



## *Rivers of the World Foundation, Inc.*

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### **Barak River Reconnaissance and Water Quality Screening Program, Feb. 2011**

By Subijoy Dutta , P.E..<sup>1</sup>

The Barak River flows on the North/North East side of Silchar , Assam through a floodplain commonly known as the Barak Valley. During monsoon the Barak valley is routinely impacted by floods. The River receives discharges from mostly agricultural fields and some non-Agricultural industrial discharges from a few industries in its vast watershed as it passes through its floodplain in Cachar area. The river and its tributaries are a major source of fish supplies for the area. Fish is one of the major food sources for the people in the Barak valley. It has been observed that during the past two decades the number of cancer cases in the area is increasing in significant proportion. Although, no particular cause of this increase have been positively identified, but exposures to chemicals that are Persistent, Bioaccumulative and



Toxics (PBTs), and other such contaminants are likely factors contributing to this cause. To that end a reconnaissance of the Barak River was undertaken during February 3-5, 2011 where various intakes and discharges into the River were looked at and screening level measurements of water quality were conducted at various points to look into the changes in water quality between various intakes and discharges.

#### **Barak River Boat Trip**

With the help and coordination of a number of local NGOs, primarily the Nagarik Swartha Raksha Sangram Parisad, (Mr. Haridas Dutta), Silchar and Dr. Kumar Kanti Das . a row-boat trip was organized which began its sail from Bethukandi on Feb 2, 2011 at about 8:30 AM.

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<sup>1</sup> This was conducted in collaboration with the Nagarik Swartha Raksha Sangram Parisad, (Mr. Haridas Dutta), Silchar and Dr. Kumar Kanti Das as coordinators. **Contact information:** Author: [Subijoy@verizon.net](mailto:Subijoy@verizon.net) ; Coordinators/Sponsors (Dr. KK. Das : [kumarkdas@hotmail.com](mailto:kumarkdas@hotmail.com) ; Mr. H. Dutta: [nagarik.sangram@gmail.com](mailto:nagarik.sangram@gmail.com) For immediate attention call: 033-2514-1043(India) or 001-410-946-2208 (directline-Voicemail USA)



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Before the two boats got boarded a village level discussion with the local people took place at ~ 7:30 AM. During the discussion the villagers were asked a few questions about their use of pesticides, chemicals and general health and sanitation practices. A number of Men, Women, and Children came to the early morning meeting as shown in the picture below.

### *Barak River Water Quality Exploration, Feb. 2011*



Local people at Bethukandi, near Silchar Assam, Feb 2, 2011

The local villagers The **Questions and Answers (Q & A)** are provided as follows:

#### **Q. What type of Chemicals/Pesticides you use and how do you apply them?**

**A.** . There were a number of farmers and a few college level students who came forward and responded that the villagers use. The pesticide they routinely use is **Indofil M-45** , a fungicide, containing Mancozeb 75% W.P. as shown below (in their original containers/bags). They apply them by mixing the powder with water



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### **Q. At what level/dosage you use them?**

**A.** The local farmers here often go with their own measure of 1 teaspoon per 5 litres of water, they said.

### **Q. How do you dispose expired pesticides/chemicals?**

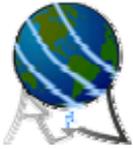
**A.** We normally dump them in the nearby Barak River if they are not usable and expired.

These answers surely caused a lot of concern. It also seemed that the youngsters in the family often does the agriculture work in absence of their parents, who are out to the town and market to sell their produce. These youngsters can easily take a couple mugs of water and consider that as 5 liters by mistake and such concentrated use and high dosages seem to be very likely events in this area. There were no specific protections or restrictions observed during the visit.

At the end of the discussion we invited a few progressive youth from the crowd to come forward and become a volunteer from the area to keep in touch with the local coordinators and get updated on safe environmental practice and educate the local community for protection of their health and the environment. This would in turn help protect the Barak River as well. The following people came forward and provided their address and phone numbers as below:

1. Mr. Panna Das, PO Bethukandi, Silchar, Assam  
Cell: 99548-88469
2. Mr. Bijay Das, PO Bethukandi Silchar, Assam  
Cell: 90858-32126
3. Mr. Tapash Das, PO Bethukandi Silchar, Assam  
Cell: 94356-18878/98542-63526

After that we proceeded towards the River to begin the exploration of Barak River Water Quality.



