WINTER 2011-2012

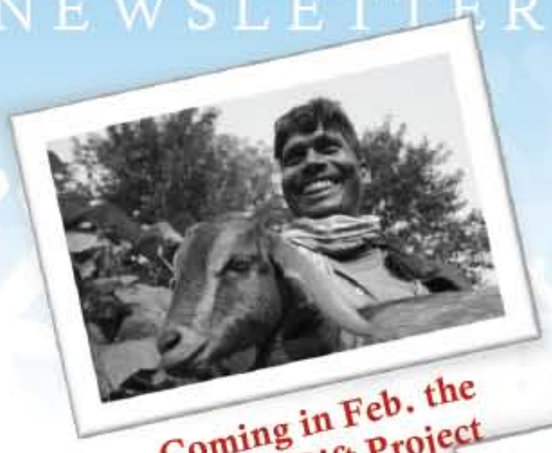
the

Filters for Families

Photos from Parasi NEWSLETTER

Women Police Unit in Parasi, 2012

SONO Table Top Model for Sioux Reservation



Coming in Feb. the Living Gift Project

Waiting in Kathmandu for bus to Parasi, June 2012

Meeting with local villagers and government officers at the field office filter factory

Hitesh, Linda, Kelsey preparing dinner, June 2012

Sharmila and Dhanu getting ready for a meeting with the local government office in Parasi. May 2012

Kerosis from Arsneic poisoning in a local Brick worker.

122° F, Hives, Personal Monsoons, and Smiling Children

Summer in the Terai was almost unbearable, the hottest temperatures in eight years broke our digital thermometer at 122° F. We constantly dowsed ourselves with menthol white powder for short cooling sessions and to dry the perpetual personal monsoon our bodies gushed every day. The summer team was amazing there was absolutely no complaining by anyone. Projects were completely early, allowing us to bus back to Kathmandu for cooler temperatures and attend more government meetings. Browse through the newsletter to see the wonderful projects and the special people who are helping Filters for Families in Nepal and Pine Ridge S.D. Sharmila and I focused on holding meetings with local and national government officials bring the filter requests from the villagers to their fiscal agendas. Some fruit has blossomed from the meetings, the local Parasi government added SONO filters to their 2013 budget. Some funds should be available in late March.

A Wonderfully Merry Christmas to All of You, Linda

Save the Date!

Jazz for Peace
February, 2013

Look for details coming in Janurary concerning the Benefit Concert for FFF by Jazz for Peace in Denver
info@jazzforpeace.org

Living Gift
February, 2013

February newsletter will feature Karen Flewelling's "Duck, Goat and School" project with FFF Nepal.
Mathew Pearson Memorial Project installs two wells and filters in schools.

Conference
May 18-23, 2013

"Heavy Metal Exposure in Economically Under developed Communities"

The Art and Science of Professional Judgment
Montreal, Canada
www.aihce2013.org

A Tale of Two Brothers


Melanosis


SKIN ULCERS

In April 2011 Filters For Families Nepal received a call for help from Ward 9, Manari, Nawalparasi. A health worker reported that villagers were very sick from arsenic poisoning. Among them was Ram Chaudary, a 40-year-old man diagnosed with cancer who later died on April 22. Ram was the oldest of three brothers with 8 children among them. Ram's brother, 30 year old Ramesh was examined by Dr. Smith and found to have 3 skin ulcers, extreme melanosis, severe kurtosis, additionally he was diagnosed with stomach cancer a month later. Dhanus, FFF Field Manager, tested the well water that the Chaudary family shared with 6 other families and found the arsenic values were very high, 600 ppb. A survey of some of the local people identified several with several cases of arsenicosis. A woman in her 40's living nearby suffered from severe melanosis and keratosis.

The two filters brought to Manari that day were installed in the Chaudary's home and the home of the women with keratosis. The same day an emergency meeting was held with the villagers where FFF Nepal promised to bring more filters in 3 weeks. A special call went out via email for donations. These donations provided funding for 22 SONO filters. Dr. Munir helped by sending internal filter parts from Bangladesh.

