



Rivers of the World Foundation

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Annual Meeting Summary

Program Planning and Implementation-2016-2017

Date: October 28, 2016 (Friday) ~ **Time:** 9:30 AM – 3:30 PM

Venue: Patuxent National Wildlife Visitor Center
10901 Scarlet Tanager Loop, Laurel, MD 20708

1. Background:

The primary objective of the Rivers of the World (ROW) Foundation is to make all efforts to cleanup highly polluted Rivers in US, India, SE Asia, S. America, Africa, Europe, and Other Parts of the World. ROW Foundation is a 501 C(3) charitable organization. The Foundation is making charitable, educational, and scientific efforts to make a difference in the life, health, and wellbeing of people.

The purpose of the meeting is to begin planning ROW events for 2017.

General Topics discussed include - ROW plan for World Water Day 2017, scheduled for March 22, 2017, however, the event can be observed during a week before or after in that timeframe. Like the last year, we plan to have the WWD 2017 activities in China - Wuhan city, Philippines - Iloilo City; India – Bangalore, Bhubaneswar, Guwahati, Gokul, Kolkata, Rishikesh and Vizianagaram; USA – Washington, DC, and Poteau, Oklahoma.

2. Meeting Attendees:

At the Venue: Bill Roper, Chris Perry, Dick Lahn, Jay Vaghani, Kumar K. Das, Subijoy Dutta, Sudheer Shukla, and Waqi Alam.

Through Conference Line:

By Conference Call (Domestic and International) - Prafulla Dhal (Bhubaneswar, India), Sucharit Dutta (Kolkata, India), Sudhir Nautiyal (Rishikesh, India), Dennis Haag (Kansas city, Missouri), Jan for Daryl Jackson (Poteau, Oklahoma), Prakasam Tata (Naperville, Illinois).

a. Registration/Introductions

Dick Lahn covered the registration of participants. After initial registration, Bill Roper provided a short introduction and called the meeting to order.



ROW Meeting 2016 – L-R: Dick Lahn, Dr. KK Das, Sudheer Shukla, and Dr. Bill Roper

3. Project Discussion

a. Updates through Conference Calls

- i. **Prafulla Dhal (Bhubaneswar, India)**, our coordinator from Bhubaneswar, Odisha called in to join the meeting and updated everyone on the activities they plan to undertake in 2017. They plan to arrange -
 - A training program in water and environment area for the local professionals from the Government organizations and NGOs.
 - River water quality awareness programs for the World Water Day 2017
 - Undertake a study to identify the pollution sources and possible remedies for a small watershed involving various polluted rivers (Kuakhai, Daya, and Brahamani), streams and creeks . A general map showing rivers of Odisha near Bhubaneswar area is below.



- ii. **Sucharit Dutta (Kolkata, India)**, called in to confirm their great support in protection and awareness for the Hooghly River, considered being a part of the Ganges River. They plan to conduct the World Water Day 2017. He plans to follow up on the repair of school buildings in Kot Timal, and Nuwakot, Nepal as a part of the ROW Foundation's earthquake assistance projects in Nepal.
- iii. **Sudhir Nautiyal (Rishikesh, Uttarakhand, India)**, called in to update their progress in water quality monitoring and testing program at the Himalayan English School. They plan to expand their water-testing program to other schools in the area. They are also in the process of completing installation of the water-testing laboratory at their school. Picture below shows some of the water testing activities.

Knowing about the River Bhilangana



- iv. **Dennis Haag (Kansas City, Missouri)**, one of the founding members of the ROW Foundation called in to provide a number of updates on some of the restoration activities that he provided guidance and advice during the current year in Midwest US. He also discussed about a few wastewater treatment technologies. He mentioned that he would continue to provide technical support to any of the international restoration or other ROW projects.
- v. **Daryl Jackson (Poteau, Oklahoma)**, represented by Jan on the call, mentioned that they will be planning to conduct an awareness program pertaining to the pollution and sporadic dumping in the Poteau River.
- vi. **Dr. Prakasam Tata (Naperville, Illinois)**, an expert in wastewater treatment, called in to summarize various activities that he undertook in Vizianagaram, Vizag, and other parts of India for water education in India during 2016. He arranged for training the wastewater treatment plant operators in Andhra Pradesh, India by inviting some of the experts from US to provide them with some of the detail operational tips and techniques for running the plants. He mentioned that the training was a great success. He arranged for an awareness March on the WWD 2016 there, and plans to conduct a few awareness event on the WWD 2017 there in India.
- vii. **Zhao Hong(China)**, our coordinator for China, called in later and updated. She plans to conduct Yangtze River cleanup and protection program in 2017. Ms. Zhao Hong organized cleanup for World Water in conjunction with ROW in 2016 (see picture below) and plans to do it in a bigger way in 2017.