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The trip covering 40 Kms on a Row Boat , Feb 2, 2011 is shown in the Map below.



Figure 1. Barak River Boat Trip Location using Garmin GPS (image: courtesy Google )



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We had two boats, one for the local NGOs to provide an awareness message to the villages on the River bank that we would pass by, and the other was strictly used by me, my nephew, Soptosetu Dutta (8 years), Sakha Ranjan Roy, and a very patient and skillful TV photographer. Soptosetu had a training from me at Kolkata in handling small tubes and filters which were needed to be changed occasionally for the monitoring instrument , YSI 85 mobile water quality monitoring Instrument.

The detail specification of the equipment is provided below:

**The YSI 85 measures dissolved oxygen (DO), conductivity, salinity, and temperature. The meter was equipped with 50 feet of cord.**

- **[YSI 85 Specifications from User Manual](#)**

### **SPECIFICATIONS**

#### **Operating Environment**

Medium, fresh, sea, or polluted water and most other liquid solutions.

Temperature:	-5 to +65°C
Depth:	0 to 50 feet
Storage Temperature:	-10 to +50°C
Material:	ABS, Stainless Steel, and other materials.

#### **Dimensions:**

Height:	9.5 inches (24.13 cm)
Thickness:	2.2 inches (5.6 cm)
Width:	3.5 inches max. (8.89 cm)
Weight:	1.7 pounds (w/ 10' cable) (0.77 kg)
Display:	2.3"W x 1.5"L (5.8 cm W x 3.8 cm L)
Power:	9 VDC - 6 AA-size Alkaline Batteries (included) Approximately 100 hours of operation from each new set of batteries
Water Tightness:	Meets or exceeds IP65 standards



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Figure 2. A view of the monitoring equipment

Pictures of the Water Quality Monitoring crew in our boat are provided below:



Water Quality  
Monitoring  
crews – (L-R)  
Majhibhai, TV  
Videographer,  
Sakhada,  
Soptosetu, and  
Subijoy...

Pictures of Crews in the NGO/Awareness Boat are provided next:



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The third crew, Dr. K.K. Das, and a few other volunteers/coordinators went on road to the Madhura Ghat and other break areas for us to go on shore and discuss with local people.

As shown on Figure 1. we collected water quality data at Bethukandi, and Madhurband Ghat, and Sadarghat before stopping at the Madhura Ghat for a short break and discussion with local people. The water quality results are Tabulated later in Table 1 and a general summary interpretation of the results are provided at the end after the tabulation of results.



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As we proceeded on our trip we came across the main water intake point for the Silchar Township very close to the Sadarghat bridge as shown in this picture below.



We also noted that all along the bank there were scores of people washing their clothes and dumping a huge load of phosphates in the water. In some areas, not too far from the drinking water intake for Silchar, there were direct-dump, bamboo-walled toilets sitting like a gallery on the bank of the River (see pictures below).



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...not too far from the drinking water intake for Silchar, there were direct-dump, bamboo-walled toilets...

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Another matter of great concern was the unwise dumping of deities (pratima) after the seasonal worships (Puja) year after year on the Barak River. This clay idols decorated and painted with various types of materials, lead paints, and other water-soluble/leachable materials which can cause serious health hazards. Generally women and children are more vulnerable to these contaminants in water.



...unwise dumping of deities (pratima) after the seasonal worships (Puja) year after year on the Barak River..

The water-soluble/leachable materials in these idols can cause serious health hazards...

