of village administration) of the state.³

In India arsenic contamination of subsurface water was first detected in Punjab in 1976 .In 1982 in W.B, India's first case of arsenicosis⁴ was found. In this article I will try to historicize this process and nature of communication from 1982, when the first case of arsenicosis diagnosed in W.B to 2012 when this communication process is completing three decades.

Following Denis McQuail, I would like to depend upon the technological aspects of mass media to specify several types of mass media. On the basis of technology mass media can be divided into five types. These are print media, film, broadcasting media, recorded music and new electronic media (based on computer or telemetric media).⁵

The United Nations' Conference on the Human Environment held at Stockholm in 1972, maybe considered as the starting point of environmental communication. Prior to that, several individual initiatives were taken to protect the environment. Among them the name of Rachel Carson may be mentioned for communicating environment through her book *Silent Spring* (1962). But it was the Stockholm Conference which raised the voice for environmental awareness internationally. While mentioning the significance of the United Nations Conference on the Human Environment or Stockholm Conference, the *Encyclopedia of Environmental Issues* says that it was the first international conference held to address global environmental issues and the proceedings helped to raise awareness around the world.⁶

In West Bengal environment became a very important issue not during 1970s but during 1980s. Because in the year 1981 for the first time (acclaimed by *Bijnan o Bijnankormi*) W.B witnessed science rally in the Kharagpur which was organized by the students of the Kharagpur IIT (on 8th March, 1981) and then in the same year in Kolkata another science rally was organized with the help of 16 science clubs (on 2nd August, 1981) to commemorate P.C Roy's 121th birthday.⁷

From the very beginning, W.B faced the challenge to tackle refugee problem.⁸ But in the public sphere environment acquired significant place in Bengal from the beginning of 20th century. For an example, in the second decade of 20th century undivided Bengal got a magazine *Prokiti* (means Nature), which was edited by ornithologist Dr.Satyacharan Laha. This magazine was started in 1924. *Prokiti* mainly dealt with the wildlife. Pollution was not the main thrust of the magazine. In the 2nd issue of the year 1924 of *Prakriti* magazine the issues of decrease in the water flow of the Bhagirathi stream of river Ganga was discussed by Sureshchandra Dutta. In this article the issues of water pollution (surface or subsurface) was not mentioned but it was a beginning of a thought process regarding water in the beginning of 20th century Bengal.⁹

Water pollution got its importance in the first special environmental pollution issue of *Amader Bijnan Jagat* (September –December, 1983) where a separate article *Paribesh Dushan o Tar Pratikar* by Manish Pradhan was published to communicate several pollution and their way outs. Here only surface water pollution was described. Although an article of post 1982 W.B it failed to understand the importance of subsurface water pollution i.e. arsenic pollution.¹⁰ But in March, 1987 issue of *Ki Ke o Keno*, the representative magazine of *Murshidabad Zillah Bijnan Parisad*, the issue of arsenic pollution was raised and communicated for the first time. In March, 1987 issue of *Ki Ke o Keno* an article *Kaler Jale Arsenic: Ekti Maratmok Samasya* by Dr. Paritosh Bhattacharya was published. Here it was mentioned that arsenic contaminated water had become a major problem in tapping of subsurface water in the districts of South and North 24 Parganas, Murshidabad. In this article, it was also mentioned that the High Court of Kolkata has ordered to seal several tube wells at Barasat (district of South 24 Parganas) to prevent the use of arsenic contaminated water. In the locale of Habra of the same district arsenic was found in several tube wells. In this way the article tried to communicate the scenario of arsenic pollution along with the detailed technical discussion of the arsenic as natural component of the earth in a very lucid way. But the problem was new to the people of W.B. So the article failed to identify the actual cause of the arsenic contamination in the subsurface water.¹¹ Actually the answer was not known to the Government of W.B too, because the issue was new to them. It was revealed in a report, published in the *Bartaman* newspaper on 15th April, 1987. Here it was mentioned that on 14th April, 1987 the secretary, Labour Department, Government of W.B had confessed before the press that the government was not aware of the causes behind the arsenic contamination.¹²

