

**ENVIRONMENT AND PUBLIC HEALTH ORGANIZATION - ENPHO
NEPAL RED CROSS SOCIETY - NRCS
TECHNOLOGY TRANSFER WORKSHOP**

Kanchan™ Arsenic Filter (KAF) Partner Organizations Training



**KATHMANDU, NEPAL
JANUARY 16-20, 2006**

PROJECT IMPLEMENTERS WORKSHOP

HOST: Environment and Public Health Organization - ENPHO
New Baneshwor, Kathmandu, Nepal

LOCATION: ENPHO Kathmandu office

DATES: January 16 – 20, 2006

TARGET AUDIENCE: Entrepreneurs / NGOs distributing or planning to distribute the Kanchan™ Arsenic Filter in the Terai region of Nepal

FINANCIAL OR INKIND SUPPORT FROM: World Bank Poverty Alleviation Fund, Simavi Foundation, ENPHO, and CAWST.

OBJECTIVES

As stated in an invitation letter, the primary objectives of this Workshop were to:

- Introduce the 75 kilogram version of the concrete filter body,
- Train entrepreneurs on the construction, installation, and maintenance of the Kanchan filter using the Gem 505 plastic filter body,
- Discuss past experiences in implementation,
- Evaluate entrepreneur competency
- Introduce entrepreneurs to promotion and marketing techniques and business management,
- Review the water cycle, water contamination and health effects, mitigation options, and testing methods.

FACILITATION TEAM

The team was comprised of the following people:

- Tommy Kit Ka Ngai - CAWST
- Bryan Fofonoff - CAWST
- Bipin Dangol – ENPHO
- Makhan Maharjan - ENPHO

With Session Presentations by:

- Arinita Maskey - ENPHO
- Dr. Narayan Prashad Upadhyaya – ENPHO
- Cathy Kang –MIT Sloan Fellows student
- Daisuke Ueno –MIT Sloan Fellows student
- David Lucchino –MIT Sloan Fellows student
- Suzanne Frey –MIT Sloan Fellows student
- Yann Le Tallec – MIT PhD student

Translation English to Nepali

- Bipin Dangol – ENPHO
- Makhan Maharjan - ENPHO

PARTICIPANTS

Attending the workshop were 40 Participants from the Terai region of Nepal. Four of the participants were women (10 %).

Twenty three organizations were represented at the workshop (see Appendix for a complete attendees list).

WORKSHOP

INTRODUCTION

This workshop was part of the training being provided by ENPHO and Nepal Red Cross in support of the ongoing Kanchan™ Arsenic Filter distribution projects being implemented in five of the twenty districts in the Terai region of Nepal. Of the twenty districts 11 are known to have high levels of arsenic contamination in their tube well water supplies. As of the end of year 2005 there are approximately 3000 Kanchan or Biosand filters installed in Nepal. These 3000 filters are made up of a combination of large concrete filters and two plastic versions of the Kanchan. The current project has enough funding to install an additional 3000 filters before the end of 2007. The funding allows for significant training to be conducted in conjunction with the filter distribution. Three project coordinators and thirteen community stewards have been hired to cover the five districts. A 3-days Staff Women Motivators Training was conducted in Birgunj between Jan 26-28, 2006 and is reported on under separate cover. A three-day government worker training course was conducted between January 30 and February 1, 2006, which is reported on under separate cover. Five additional two day workshops are to be completed before the end of June 2006 and will include, teachers, health workers, and village leaders. A summary of the project plan is provided in Appendix A.

CAWST staff facilitated during this workshop with Mr. Bipin Dangol of ENPHO apprenticing as trainer. Mr. Dangol will become the lead facilitator for future training coordinated by ENPHO. CAWST will continue to provide ENPHO with support on workshop, content, structure, and flow.

Initially scheduled for a full five days, the workshop was shorted to four days because of a full day curfew imposed by the Nepali Government in an effort to avoid planned public demonstrations by opposing political parties. The curfew was imposed between 8 am and 6 pm on Friday January 20, 2006, which was scheduled to be the last day of training. The decision to cancel the final day of training was made before noon on Thursday January 19. With the exception of a session on Sales and Marketing Strategy, the planned content of the workshop had generally been covered in the first four days with primarily housekeeping issues left unfinished. Those housekeeping issues left unfinished included; entrepreneur competency evaluations, entrepreneur contract signing, and certificate distribution.