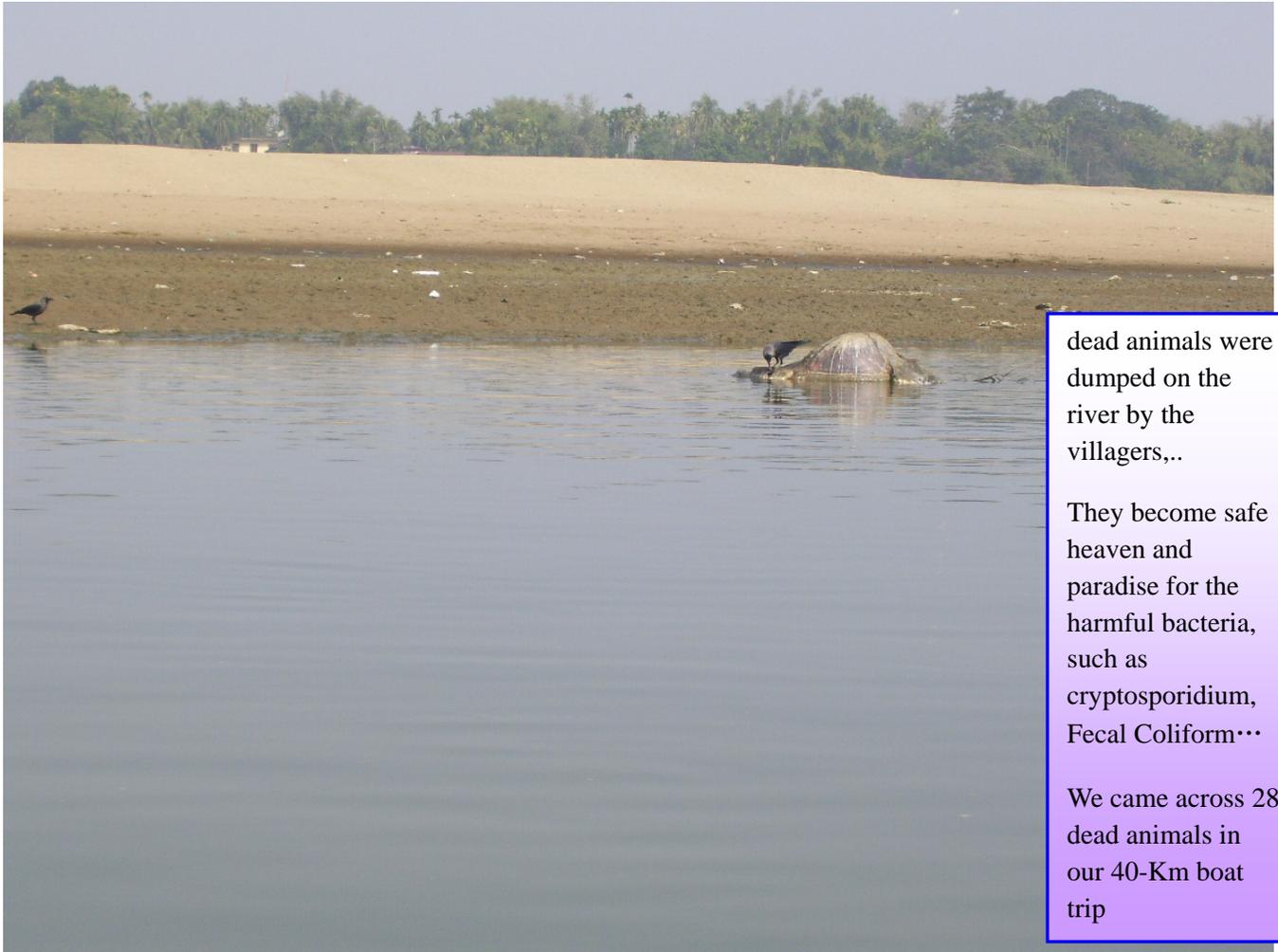


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Another matter of great concern were dead cattles/animals that we observed in the river. These dead animals were dumped on the river by the villagers, who had no idea of the tremendous amount of harm/hazard that these dead-bodies could create. They become safe heaven and paradise for the harmful bacteria, such as cryptosporidium, Fecal Coliform, and others. Accidental high level exposure to these bacteria can be very serious for local people. **We came across 28 dead animals in our 40-Km boat trip that day.**



dead animals were dumped on the river by the villagers,..