In this situation another report was published in the March –April issue (1988) of *Bijnan o Bijnankormi of Paschbanga Bijnankormi Sanstha* (a science organization of Kolkata). The report was on the survey made by Ashoknagar Science and Socio-cultural Forum on the arsenic affected area of Ashoknagar (District of North 24 Parganas). It was clearly mentioned that State Government had not been taking this issue seriously and a large number of arsenicosis affected people of that locale were compelled to go to the quacks because they were poor and not getting adequate treatment in the local hospitals. In the survey report it was depicted that in the locale of Ashoknagar more than 80% tube wells were arsenic affected.¹³

In the last half of 1980s the basic nature of the arsenic pollution communication was to uphold the deadly face of the arsenicosis and to make people aware of this new type of water pollution. In this decade the causes of this pollution was less known to the communicator as well as to the government of W.B. So the technique of prevention of arsenic pollution was not the main target of the communicators, they were eager mainly to communicate the negative outcome of arsenic upon human being.

According to the functionalist theory of mass communication it can be said that media is an institution of the society which can play several role to communicate information or to manage social tension on the basis of social needs.¹⁴ It can be said that from the last half of 1980s this role was played by the Bengali print media in case of communicating arsenic pollution.

In the July-October issue of *Bijnan o Bijnankormi* (1992) an article named *Paniya Jale Sneko Bish* by Rabin Majumder was published. This article discussed that under National Drinking Water Mission a project had been running since 1988 in W.B. In 1992, the State Government formed an advisory committee to combat this pollution. This article tried to give a clearer picture regarding the causes of the arsenic contamination compare to the article published in the *Ki Ke o Keno* in the last half of 1980s. Actually this article tried to communicate the recent developments regarding the cause of arsenic pollution.¹⁵ Another informative article was published in the August-September issue (1992) of *Jana Bijnaner Istahar of Paschimbanga Bijnan Mancha*. Arabinda Das in the article named *Prasanga Arsenic* tried to clarify arsenic and arsenic related problems scientifically. It was suggested that to prevent arsenic pollution people can use filter specially designed by School of Tropical Medicine and All India Institute of Hygiene and Public Health to purify arsenic contaminated water. In this informative article it was also mentioned that several Universities like Jadavpur University along with the Government of India and Government of W.B had been working to combat this pollution.¹⁶

Here it is also important to note that not only local magazines or weeklies, widely circulated Bengali dailies like *Anandabazar Patrika*, *Aajkal*, *Sangbad Pratidin*, *Kalantar*, *Bartaman* also started to address this pollution from 1980s and they emphasized on photography to communicate arsenic pollution. This trend added a new dimension to the history of arsenic pollution communication process through print media. A news was published on 20/06/1993 in *Anandabazar Patrika* (here after *A.B.P*) where the scenario of arsenic pollution of W.B along with a map was depicted. It was mentioned that 28 police station areas of seven districts of W.B were affected by the arsenic pollution. These were North 24 Parganas, South 24 Parganas, Howrah, Nadia, Murshidabad, Malda and Burdwan. It was also mentioned that Gautam Deb, Minister in Charge, Department of Public Health Engineering, Government of W.B, (here after P.H.E), admitted that arsenic pollution had been turning into a social problem too. Minister mentioned that he had been receiving reports that young women of arsenic contaminated areas were not able to marry due to the presence of arsenicosis in the their locale. The Chief Engineer of P.H.E also admitted this. In this way such news helps us to understand how pollution had been creating social problem also.¹⁷