Sadly, a few months after this visit, Ramesh died from a heart attack. His home, Manari Village, still needs 85 more filters.


Community Meeting


Keratosis


SONO in Manari

Kim, Ian and Eric
Science & Art Camps Dec. 2011

In October of 2011, I began planning a trip to Nepal with two of my friends; Eric and Ian. As we began planning our trip, we had two objectives in mind – to hike the Annapurna Circuit, and to volunteer and become immersed in a local community. The Annapurna Circuit is considered one of the best treks in the world; typically taking about 21 days, to hike through distinct regional scenery of rivers, flora, fauna, and above all – mountains. For our second goal, we were fortunate to connect with Linda Smith, Director of Filters for Family (FFF). Linda encouraged us to use our backgrounds in science and photography to teach hands-on classes to kids and young adults.

When we arrived in Nepal in November, we found our first month of travel exciting and relatively easy, because most everyone spoke English. As we headed toward our teaching destination in Parasi, our trip became much more challenging. In the small town of Parasi, (located off the tourist circuit), English was rarely needed and infrequently spoken. As we struggled to find our destination, we quickly became lost in a maze of unmarked streets. After some wandering, and a lot of luck, we finally ran into a group of high school students who actually turned out to be the group we were going to teach! They led us to Filters for Families and we got settled in.

Over the course of the next week we taught crafts to kids ages 5-10 each morning, and when the high school students arrived in the afternoon, Eric and I taught science while Ian taught photography. Science lessons included plate tectonics, watersheds, soil and sediment erosion, GPS and map reading, and Arsenic removal. They were so enthusiastic and excited to learn! Eric and I were both very impressed with their science knowledge, intelligence, and eagerness to participate. They were excited to get to know us, and very welcoming. While the boys played badminton, some of the girls taught me some common Nepali phrases and wanted to know all about my life back home. A couple of the girls even brought me flowers and henna on the last day of class and decorated my hand in pretty designs! It turned out beautifully and I was sad to see it fade a few weeks later. Eric, Ian and I; along with Linda to go see the Arsenic removal techniques, educational methods, and difficulties that FFF faces to provide clean drinking water.

With the younger kids we focused on crafts. The kids had a blast drawing, pasting, cutting, and gluing to create projects they could take home. On the final day, Eric and Ian preformed a puppet show, which was silly and filled the kids with laughter. They all had such beautiful smiles! Afterwards we started another craft project where we taught the kids to make paper boats and hats. We soon found that at least one or two of the boys far exceeded our simple paper folding skills as they created a multitude of beautiful paper flowers. Such a fun surprise! We quickly filled an entire vase with their colorful creations.

In our free time from teaching we were able to tag along with Linda to go see the Arsenic removal techniques, educational methods, and difficulties that FFF faces to provide clean drinking water to everyone in the affected region. Seeing the conditions in which people lived, and how sick they were was very eye opening and very despairing. Arsenic poisoning is a very real and very serious problem, which FFF is doing truly amazing work towards minimizing.

Our week with FFF went by quickly, and we soon found it time to say our goodbyes. Everyone we had met was friendly and welcoming and it felt like we had become part of a family there in Parasi. It was so rewarding to get to know the kids and I was sad to say goodbye. I hope that someday I can return, but I'll never forget all the fun we had and the people who quickly touched our hearts and became our friends. ---KIM

Read Eric's letter on the "Filters For Families" Facebook page

TRANSLATORS: Couldn't have done it without their patience, creativity, and kindness. Hitesh, Salihe, Sharmila, and Sahen

Teaching Summer 2012

Mira and Hitesh learning to plant rice in Parasi.