They become safe heaven and paradise for the harmful bacteria, such as cryptosporidium, Fecal Coliform...

We came across 28 dead animals in our 40-Km boat trip

After these observations and measuring the water clarity and monitoring the quality at a few points we came to the shore at Madhura Ghat at about 10:45 AM.

At Madhura Ghat we came across a boat-load of people crossing over from the other bank coming over to Silchar for their daily work as daily passengers. The Road crew with Dr. K.K. Das and others were



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also there with a number of reporters and other interested people waiting to discuss the overall mission and to know about our findings so far. We mentioned the above concern to the local people there.

A number of people from the Nagarik Swartha Raksha Sangram Parishad were available there to help the crew members with their need for water/Tea etc.





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The 2<sup>nd</sup> boat with local NGOs displaying banners of Local Sponsors of the event



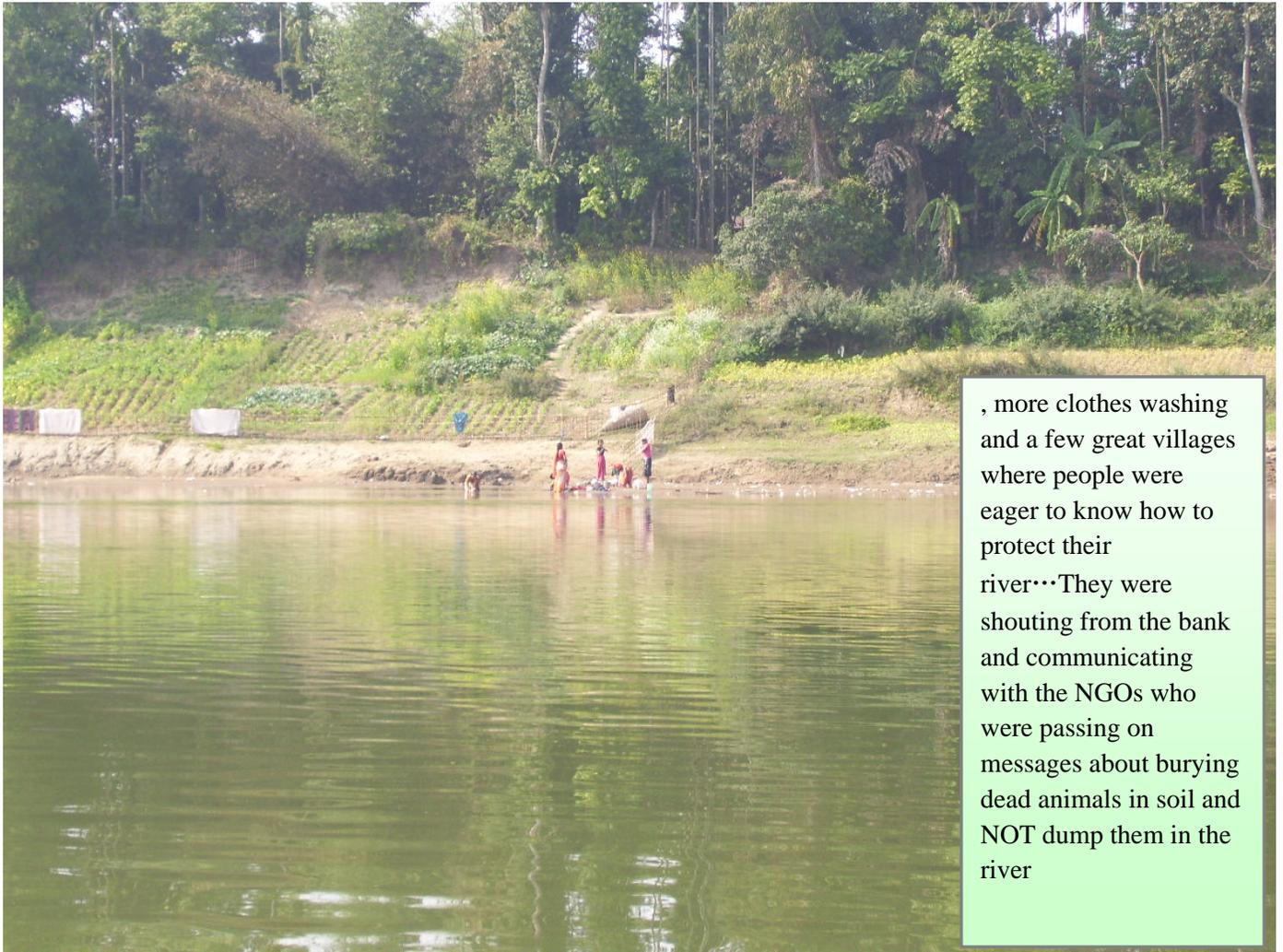
After about 30 minutes of break at the Madhura Ghat we started back on the trip moving towards Masimpur area. On the way we came across numerous dead animals, more clothes washing and a few great villages where people were eager to know how to protect their river. The villagers were speaking loudly from the bank at a distance to communicate with the NGOs, who were passing on messages about burying dead animals in soil and NOT dump them in the river.