On 14/12/1995, *A.B.P* published news where it was mentioned that for not having access to the safe drinking water, 5 villagers of Purulia were compelled to drink dirty pond water.¹⁸ In the previous example it was manifested that the Bengali print media tried to uphold the spread of this

pollution and also prescribed some of the way outs to solve this problem. But apart from this, the Bengali print media also tried to communicate the history of combating arsenic pollution also. On 16/10/1996 news was published in *Sandhya Aajkal* where it was mentioned that from the beginning of 1980s arsenicosis started to spread in the state and in 1984 and 1991 State Government formed several commissions to combat this pollution. The commission's report of 1991 mentioned that 31 blocks of W.B had been affected by the arsenic contamination. A photograph within the news was published, where it was depicted that experts from Japan were examining the arsenic affected person. A ray of hope twinkled in this news.¹⁹ In this year another article by Suniti Kumar Mondal was published in the in the September –October issue of *Jnan O Bijnan*. In this informative article chemical analysis of arsenic along with its geological status was mentioned.²⁰

News was published in the *A.B.P* on 24/10/1996 just after the publication of feature on arsenic in *Sandhya Aajkal*. In the *A.B.P* on 24/10/1996 it was clearly mentioned that the State Government was not serious regarding this issue. Here it was mentioned on the basis of the statement of the district level health officer, the residents of Garapota area of the Bongaon (District of North 24 Parganas) had been drinking subsoil water as a safe source of water. But a survey made by the School of Environmental Studies (Jadavpur University) on that area on 28th August 1996 opened the Pandora's Box. The report revealed that the area's subsurface water was highly arsenic polluted. This actually raised a question against the authenticity of the sample collected and tested by the district health officers.²¹ On the same date another news was published in *A.B.P* where it was mentioned that school students of several areas of districts of Nadia, Malda, Murshidabad, Burdwan, Hoogly, South 24 Parganas and North 24 Parganas were drinking arsenic contaminated water from tube well unknowingly that they were actually taking poison. A survey was conducted by collecting samples from 570 schools' premises of the above mentioned 7 districts organized by the School of Environmental Studies (Jadavpur University) unearthed this reality. Here the helplessness of school authorities was also revealed.²² In this way Bengali print media expressed the hard reality. On the same day *A.B.P* published news where the social dimension of this arsenic pollution was highlighted. It was mentioned that in several arsenic affected villages of Domkol and Jalangi area of the district of Murshidabad, young men and women were compelled to give up their aspirations to marry due to the arsenicosis disease.²³ This way Bengali print media tried to communicate the social dimension of this pollution. Apart from this in the next year Bengali print media also highlighted non-governmental activities to communicate this pollution. Here mention may be made of two news items published on 03/04/1997 in *Aajkal* where arsenic pollution was communicated. In one of these two news, the fate of the arsenicosis affected people of two blocks i.e. Karimpur-I and Karimpur-II was communicated with photographs of an affected person. Here name of a science organization Breakthrough Science Society (Kolkata)²⁴ was mentioned which had been working voluntarily in Nadia to combat arsenic pollution.²⁵ News on initiative taken by an aged resident of Halisahar retired person Anil Pal to combat arsenic pollution was published in *Aajkal*. He actually tried to make people aware of this pollution. The report revealed that he voluntarily had been collecting sample drinking water from the householders of his locale and sending them to the laboratory of the School of Environmental Studies (Jadavpur University) to check the quality of the water. In this way he had been trying to make people aware of this pollution in his own district i.e. North 24 Parganas. This news also mentioned the name of *Bijnan Darbar* (Kachrapara) as a science organization whose members had joined hands to combat this

pollution in the district of North 24 Parganas through campaign. In this way Bengali print media tried to highlight the role of voluntary organizations too.²⁶

On the one hand Bengali print media started to highlight this issue on the other hand they started to unearth new dimensions of the pollution. A news was published in *A.B.P.*, on 10/11/1997 where the problem of inadequate infrastructure was addressed. It was mentioned that W.B's one and only Arsenic clinic of S.S.K.M Hospital (Kolkata) of that time compelled to refuse 13 patients of a family of Barasat area of the district of North 24 Parganas due to lack of infrastructure.²⁷