- viii. **Noel Hechanova** (Iloilo City, **Philippines**), and **Evelyn Belleza**, our coordinators from Iloilo City, Philippines were not available during our meeting. Noel Hechanova called on the following day and mentioned that they had a great program in 2016. The picture below shows one of their WWD 2016 programs of River Tour with participants from 3 Universities in Philippines.



They plan to conduct a number of programs in 2017 including a training workshop to cover –

- Remote sensing – Hyperspectral applications and analysis for erosion control and identifying the major pollution sources for the rivers,
- Renewable energy using solar, wind and other sources,
- Effective wastewater treatment plants by retrofitting the pumps with solar systems, and
- Iloilo River improvement plans and views.

b. Presentations at the Meeting

Subijoy Dutta – presented the Annual Report for 2015-2016 which listed all the different activities ROW conducted during the past year (12 months) . He touched upon some of the activities undertaken during 2015-2016. Major highlights of his presentation is below.

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■ Some of the Major Accomplishments of 2015-2016

- Launched New Website – January 2016
- World Water Day 2016 – 9 events
- 4 Cash Awards given - <http://www.rowfoundation.org/0/WWD2016-Reports>
- Established Environmental Training and Research Institute (EnTRI)
- First EnTRI Seminar, Feb 3-4, 2016, Rishikesh, India
- Earthquake Relief in Nepal – Repairing of Two School buildings (Thansing, Nuwakot; and Kot Timal)
- Water quality testing and Monitoring Lab Setup – Himalayan English School, Ghansali, Jharkhand, India
- Conducted meetings and seminars in Bhuvaneswar, Odisha. Visited with State Pollution Control Board, discussed issues and considering a study on certain segments of the Mahanadi, , Daya, Gangua, and Kuakhai Rivers.

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Environmental Training Development Seminar
Feb 3-4, 2016

February 2, 2016

AGENDA

Rishikesh, India
PARMARTH NIKETAN, Rishikesh, Uttarakhand



Inaugural Seminar at the Environmental Training and Research Institute (EnTRI) Uttarakhand, India

This seminar organized by the Rivers of the World Foundation (<http://www.rwfoundation.org/>), Crofton, Maryland, USA in collaboration with the Rishikesh School of Yoga and Ayurveda with support from the Parmarth Niketan (<http://parmarth.org>) should address the following for ALL FUTURE TRAINING to begin at the EnTRI.

- Components
- Collaborations
- Commitments
- Scheduling
- Validation/feedback
- Research Needs
- Water
- Environment
- Rivers
- Life
- Health
- Community

Background: provided earlier to all confirmed participants, Link: <http://www.rwfoundation.org> 2nd link: [EnTRI Seminar Feb 3-4, 2016](#)

DAY 1	Wed., Feb 3, 2016	AGENDA
	Minutes	
	9:30	1 Registration and Signup
		Inaugural Bhajan - Mrs. Vidya Subramanian
		Introduction & Background - Dr. Bill Roper and Subjoy Dutta
	10:00 30	2
	10:30 30	3 Scope & Purpose of the Seminar - Subjoy Dutta
	11:00 15	4 Logistics and Administrative Support - Sucharit Dutta and Tushar Kant Guha**
	11:15 60	BREAK
	12:15 45	5 Ganges River Protection - Swami Chidananda (Parmarth Niketan) and Nandini
	1:00 90	6 Water Treatment - Dr. Prakasham Tata
		LUNCH
	2:30 45	7 Remote sensing Technologies, Leading edge Water Treatment Technologies - Bill Roper
	3:15 45	8 US AID and other Agency participation - Subi Subramanian
	4:00 30	9 Municipal Solid Waste and Hazardous waste management, Innovative Treatment - Subjoy Dutta
	4:30 30	10 Municipal Solid Waste and Hazardous waste management, Innovative Treatment - Subjoy Dutta
	5:00	Water Testing, Monitoring and other Systems - Mr. Krishnan, Water Systems International
		ADJOURN Until Next Morning, February 4th 10:00 AM



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Field visit after the seminar arranged by the Parmarth Niketan



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Earthquake Relief and School Rebuilding in Nepal

As a part of **Relief Effort to Nuwakot, Kavri and Gorkha-Pokhara area** the Rivers of the World Team have started temporary rebuilding of Classrooms, and toilets for one earthquake impacted School - Rashtriya Secondary School, Thansing, Nuwakot, Nepal. Planning and arrangements for another School in Kavri District is underway.