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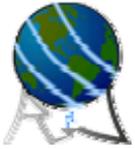
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, more clothes washing and a few great villages where people were eager to know how to protect their river...They were shouting from the bank and communicating with the NGOs who were passing on messages about burying dead animals in soil and NOT dump them in the river

The trip was already into its 5<sup>th</sup> hour when the MajhiBhai (Boatmen) were showing signs of tiredness. We felt the need for a break and some refreshments for them, and then made an unplanned stop at Masimpur. We refreshed ourselves at a great Tea shop there... and educated the shopkeepers and locales not to burn plastics any more along with their daily collection of trash from the shop/business area. The owner promised to me that he will not burn plastics any more. We plan to verify that during the next visit.



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, .....Local Shopkeeper in Masimpur during our Tea break. We educated the shopkeepers and locales not to burn plastics any more (it was their daily practice) along with their daily collection of trash from the shop/business area. The owner promised that he will not burn plastics any more.

After leaving Masimpur, somewhat rejuvenated, we came across a little different area, highly rural, and the farmers were growing a lot of vegetables. We also noticed some erosion in some of these



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Our little crew, Soptosetu Dutta, was getting a little tired after about 8 hrs on a small row boat. He did some note takings, and writings. Even the older crews were getting tired and trying to stretch....





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We saw more vegetable farming ...