After a long gap the state government finally started to develop infrastructure to combat this pollution. Such news published in the *A.B.P.* on 6/12/1997. The state Government has decided to start a separate cell under the Department of Health and Family Welfare to combat arsenic pollution. Prior to this, Public Health Engineering Dept. was entrusted for this job.²⁸

But what was the perception common people regarding arsenic pollution, and what was the reality? For an example mention may be made of two letters published in *A.B.P.* on 27/12/97 by Joydev Jana of undivided district of Medinipur²⁹ and Tushar Bhattacharya of Murshidabad district. Joydev Jana's letter reflected that the scientific causes of the arsenic contamination of the subsurface water is known to him and through the news paper he had been trying to communicate and disseminate his knowledge to the larger audience. Letter of Tushar Bhattacharya reflected the scenario of the Murshidabad. He had written his letter as a reaction of news (published in *A.B.P.* on 15/11/97) that Japan Government had decided to give financial assistance to combat the arsenic pollution of the district of North 24 Parganas. Shri Bhattacharya mentioned that Murshidabad should be a claimant of the Japan Government's financial assistance. He also argued that in the name of testing of arsenic contamination level of the subsurface water in Murshidabad, several non-government organizations had been making money, who have no those do not have any legal right to examine the water.³⁰ Actually the condition of this district was not good. It can be traced from several local weeklies like *Murshidabad Sandesh* too.³¹ *Langol*, a representative magazine of the *Halisahar Sanskritik Sanstha*, in their November 1997 issue published a survey report on arsenic pollution of North 24 Parganas, conducted by the *Bijnan Darbar (Kachrapara)* with the help of Centre of Environmental Studies (Jadavpur University). The report revealed that *Bijnan Darbar* had tested 249 sample of subsurface water collected from several household and public tube wells. Most of the results of the samples manifested the presence of the arsenic in the subsurface water.³²

In the next year a report was published in *Sangbad Pratidin (here after S.P)* by Debashis Bhattacharya solely on arsenic pollution in W.B, India and Bangladesh. Here the finding of the retired Head of the Dept. of Dermatology, School of Tropical Medicine Dr. K.C. Saha was reported with photograph. Dr.Saha suggested using surface water to the residents of the arsenic polluted areas because that may be a safer source of drinking water. In 1998 too arsenic continued to gain the importance of media which helps us to understand the history of combating this pollution too. Another news was published in *S.P* on 12/11/1998 where the anxiety among the people related to the deadly face of this pollution was communicated. Here it was clearly mentioned that this pollution is a silent killer and it should be treated as threat to the Indian public health.³³

In 1998 a post editorial was published in *A.B.P.* on 23/12/1998 by the director of the School of Environmental Studies(Jadavpur University) Dr. Dipankar Chakraborty³⁴ reflected the anxiety regarding arsenic pollution in the capital city of W.B along with the scenario of the state.

This also shows the role of Bengali Print media regarding arsenic pollution. On 20/06/1993 in *A.B.P* a news stating that 28 police station areas of seven districts viz. North 24 Parganas, South 24 Parganas, Howrah, Nadia, Murshidabad, Malda and Burdwan were affected by arsenic pollution was published. But the degenerating scenario was depicted in the article by Dipankar Chakraborty on 23/12/1998. He mentioned the district of Hoogly along with other 7 districts mentioned earlier (on 20/06/1993 in *A.B.P*). So with the help of print media we can trace the spread of arsenic pollution in West Bengal. Here author proposed to start rainwater harvesting to avoid subsurface water too.³⁵