The Rivers of the World Team is visiting only a few earthquake-impacted areas of Nepal as shown in the Map below.



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Earthquake Relief and School Rebuilding in Nepal

Rashtriya Secondary School, Thansing, Nuwakot,



Thansing, Nuwakot Area

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Repair began at Raktakali Primary School . June 1, 2016

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Raktakali Primary School, Kot-timal



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- A synopsis on *Rivers of the World Foundation* –
 - Where and How we Flow

■ Countries Where we Currently work

- China
- India
- Nepal
- Philippines
- United States



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The Water Testing Kit

Mr. Subijoy Dutta gifted following instruments and testing material –

- Pocket Tester TRACER for (TDS/Salinity/Conductivity/ Temp)
- pH testing kit
- Dissolved Oxygen Testing Kit
- Turbidity kit

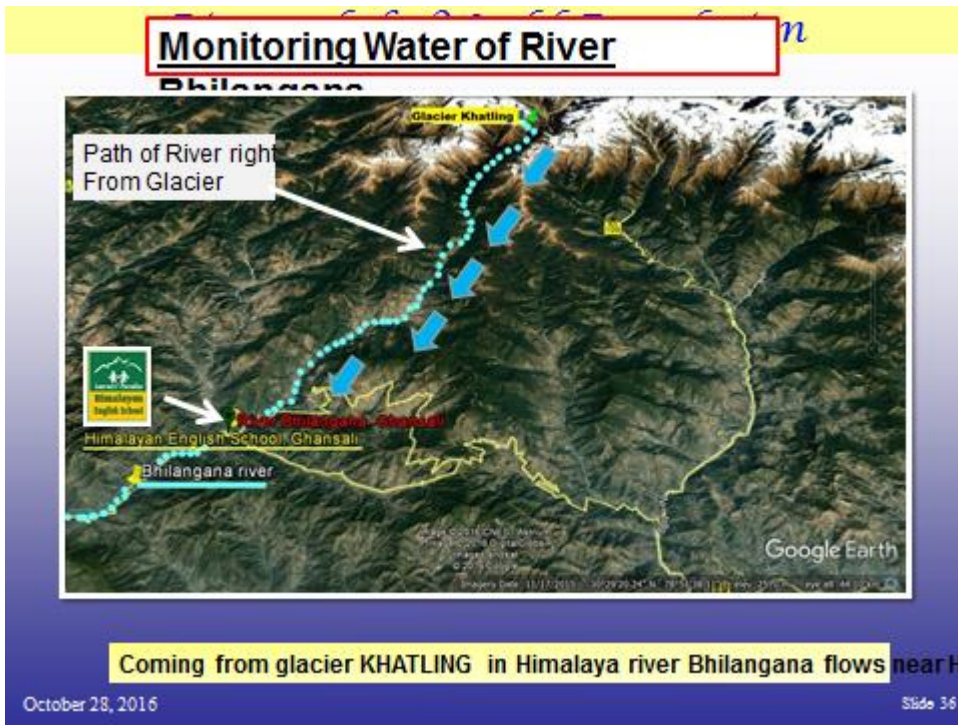


By using these instrument students can find out – pH of water, conductivity, Total Dissolved Solutes, Temperature, Turbidity, Dissolved Oxygen etc.

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We plan to provide more such kits in 2017. Some of our water experts will be visiting India during the first part of February 2017 to provide training to local professionals in water and environmental area.



Christopher B. Perry, Operating Manager, Bourn Environmental, coordinates with the ROW Foundation on various stream restoration works. Chris and Jay Vaghani presented some of the local projects in Maryland and involving stormwater management in reducing runoff and flash floods tabilization work that he conducted recently. Some of his project pictures/slides are below.