Also, noticed a few Brick factories emitting smoke



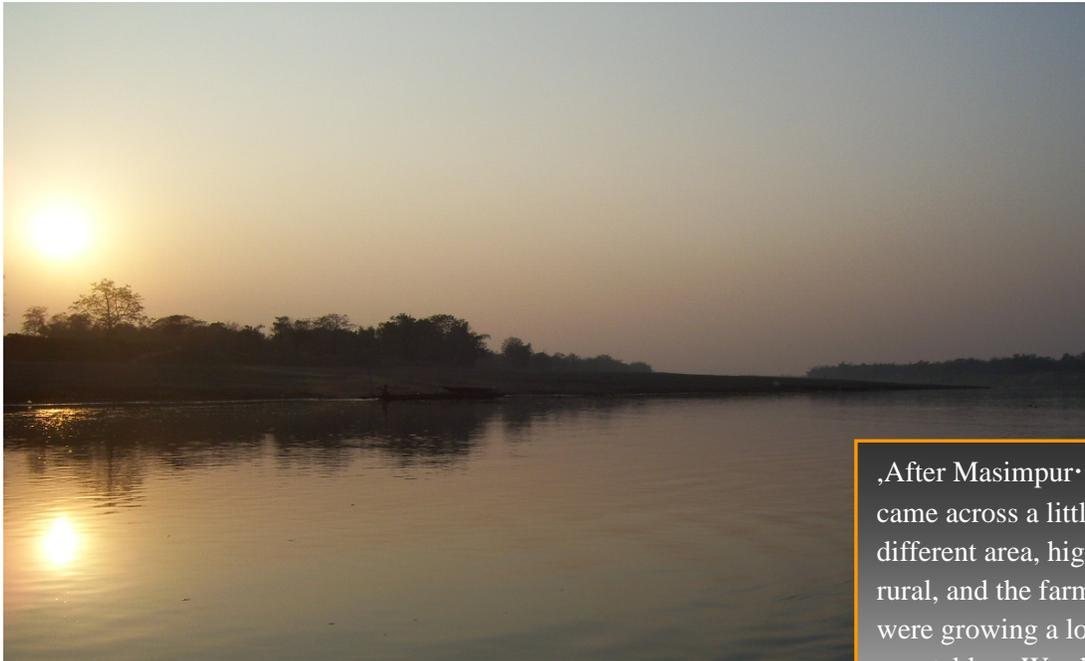


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It was almost 10 hrs into the trip and we began to see the setting Sun. Quite an amazing view from different points in the River as it meanders and changes its direction from North to east, west and south at times.



,After Masimpur...we came across a little different area, highly rural, and the farmers were growing a lot of vegetables. We also noticed some erosion in some of these areas.





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Soon it became dark...and we were somewhat unprepared and trying to establish communication with the ground crew... After about 10-15 mins of eager tries to locate the Ground crews, we finally saw their waving light at a distance and got some relief that we were close to the end of our trip. We met the road crew with two cars close to the Ranighat Bridge where we ended our Boat trip. Based upon the GPS traverse and tracking of the complete Boat trip, we calculated the distance covered as approximately 40 Kms. We were then taken by a car to Kathigora, where a meeting was arranged.



With the Road Crew, Dr. KK Das and others, after the Boat Trip...Getting ready for the Meeting at Kathigora.



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Kathigorah is a medium size town there with a population of about 100,000. Mr. Mainul Haque, president of the local NGO made arrangements for a community meeting, which was attended by about 100 people who were concerned about the massive contamination and pollution of the Barak River. Mr. Dipankar Roy also played an important role in getting the meeting and discussion together.

A number of people talked about their concern and asked for possible resolve and measures to protect the River. One Mr. Salim Ahmed had a very broad view and he had clearly stated the concern about steeply degrading air and water quality in the area. He referred to the air emission from the nearby Panchgram paper mill, and the massive sludge and other richly colored contaminants from the paper mill that flows directly into the River. Listening to this concern we made a special arrangement to monitor the water quality at the point where the discharge from the Panchgram paper mill hits the Barak River. I did that two days later on Feb 4<sup>th</sup>, around 8:30 PM. The Specific conductivity and salinity of the water were recorded at three times the average value observed during the 40 Kms stretch of the River. There were floating foam and noxious odor at the site. A close shot of the flowing River with foam is shown below.



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Massive load of chemicals in the Barak River from the Panchgram paper Mills , close to the Discharge point.

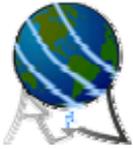
Photo: Feb 4, 8:30 PM

During the follow up discussion, Mr. Mainul Haque revealed an incident where one local fisherman/farmer applied a pesticide to kill fish for easy harvesting without the knowledge of serious poisoning due to the pesticides. He mentioned that, when ducks ate those floating dead fish, the ducks died, when foxes and stray dogs ate those ducks, the dogs died, and when Vultures ate those foxes, the vultures died. That severe was the poison and its lingering effect, he mentioned.

We explained to the local people that we would check further on the pollution in Barak River from the Paper plant, but during this visit there was no further daylight hours/time to accomplish that.

### **Water Quality Monitoring Results and Analysis:**

The results are summarized and Tabulated below.



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Parameters	Bethukandi		Kalibari Char	Sadarghat	Madhura Ghat		Jatinga Confluence	Near Panchgram Paper Mills	Remarks
Sampling Location #	Barak-R#1		Barak-R#2		Barak-R#3		Barak-R#4	Barak-R#5	
Clarity, ft.	2.25		2.20		2.6			0.5	
Monitoring Depth, meter	0.1	1.0	1.0	1.0	1.0	0.5	1.0	0.1	
Temperature Deg. C	19.6	19.6	20.0	20.4	19.9	20.2	21.6	21.0	
Salinity, ppm	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	Salinity Level high at #5
Conductivity, umho/cm	125.1	145.4	136.0	124.5	123.4	124.0	124.5	332.7	Very High Conductivity at #5
Specific Conductance	138.6	161.9	130.0	135.9	137.1	137.0	135	359.2	
Dissolved Oxygen, mg/l	4.46	4.36	6.7	6.7	7.6	5.16	3.7	2.27	<b>Dangerously Low level of Oxygen at #5</b>
Saturation, %	48.0	47.6	72.8	74.2	84.1	58.1	40.0	24.4	



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The observations and findings from the Water Quality Exploration of River Barak as provided in Table 1 above, we could make the following screening level inferences.