I spent about six weeks in Parasi during the monsoon season. My mornings were spent teaching English to some village kids who were out of school on break and I spent most afternoons interviewing the different organizations that work in water sanitation. Some of my favorites moments include drinking tea and taking evening walks with my neighbors, rice planting and playing endless games of “Head, Shoulders, Knees and Toes” with the kids. I miss Nepal everyday! Mira

Ronnie, Mira, and Kelsey take a break from teaching at Chitwan Park. Ronnie and Mira taught Art and English classes to children on summer break. Ronnie donated a suitcase full of books to local schools to start a well needed library. Kelsey taught Biology, English and sang Justin Beaver songs with students.

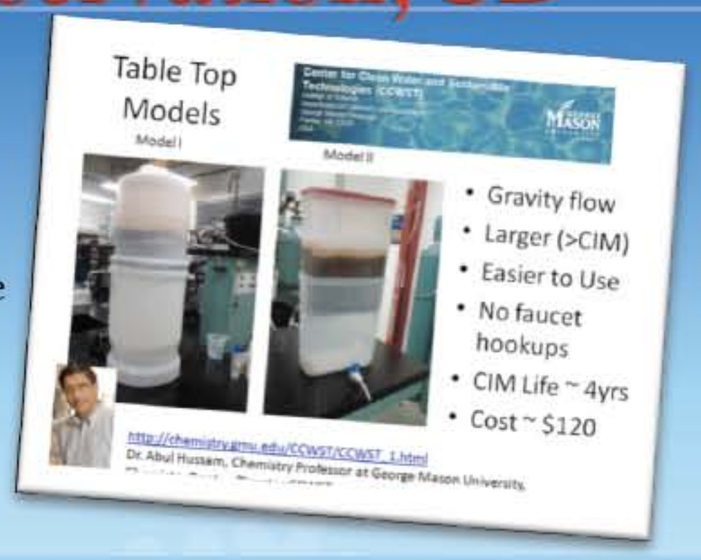
Second Quilting Class Taught by Sharon

This is the second quilting class Sharon taught in Parasi. She taught two classes during 5 days, each class made a beautiful quilt and the women learned techniques to made purses in January 2013. We look forward to her new classes. Sharon survived the 122 temperatures with grace!!!

Pine Ridge Reservation, SD

Canister Model connects to the faucet. The model didn't work as well as expected for several reasons:
1) Flow rate was too fast
2) Too many faucet styles made it difficult to connect the filter tube to the faucet

Pilot study sponsored by Calvary Episcopal Church Golden, CO and Zubin Mehenti



GMU tests on the Gravity Flow/Table Top model showed this model to be very effective in removing metals and easy to use.

Dr. Linda Smith and I went to Pine Ridge Indian Reservation in South Dakota for a formal review of the Filters for Families (FFF) report regarding the water results on Pine Ridge. Sonja Weston, Health and Human Services Director presided over the meeting. Dr. Smith presented FFF's report emphasizing areas of concern, health issues, and the test filter results. She listed a set of possible solutions to be implemented by HHS, such as setting up a database for all water research findings, identifying and managing the installment of filters in homes, and drilling a safe water well for affected residents to gather water for drinking and cooking purposes to name a few. She suggested a collaborative effort and partnership with the tribal council and Health and Human services.

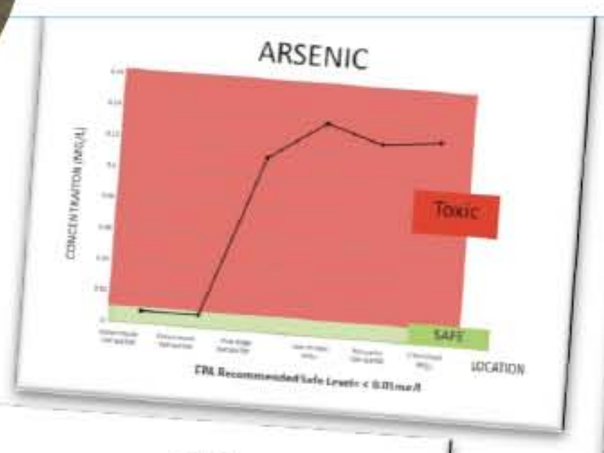
The Filters for Families report was opposed by the Indian Health Services field officer. He suggested the report was inaccurate and FFF's intent was to scare the people, he said they had no approval to water test or do work on the Pine Ridge reservation. The HHS director and other committee members rebuked his statements. Sonja Weston eloquently stated, "Filters for Families was directed to report to her and work within the HHS umbrella. I have had the privilege to work with these ladies for the past three years. Their intent is to help us with a problem; we know has been affecting us all and has been ignored way too long." The HHS committee voted to accept the report and to partnership with Filters for Families. The motion passed by a two-thirds majority.