Sand Filters



Bioretention Ponds



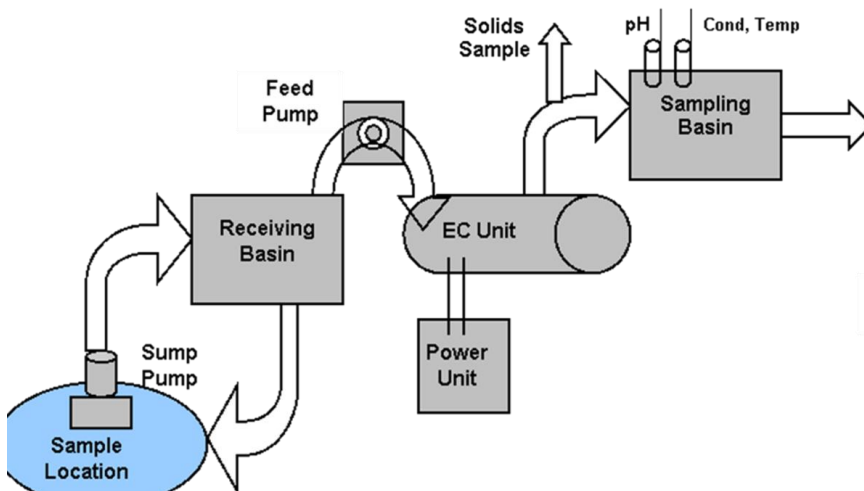
Stormwater Pond Retrofits



Dr. William Roper, President of ROW Foundation presented the following 3 topics as summarized below.

Review of selected water treatment technology developments (William Roper)

The two water treatment technologies discussed were the Rigby Electro-Chemical (EC) system and the Micronic Technologies MicroDesal (MD) system. The EC system uses a direct current electrical charge in the reaction chamber which causes pollutants to club together and also kills the bacteria. This functional change within the wastewater causes metals and other contaminants to separate out rapidly in a settling base and following treatment within the EC chamber. The diagram below is a illustration of the operational configuration for the EC system.



The EC system has been in field test operation in the Texas oil and gas industry for the past year and a half. The results for pollutant separation in the field test have been excellent. The EC system is also planned to be applied to a water treatment system at very large laundry facility the United Arab Emirates. The system has been demonstrated but a change of ownership has put large-scale application temporarily on hold. The EC system was also evaluated by the British Army for tactical water supply and is in the process of purchase pending resolution of budget constraints. A new water supply project or Sierra Leon in Africa may also take advantage of the EC system. The Singapore public utilities board is considering an EC demonstration as part of the country smart nation plan focused on adapting smart water technologies in various aspects of Singapore's water management. There is also been a recent request by the Ministry of environment or technologies control a massive green algae pollution issue in South Korea. The government is exploring a case study using the EC system as well as a select number of other technologies. Below is a picture of the trailer mounted EC system field demonstration unit at the Rigby laboratory facility.



The Micronic Technologies' MD water treatment system is still in the research and development stage although significant improvements in the volume of treated water produced have been achieved at the laboratory level. The company is now fully relocated to Southwest Virginia and is headquartered in the city of Wise, Virginia. The current research is focused on the use of a flow bench testing facility to evaluate improvements in the water treatment system. The MD system uses an innovative evaporation technique to separate clean water vapor from contaminants at less than 100°C and then condense pure water out of the water vapor in a condenser. The newest innovation is to use vapor compression around the evaporator to maintain high temperatures in the evaporator for maximum evaporation conditions and also to increase the condensation part of the system



increasing water volume production.

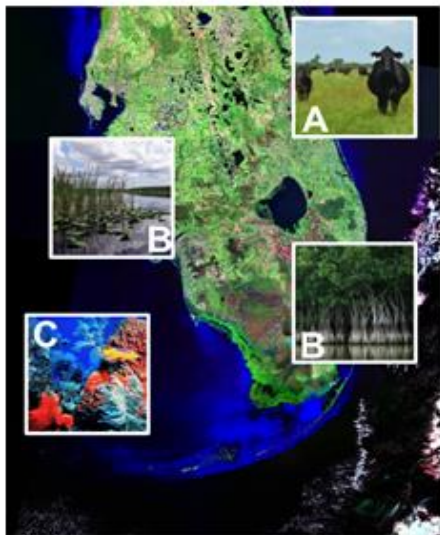
Remote Sensing Technology developments (William Roper)

The remote sensing development discussion focused primarily on an ongoing NASA HypsIRI program to enhance hyperspectral remote sensing in a new satellite mission planned for launch in the 2019 timeframe. Research and development has been underway for several years to define the sensor systems to be incorporated into this mission. Some of the science and applications accomplishments during 2016 include:

- the mission and products symposium June 3-4, 2016 at the Goddard space flight Center
- a science and applications workshop October 18-20 at Caltech
- sensor testing and act was edition in the California HypsIRI target area
- the US for surface application of HypsIRI airborne data to track drought affects in the Sierra Nevada
- planning for the 2017 Hawaii volcano and coral reef campaign
- HypsIRI aquatic studies group applications evaluation
- fourth annual aquatic forum meeting at Goddard space flight Center on June 3, 2016

the specific part of the committee on earth observation satellites for the ROW foundation is the feasibility study for an imaging spectrometer for aquatic ecosystems (non-oceanic). Bill Roper is a member of the ad hoc working group on the aquatic ecosystem program at NASA for the last four years and continues to be involved with the program. The illustration below describes some of the land to ocean biodiversity observations that are being evaluated with various hyperspectral airborne sensors in South Florida.

The ABCs of land-to-ocean biodiversity observations



- Scoping study for land-to-ocean airborne campaign with ER-2
 - AVIRIS-NG
 - PRISM
 - HyTES
 - LVIS
- STM for airborne biodiversity airborne & field campaigns
 - Key questions
 - Study design
 - Implementation strategy

There is a new joint airborne campaign that will provide the first of their kind high fidelity imaging spectrometry measurements of a diverse set of Asian environments for science and applications research. The first phase will be focused on India and will enable new scientific and applications research in the following unique environments shown in the image below:

AVIRIS-NG NASA and ISRO Airborne Campaign in India

This joint airborne campaign will provide the first of their kind high fidelity imaging spectroscopy measurements of a diverse set of Asian environments for science and applications research.



57 priority 1 sites approved for measurement. Pre-campaign Science Meeting Seoul 2015

The campaign enables new scientific and applications research in these unique environments:

- Natural ecosystems
- Water resources, snow, and ice
- Geology and natural hazards
- Coastal and inland waters, coral reefs
- Agricultural lands and urban areas

Please see Appendix A.31 in ROSES 2016 for data use

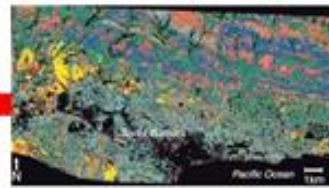


ISRO B-200 Aircraft at NRSC

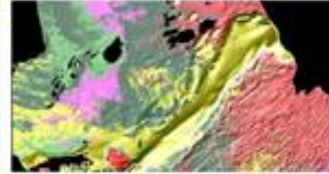


AVIRIS-NG being checked

Ecosystem and Agriculture



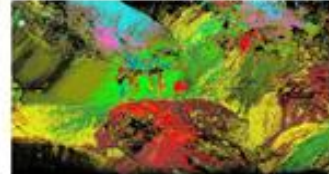
Asian Coastal Waters & Coral



Dust and Black Carbon on Snow & Ice



New Geological Regimes



Grants and other funding opportunities (William Roper)

A review of some of the potential funding opportunities in the coming years were presented based on historical information. Of particular interest was the national Fish and wildlife foundation and their Chesapeake Bay stewardship fund. This fund is dedicated to protecting and restoring the Bay by helping local communities cleanup and restore their polluted rivers and streams. Projects are intended to advance cost-effective and creative solutions with financial and technical assistance. Another program of the national Fish and wildlife foundation focuses on the protection and preservation of freshwater ecosystems. The foundation focuses on several approaches to restore and maintain freshwater species and their habitats and five major areas:

- passage: eliminate barriers to fish movement
- water quality: reduce pollution to restore clean water
- water quantity: ensure that stream flows are maintained at healthy levels
- spring systems: protect springs and other unique ecosystems for freshwater species
- control of invasive species: restore the natural balance of the ecosystems

Some of the specific grant programs that could be expected in 2017 and their expected dates for submittal of proposals include the following (substitute 2017 for each 2016 date):

	Application Open Date	Proposal Due Date
Agricultural Conservation	February 1, 2016	March 3, 2016
Restoration and Community Stewardship	May 31, 2016	June 30, 2016
Stormwater Management	August 30, 2016	September 29, 2016

Sudheer Shukla, a ROW member, presented a discussion on Reduced Pollution into Watersheds from Carbon Sequestration Practices on Agricultural Land

There is a connection between soil carbon sequestration and reduction of pollution into rivers and watersheds. Agricultural practices that sequester carbon in soil often also reduce runoff of chemical fertilizers, pesticides and herbicides into watersheds.