- It seems like the clarity of water is better as we moved from Urban area (Silchar) to the Rural area (Masimpur),
- The salinity remain almost constant at 0.1 mg/l or ppm all throughout, except for the River water near Panchgram papermill , which was 0.2 mg/l.
- No significant Variation in water quality with Depth. Observed.
- Temperature.generally similar, except near Panchgram papermill (#5), where it is highr by about 5%.
- Specific Conductance was similar in most cases except near #5, where it is quite high.
- Generally the Dissolved Oxygen content was okay in most of the areas. However, the DO was dangerously low near Panchgram paper Mills, sample #5.



Until we conduct further study and analyses and come up with more specific recommendations, I suggest that **the local people should undertake and use the following guidelines when/where applicable.**

1. Bury dead animals/cattles in the soil or in a pit near their farm, but **DO NOT dump them in the River**





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2. Read the pesticide Labels carefully and apply only per instruction. Do NOT use more than recommended.
3. DO NOT leave pesticide bags with children or ask children to apply pesticides.
4. Check on pesticide/chemical alternatives which would provide equally good crop protection, such as neem-leaves extract, or cayenne pepper powder

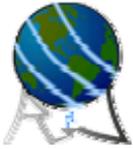


5. Form a community level River/water quality protection group, DO NOT focus on water quantity for now, it creates conflicts, and we must avoid any conflicts at the beginning.
6. DO NOT dump paper, plastics, soda cans, drums or any other waste objects into the River.
7. Arrange to have a local trash/paper/plastic collection system, and DO NOT burn plastics, the emissions may contain Dioxins/Furans which can cause cancer or other diseases.
8. Make arrangements with nearby Municipality to pick up the trash once a week.. If nothing works, create lined cells/pit (liner should be 40 mil. HDPE plastic) and dispose there. If any community need help in designing the Pits/Cells we can provide technical support through our technical staff in Kolkata, who need to be compensated for their travels and local stay etc.
9. Develop a River Watch (Nadi Prahari' team, who would keep an eye/watch for a certain section, say 2 Kms of the River. This team should impose a penalty for dumping dead animals in the River.



10. The River Watch teams and groups for the Barak Valley should get together once a year in a suitable place along the River bank traveling preferably with their Boat. We will try to have a representative from Rivers of the World Foundation in that meeting to discuss the





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progress/problems during the year, and plan only a few simple items for each groups for the next year.

11. If you like these ideas, please send your Full name, village location, mobile number, and any e-mail address by an email to [Subijoy@verizon.net](mailto:Subijoy@verizon.net) or visit the Rivers of the world foundation [www.rowfoundation.org](http://www.rowfoundation.org) and click on 'Join as a member' and download the form..

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How to Treat Yamuna Waters & Beyond ?

- A presentation by S. Dutta on Wastewater Treatment and Reuse System - for Polluted Waters at the American Chemical Society International Wkshp. on Sustainability and Water Quality **NEW!**

River Reconnaissance During India Trip in Maps for 2011 New!

Summary Report of the Rivers of the World Annual Meeting 2010

Philippines - Preserving Water Quality of Iloilo River - by Noel Hechanova !!!!!

Congratulations !!! to The Iloilo River Development Committee On Their Gold

Yamuna-Drain near Ampur (S. of Faridabad)

Wastewater Treatment and Reuse System - for Polluted Yamuna Waters and Beyond  
International Workshop on Sustainability and Water Quality  
January 17-20, 2011  
Subijoy Dutta, P.E.  
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