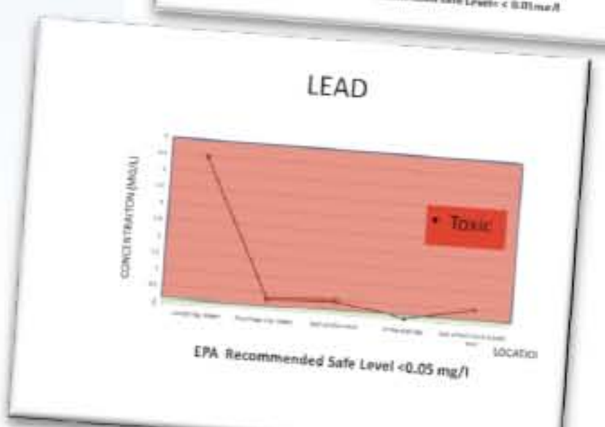
I am honored to work alongside Dr. Linda Smith as her tribal liaison in her efforts at Pine Ridge, South Dakota. It has also been an honor to work with Sonja Weston, HHS Director, Robin Tapio, Ogallala Sioux tribal councilwoman, Johuanna Patterson, HHS coordinator and many others. I regret [her departure] but wish Sonja Weston well in her new endeavors. She is taking a sabbatical leave from Tribal government. She is a strong leader and stateswoman. She loves her people and will be sorely missed.

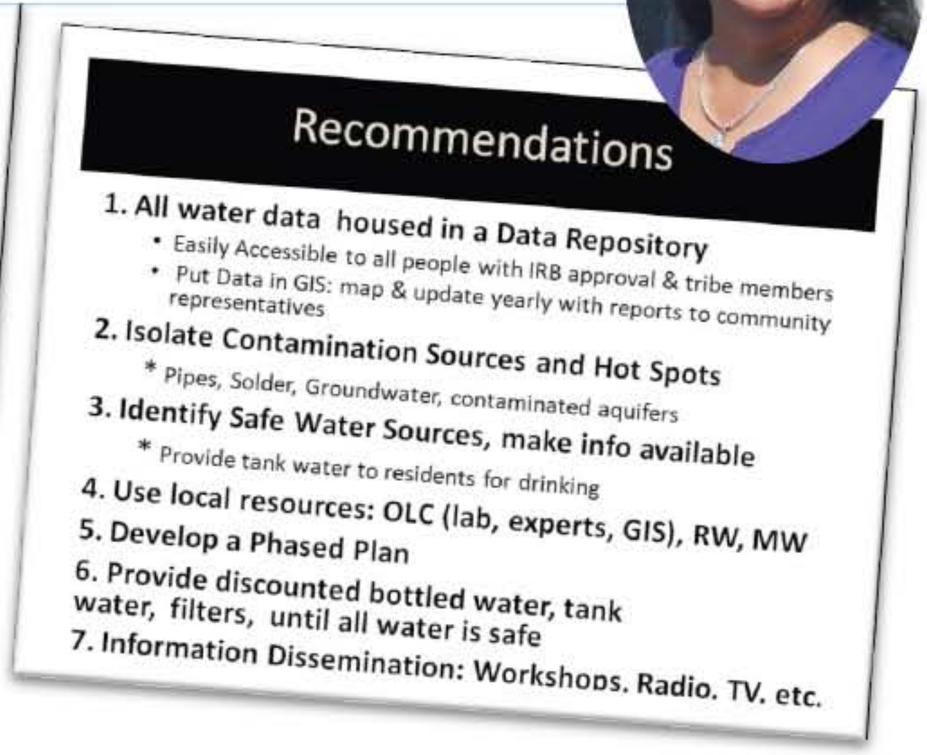
Please wish us well as Filters for Families continues to push forward to bring safe drinking water to the people of the Ogallala Sioux Nation on the Pine Ridge reservation.