In the next year we can also trace that the Bengali mass media tried to highlight this pollution and tried to play functionalist role of media. In this year we can see that several non-governmental organizations started to test drinking water in free of cost or at a very nominal charge which depicts the lack of governmental establishment to combat arsenic pollution. On 10/05/99 two reports were published in *A.B.P* and *Aajkal*. These two news highlighted the initiative taken by Breakthrough Science Society (Kolkata). This organization established a laboratory at Kolkata to test arsenic contamination of the subsurface water in a very low cost (Rs.20/-).³⁶ In response to the news published in *Aajkal* Joydeb Dey, the Secretary of *Bijnan Darbar* (Kachrapara), wrote a letter to communicate that their organization had been testing drinking water, collected from several household, or premises located in the districts of Nadia, North 24 Parganas and Hoogly, from the laboratory of School of Environmental Studies (Jadavpur University) without any cost since 1996.³⁷

A ray of hope twinkled. During 21st century a demand for safe and purified surface water was raised along with the awareness regarding arsenic pollution among the people from the affected areas of W.B. A reporting on a workshop at Kolkata on arsenic pollution on 30th March, 2000, was published in *A.B.P* on 31st March, 2000. Here affected person from Malda, Nadia, Murshidabad and North 24 Parganas attended the workshop. They took oath to start campaign to make people aware of the pollution and the disease arsenicosis. Group photo of arsenicosis affected persons came from Deganga area was also printed on the top of the news. In the picture they actually uncovered their palm and foot two shows the effect of the arsenicosis on their skin. In this way Bengali print media tried to communicate the deadly faces of the arsenic pollution through photograph also.³⁸ Two reports were published on the measures to communicate arsenic pollution in W.B on 11/1/2000. In one news the measures taken by the employees of the Department of Public Health Engineering, Government of W.B was mentioned. In another news a report about inauguration of a mobile van with a laboratory to test arsenic contamination was published.³⁹ This actually reflects the attitude of the Government. Voluntary organizations like *Bijnan Darbar* believed that the laboratories should reach to the doorsteps of the people and since 1990s they had started to serve people by collecting sample from the doorsteps. But government of W.B had failed to understand this reality in the last century. Because the 1st mobile van with laboratory was inaugurated on 10/1/2000. But in last part of 20th century state government started to acknowledge this problem as an environmental problem and mentioned that indiscriminate tapping of subsurface water actually resulted the spread of this pollution in a report published by Department of Environment, Government of W.B.⁴⁰

But how far government has achieved success to combat this problem in 21st century? If we go through several news published in Bengali print media in the 1st decade of 21st century, we will find a negative scenario. For example mention may be made of several news and public

opinion published in *A.B.P* in 2000 and 2001. A letter by Joydev Jana a resident of the district of South 24 Parganas was published on 6/03/2000, where it was mentioned that in the interior areas of Kakdwip (a subdivision of the district) subsurface water had been used indiscriminately for the purpose of cultivation. He raised his voice and appealed to the government of W.B to start project for rain water harvesting as a preventive measure. This letter depicts common people's awareness.⁴¹ But the problem continued. Another news was published on 7th April, 2000 where it was mentioned that in several villages of the district of Murshidabad like Rajapur (a village situated in Domkal Subdivision⁴²) people have committed suicide due to suffering from arsenicosis. In this news the fate of the Rajapur village was mentioned where farmer Jahangir Husain lost his 17 family members for arsenicosis. This news traced scope of massive embezzlement of funds, allotted for the infrastructural development for safe drinking projects, by the local administration. A photograph of arsenicosis effected farmer of Rajapur, Fazal Karim Mondal was also printed in the top of the news who uncovered his palm and foot to show the affect of arsenicosis upon his skin. This way with visual image Bengali print media highlighted this issue properly.⁴³

In *A.B.P* on 28/01/2002, news on the attitude of Food and Agriculture Organization of United Nations⁴⁴ mentioned that due to use of subsurface arsenic contaminated water for agriculture in W.B and Bangladesh large number of cultivated crops became arsenic contaminated.