With healthy plants growing in healthy soil, there is a symbiotic relationship between the plants and microorganisms (microbes) in the soil. Between 20% to 40% of the carbon plants take in through photosynthesis is sent as carbohydrates, sugars and proteins to feed soil microbes, including bacteria and fungi. These microbes in turn make nutrients available to plant roots. For example, there are nitrogen-fixing bacteria that make nitrogen available to plants, and mycorrhizal fungi can “mine” phosphorus from rocks and other sources and deliver them to plant roots through their networks.

The carbon delivered to soil microbes by plants is transformed as these microbes die and decay or are consumed by other microbes, and some of this carbon is eventually transformed in a stable form that is sequestered in the long term.

Chemical fertilizers interfere with the relationship between plants and soil microbes because they give a signal to plants that they can get nutrients “for free” from above the ground, and that they don’t have to feed soil microbes to “trade” for nutrients. So they don’t send as much carbon into the soil, which reduces the size and robustness of the soil microbial population, and also reduces the amount of carbon that eventually becomes sequestered in soil. Note that there is always some carbon that is respired by microbes and oxidized from soil, so the soil often loses soil carbon overall with the use of conventional chemical agricultural methods.

Pesticides and herbicides also reduce the soil microbial community by killing them directly. They kill the insects and weeds they are intended to kill, but they also kill much of the microbial life in the soil, which reduces the natural biological fertility of the soil (via nutrients delivered by microbes) and also decreases the potential of the soil to sequester carbon.

A key to maximizing carbon sequestration in soil is shifting from chemical to biological agriculture, which, among other practices, involves significantly reducing (and ideally eliminating) the use of chemical fertilizers, pesticides and herbicides. This reduces the amount of these chemicals that run off into rivers and watersheds.

Also, practices that increase soil carbon increase water holding capacity of soil and decrease runoff. For every 1% increase in soil organic matter, soil can hold an additional 17,000 to 25,000 gallons of water per acre. So increased soil carbon translates to decreased runoff, and in particular, decreased runoff of fertilizers and pesticides used in agriculture.

Some key management practices to sequester carbon on cropland are no-till or reduced tillage methods and use of cover crops, i.e., crops planted not for harvesting but to return nutrients to the soil. Tillage exposes soil carbon to oxidation, and in the long-term, reduces air and water infiltration and increases runoff. Cover crops in areas with climates similar to Maryland or colder are usually planted in the fall after harvesting the last “cash crop” (crop harvested to be sold). Ideally, cover crops are then mowed before spring planting to create a mulch layer that retains rain water, reduces erosion, and mitigates soil temperatures in the summer. This mulch layer also reduces runoff, and thus runoff of agricultural chemicals into watersheds. Ideally, spring planting is done through this mulch layer, with minimal disturbance of the underlying soil.

In summary, these practices 1) involve significantly reducing and ideally eliminating the use of chemical fertilizers, pesticides and herbicides, and 2) increase water holding capacity of the soil and land so that all runoff (including runoff of chemicals) is reduced.

Dr. K.K. Das, Director of the Sundari Mohan Seba Bhavan Hospital (<http://sundarimohan.org/>) in Silchar, India, is a member of the ROW Foundation. He mentioned that there seems to be a significant level of increase in Cancer cases in this area during the past fifteen years. Being concerned about this issue, and considering the **Barak River** (as in the adjacent picture) water as the primary drinking water source of the local people along the River valley, he spoke about conducting a bacteria testing of the water there, which will bring a lot of attention to the water quality from the local authorities. He mentioned that the only results the authorities care for is the bacteria level there, and a monitoring of that parameter is of key importance. He stressed that we should make efforts to monitor the bacteria levels in water. He said he would arrange for his Laboratory to test the bacterial level in water of the Barak River. Subijoy Dutta will be getting some water monitoring locations specified to him and the ROW Foundation will undertake some bacteria monitoring of the Barak River at certain locations in the greater Silchar area in 2017.



Donald Henry, our Chief Accounts Officer, prepared the **Financial Report for FY 2015-2016**. He was unable to attend the meeting. Donald mentioned about the need to establish a clear and understandable budget; fiscal infrastructure and soundness to support grant writing and support from other organizations.

The meeting adjourned at 3:30 PM