Charlene Harjo Irani
Oklahoma Seminole/Kiowa Nation member

During our water sampling program we met JP Marshall who lives in Porcupine. See results from water analyses in the graphs to the right. During the testing program JP was diagnosed with colon cancer and his granddaughter was diagnosed with epilepsy.







Fundraising Projects

Edgewater Coffee House

Benefit Concert

SONS OF THE BURBS
Harry, Jim and Phil

A huge thank you to Sons of the Burbs and Gina, owner of the Edgewater coffee House for hosting the Benefit Concert on May 1 2012. The coffee house was bouncing with music, toes were tapping and a fun night was held for all. The event plus the silent acution raised over $1500 for Filters for Families. Betty Ill andLinda hung Nepali cafts and set up the auction tables and food, while Charlene Irani manned the door. It was so much fun sharing the evening with friends who had voluteered in Nepal and South Dakota as well as those who have encouraged us thourgh the years.

Craft Fairs

Half the Sky Fair, sponsored by the Women's College at the University of Denver, supports projects working in developing countries where women are marginalized. Our booth raised about $400 for filters.

Thanks to the people who helped:
Betty Ill, Carolyn Muñoz, Charlene Irani, Carol Christian, and Santoshee Manandhar

Bear Valley Church Fair brought in another $380 for our filter projects. Linda and Carol greeted friends at our booth and enjoyed visiting with past volunteers and new friends.

Sawyer Filter

Sawyer Filter Facts:

- US EPA Tested & Approved
- Up to 500 gallons of potable water a day... cleaner than US bottled water
- Removes all harmful bacteria & protozoa
- Weighs < 8 ounces; sets up in 5 min.

Sawyer filters remove:

Waterborne Diseases	EPA Requirement	Exceeds EPA Recommendation	Removal Rate
Bacteria Which Cause: I.E.: Cholera, Botulism (Clostridium botulinum), Typhoid (Salmonella typhi), Amoebic Dysentery, *E. coli*, Coliform Bacteria, Streptococcus, Salmonella	99.9999% 6 log	Yes	99.99999% 7 log
Protozoan (Cyst): I.E.: Giardia, Cryptosporidium, Cyclospora	99.9% 3 log	Yes	99.9999% 6 log
Viruses: I.E.: Hepatitis A (HAV), Poliovirus, Norwalk, Rotavirus, Adenovirus, Hepatitis E (HEV), Coxsackievirus, Echovirus, Reovirus, Astrovirus, Corona Virus (SARS)	99.99% 4 log	Yes	99.9997% 5.5 log

Purifier / Filter

* Filter does not remove dissolved solids, including chemicals and heavy metals.

Sawyer Filter Technology

With the technology derived from kidney dialysis, Sawyer worked with a fiber manufacturer to actually improve the hollow fiber membrane technology. In order to improve both the filtration rates and longevity of the filter, they needed something even more precise and rugged. The fiber composition had to deliver exactly 0.1 & 0.02 micron filtration 100% of the time to ensure no bacteria would get through, and the membranes had to be sturdy enough to withstand backwashing which allows the filter to be cleaning and reused.

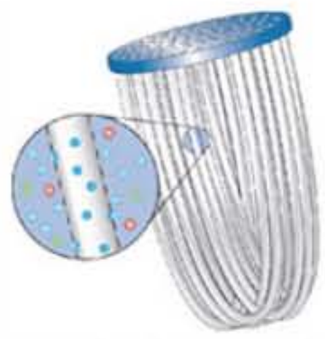


Diagram of a Hollow Fiber Membrane

Sawyer's Hollow Fiber Membrane filters are small, portable, easy-to-use, reliable, inexpensive, and can last more than a decade without needing to be replaced.