In this way a demand for alternative safe source of water was raised in W.B, trend of which can be traced with the help of several news published in several Bengali print media. The administrative failure regarding combating arsenic pollution was also depicted in news published in *A.B.P* on 22/03/2004. Here the arsenic contamination level of the subsurface water of Sonarpur area of Baruipur Subdivision⁴⁵ was depicted. Here it was also mentioned that local administration has been neglecting this issue.⁴⁶ The print media tried to communicate this pollution but the state government was not interested to highlight this problem. In 2004 1st W.B Human Development Report was published where one and half pages out of 232pages were devoted to this issue.⁴⁷

Arsenic pollution is mainly a pollution of southern part of W.B. The districts of Northern W.B as mentioned in the official website of North Bengal Development Department, Government of W.B were slightly arsenic affected. According to the Human Development Report, Government of W.B only Malda⁴⁸ among the districts of Northern W.B is badly affected by this pollution. But arsenic pollution actually created awareness throughout W.B. For example, a letter on 18/06/2007 was published in north Bengal edition of *A.B.P* where a resident of a non-arsenic contaminated district of Coochbihar, W.B Kalyan Das expressed his concern towards expanding sphere of arsenic pollution in southern W.B.⁴⁹ As I have mentioned earlier that from the beginning of 21st century the state government started to combat this pollution much more actively. This was reflected in the print media too. A news was published in *S.P* on 08/08/2008 where the progress of Rs.2500 crore project, to combat arsenic pollution in West Bengal was mentioned. Another news published in *A.B.P* on 17/08/2010 also shows the activeness of the local administration regarding this issue. In that news positive role of the mayor of Kolkata Municipal Corporation regarding arsenic pollution was mentioned.⁵⁰

How far the situation changed in two decades after the detection of arsenicosis in W.B? On the occasion to communicate World Water Day (22th March) *Prokiti o Manush*, science and

environment page of *Kalantar* newspaper, published a special page on water pollution on 25th March 2013.⁵¹ Here Suresh Kundu wrote an article on scenario of arsenic pollution in W.B which gives us a detail description of the state of arsenic pollution in W.B, two decades after the detection of arsenicosis in W.B. Here author have tried to mention that the situation is alarming. He has mentioned that by giving fees for trade license businesspersons are taking subsurface water indiscriminately for supplying packed water which is opening another Pandora's Box.

But in this degenerating scenario the Bengali print media have not stopped their positive role. In the year 2014 a 234 paged Bengali book has been published by National Book Trust solely on arsenic and fluoride pollution which shows that Bengali print media is still taking this matter seriously.⁵² In the present year Bengali print media is continuing its role. For an example mention may be made of Bengali magazine *Ekak Matra*'s special issue on scarcity of drinking water. Here out of 7 articles on drinking water one by Jayanta Das is solely dealt with the problem of arsenic pollution.⁵³ Actually it is a fight for safe drinking water and I think the communication process will show a new way to solve this problem. During the second half of nineteenth century Bengal when British officers started to purify the water of river Ganga for drinking at Palta (1868) at that time too Bengali society took this issue of safe drinking water seriously and tried to communicate the concept of safe drinking water⁵⁴ like recent times. So the context and time is changed but the demand for safe drinking water is still relevant.

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- ³⁰ Two letters by Joydev Jana and Tushar Bhattacharya, were published in *A.B.P* (Kolkata) on 27/12/1997.
- ³¹ On the first page a report was published with headline *Jillahr Besh Kichhu Sthamer Jale Arsenic* in *Murshidabad Sandesh* (Berhampur) on 10/12/1994. It shows that local weeklies were taking this matter seriously.
- ³² A news was published with headline *Arsenic Dushaner Anusandhani Pratibedan*, in *Langol* (November issue, 1997), A Bengali representative magazine of *Halisahar Sanskritik Sanstha*, (Cultural Organization of Halisahar).
- ³³ Two news was published in *S.P* (Kolkata) on 12/11/1998.
- a) *Paschimbanga o Bangladeshe Arsenic Dushan Sobcheye Beshi*
b) *Arsenic Dushone Mara Jete Pare Kayek Hajar* in *S.P*
- ³⁴ His cooperative attitude and his positive role from 1980s to combat arsenic pollution have been mentioned by Joydev Dey, activist of *Bijnan Darbar*, *Kachrapara* in an interview taken by present researcher. Date of interview 16/10/14 at *Kachrapara*, West Bengal.
- ³⁵ A post editorial was published with headline *Paschimbange Arsenicer Bipad Kolkatao Kintu Nirapod Nay* in *A.B.P* (Kolkata) on 23/12/1998.
- ³⁶ A news was published with headline *Jale Arsenic Pariksha Ebar Kuri Takatei* in *A.B.P* (Kolkata) on 10/05/1999. Another news was published with headline *Arsenic-er Matra Janar Byabastha* in *Aajkal* (Kolkata) on 10/05/1999.