The proprietary water filters are comprised of tiny "U" shaped micro-tubes that allow water to enter into their core through tiny micro-pores. The high number of those tiny tubes and their surface area allows the filter to have one of the fastest flow rates in the world. This high flow rate eliminates the need to store water, reducing the possibility of water contamination after the filtration process.

Each filter is certified for ABSOLUTE microns; that means there is no pore size larger than 0.1 or 0.02 micron in size. This makes it **impossible** for harmful bacteria, protozoa, or cysts like E. coli, Giradia, Vibrio cholerae and Salmonella typhi (which cause Cholera and Typhoid) to pass through the Sawyer PointONE™ biological filter. At 7 log (99.99999%) the filter attains the highest level of filtration available today.

If viruses are an issue, we offer the Point ZeroTWO Purifier (0.02 micron absolute pores), the first and thus far only portable purification device to physically remove viruses, which it does at a >5.5 log (99.9997%) rate, exceeding EPA and NSF recommendations.

Filters for Families is using the Sawyer filter in areas that are arsenic-free. We've installed the filter in five schools in Nawalparasi, two new wells were drilled to 35 ft to avoid arsenic aquifers. We developed a two bucket system with a stand for the students to have a 50 liter reservoir of water to drink right from the tap. The flow rate is 45 liters/hour so it takes only an hour to fill up the reservoir. We asked the school to sign an agreement with us to manage the filter. Pictures coming in Feb. newsletter.

SONO Filter

2-3 Bucket System made in Nepal

In-line Model to be atttached to a faucet or under the sink

Slides from Dr. Munir's Talk, if you have questions please contact Dr. Smith, director.linda@gmail.com

Mechanisms of Arsenic Removal

- Corrosion of Fe^0-composite continuously generates hydrated iron oxides with high specific surface area.
- Mn (ca. 0.2%) in the Fe^0-composite acts as a catalyst for rapid conversion As(III) to As(V)
- Arsenate is removed by surface complexation with HFO (possibly magnetite and maghemite (γ-Fe_2O_3)).
- Removal process is independent of the concentration of As(III) + As(V) input concentration.
- Excess Ca^{2+}, Fe(II)/Fe(III) and other divalent cations enhance adsorption and complex formation through double-layer charging.
- Further, cementation reactions produce a porous high surface area insoluble spent material very similar to natural HFO with a high capacity for arsenic removal.

Active Material

Composite Iron Matrix (CIM)

- Uniform, porous, lighter, and less fines
- Preformed Hydrous Ferric Oxide (HFO)
- Active-surface with large surface area
- Insitu continuous formation of HFO during filtration
- Continuously increased capacity
- Removes many other toxic inorganic and organics
- Extremely low disposal hazard
- Indigenous, inexpensive, and long lasting(≥ 5 yrs)

Charcoal: Cooking Wood

- Removes organic compounds - Pesticide residues

Inactive Materials

Sand: Processed River Sand and Brick Chips

- Flow stabilizer
- Disperser
- Coarse particulate filter
- Mechanical stability

- **Low cost**
- **No chemical is added**
- **Manufacture in Kushtia from locally available materials at 200 units/day.**
- **20-50 L/hour meets the daily drinking and cooking need for 2 families**
- **Effluent As(Total)** < 10 ppb (CL 95%)
- **Effluent As(III)** < 5 ppb (CL 99.9%)
- **No pretreatment of water is necessary- a completely non chemical filtration system.**
- **No backwashing or regeneration is necessary.**
- **Removes iron, manganese, heavy metals, nitrate, nitrite and many anions quantitatively.**
- **Active Media Life time:** 5 Years minimum
- **Maintenance:** Change or wash upper sand layers/ yr.
- **Waste:** Completely nontoxic, non hazardous – passed TCLP, TALP
- **Passed several rigorous ETVAM test programs**
- **Water quality: Excellent**
- **Does not require any energy input.**
- **Approved by Govt. of Bangladesh.**

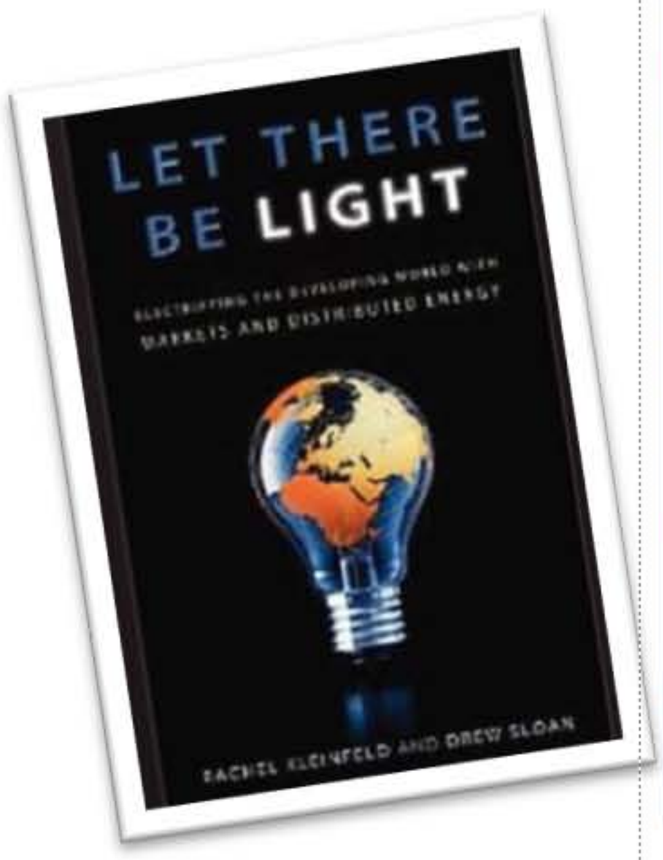
CIM DISPOSAL AND RECYCLING

1. CIM is a natural non toxic material
2. CIM can be disposed in the open
3. CIM does not leach arsenic (Grainger-USEPA)
4. CIM can be recycled and reused
5. CIM can be used to make metallic iron

SONO IS A "GREEN" FILTER

Toxicity Characteristic Leaching Procedure (TCLP) of used CIM: Non detectable and non hazardous (Limit 0.50 mg/L)

Great Books on Development



"Providing electricity to the unlit and unstable parts of the globe is crucial to jump-starting development, improving the environment, and stabilizing fragile states that ferment man of today's security threats. *Let There Be Light* shows the failures of centralized electricity to meet these challenges-and describes how distributed, renewable energy such as solar and wind poser can work. But, Kleinfeld and Sloan argue, it is not enough to harness the power of the elements. To scale, distributed energy must harness the power of the market. Taking on the major challenges that have impeded distributed energy's success, this book describes the roles development donors, social entrepreneurs, venture capitalists, the military, and the business world can play to make lighting the developing world a reality."

Truman National Security Institute

Check the next Newsletter to see how this book has influenced how FFF is working in Pine Ridge, South Dakota and Nepal. *Linda

Trekking Photos from Friends

Mt. Pumori (7,161 m/ 23,494 ft)
8 km west of Mt Everest. Photo taken by Adam Jones on his ascent to Everest Camp 3, May 2012

Yaks trekking from Lukla to Everest Base Camp. Photo taken by Lee Recca, May 2012

5 Ft. tall Cranes near the Army Camp in Parasi. Photo by Mira Shackelford, June 2012.

Send Tax Deductable Donations to:

Filters for Families
2844 Depew St.
Wheat Ridge, Colorado
80214

Pay Pal:
http://filtersforfamilies.org/donate.shtml

Thanks to Matt Shaw, Mary Taylor, and Elton Smith for their wonderful help with the newsletter.