- ³⁷ A letter by Joydev Dey, secretary, Bijnan *Darbar* (Kachrapara) was published on 18/05/1999 in *Aajkal* (Kolkata) on 18/05/1999.
- ³⁸ A news was published with headline *Arsenic-Daitwar Biruddhe Sanghabaddha Laraier Angikar Akrantrader* in *A.B.P* (Kolkata) on 31/03/2000.
- ³⁹ Two news was published on 11/1/2000 in *A.B.P* (Kolkata). Headlines were
- a) *Arsenic :Kal Theke Prochare Cycle Abhijan*
 - b) *Jal Parishes Chalu Bhramyaman Rasayanagar*
- ⁴⁰ *Report on the Status of Environment in West Bengal*, Department of Environment, Government of W.B, 1998.p.47.
- ⁴¹ A letter by Joydev Jana, a resident of the district of South 24 Parganas, was published in *A.B.P* (Kolkata) on 06/03/2000.
- ⁴² Official website of the District of Murshidabad. <http://murshidabad.nic.in/AdminSetup.aspx> (Accessed on 06/03/15 at Kolkata.)
- ⁴³ A news was published with headline *Jahar Chhara Jal Nei Rajapur Grame* in *A.B.P* (Kolkata) on 07/04/2000.
- ⁴⁴ Official Website of Food and Agriculture Organization of United Nations. <http://www.fao.org/about/en/> (Accessed on 24/03/15 at Kolkata.)
- ⁴⁵ Official Website of the district of South 24 Parganas. <http://s24pgs.gov.in/s24p/page.php?nm=SubDivision> (Accessed on 24/03/15 at Kolkata.)
- ⁴⁶ A news was published with headline *Paner Jale Bish ,Prashashan Ghumachchhei* in *A.B.P* (Kolkata) on 22/03/2004.
- ⁴⁷ *West Bengal Human Development Report 2004*, Development and Planning Department, Government of West Bengal, Kolkata, 2004.pp.132-133 &186.
- ⁴⁸ *West Bengal Human Development Report 2004*, op.cit.pp.132.
- ⁴⁹ A letter by Kalyan Das was published in North Bengal edition of *A.B.P*, on 18/06/2007.
- ⁵⁰ A news was published with headline *Arsenic Dushan Niyantrane Abashese Udyogi Mayor* in *A.B.P* (Kolkata) on 17/08/2010.
- ⁵¹ A feature by Suresh Kundu with headline *Jale Arsenic: Jeneshune Bish Korechi Pan* was published in *Kalantar* (Kolkata), dated, 25/03/2013.
- ⁵² Manindra Narayan Majumder, Paribesh O Janaswashthye Arsenic O Fluoride, National Book Trust, New Delhi, 2014.
- ⁵³ Jayanta Das, *Jeneshune Bish,Ekak Matra*(R.N. WBBEN/2000/1678),(September issue),Kolkata,2015.p.14.
- ⁵⁴ Pratik Chakrabarty, *Purifying the River: Pollution and Purity of Water in Colonial Calcutta* in *Studies in History* (Vol.31, issue.2), Sage, New Delhi, 2015.pp.178-205. (<http://sih.sagepub.com>)