The workshop was conducted during the same period that a MIT Sloan Business School Global Entrepreneurship Lab Project Team was in Nepal. The G-Lab Team objectives were focused on increasing the rate of adoption of the Kanchan™ Arsenic Filter in the Terai region of Nepal. Presentations by project team members were incorporated throughout the four days of the training.

MIT G-Lab project deliverables focus on five major areas for several regions in Nepal:

- Awareness/education program on safe drinking water issues
- Sales and marketing strategy
- Supply chain engineering (to include distribution strategy)
- Micro-financing scheme for customers who cannot afford to pay for the filter in full
- Strategy for global expansion (possibly into Myanmar, Vietnam, India, Thailand, or Bangladesh)

OBSERVATIONS

- 1) The workshop was opened by Makhan Maharjan, program manager at ENPHO, and welcoming addresses from Dr. Suman Kumar Shakya from ENPHO, Padam Kumar Khadka from Nepal Redcross Society (NRCS) and Jhanka Narayan Shrestha from Poverty Alleviation Fund (PAF) .
- 2) Participants were polled to determine their expectations for the planned 5 days of training. Participant expectations included:
 - What is water cycle?
 - What is arsenic and pathogens?
 - Health effects of arsenic in drinking water
 - How to construct the KAF, how to operate and maintain the KAF?
 - How does the KAF remove contaminants?
 - How to be a good program implementer? What are the methods to effectively promote the KAF?
 - Need a certificate at the end of the training workshop
- 3) Barriers encountered by program implementers in filter distribution were vocalized and included:
 - Lack of awareness on arsenic and pathogens among users
 - Very poor villagers cannot afford
 - Villagers are confused because of inconsistent filter subsidy scheme
 - Lack of coordination between different agencies
 - Lack of monitoring and follow-up activities
 - Need water testing knowledge and accessibility to water testing facilities
- 3) Solutions suggested by program implementers:
 - Produce effective IEC materials for awareness and education
 - Get government financial support to subsidize filters

- Develop monitoring and follow-up mechanism
 - More policy coordination between government, NGO, local organizations, and stakeholders
 - Promote KAF through street drama, local FM station, and TV
- 4) During a workshop session on awareness and education participants identified the following groups to target:
- Women (all women groups)
 - Village leaders
 - Community based organizations
 - Nongovernmental organizations
 - Schools, teachers, and students
 - Savings groups
 - Media
 - District, NGOs, Government, and Universities

During the same session participants sited these activities could be directed at the target groups:

- Women motivator visits
- Rallies using school students
- Street dramas
- Orientations with village leaders, community based organizations, school teachers, and students
- A door to door campaign

4) Participants were keenly interested in information presented during a session on Micro Finance possibilities by the MIT G-Lab team. Much local research and networking was conducted by the MIT group in Kathmandu prior to the workshop. One of the most viable options to come out of the investigation and session was the concept of setting up local savings groups or utilizing existing savings groups to finance filter purchases.

5) Participants were presented with two options for *KanchanTM* Arsenic Filter component distribution during the MIT G-Lab presentation on supply chain management. For both scenarios it was presented that ENPHO could obtain better pricing of the Gem 505 filter components by buying in large volumes and as such would purchase and distribute the buckets, basins, lids, and pipes. Option one on distribution had ENPHO store the components in Kathmandu and have them delivered to the regional entrepreneurs as they submitted orders directly to the ENPHO office. Option two had ENPHO distribute the filter components to regional distribution centers and entrepreneurs would pick up parts as necessary from the regional distribution center. Through discussion the group agreed option one was their preference. During the presentation it was communicated that cost of the filter component (bucket, basin, lid, and pipes) was approximately equal to the 50% subsidy that ENPHO was provided. For the scope of the existing funded project (2500-3000 filters) the filter components would be provided without charge to the entrepreneurs in lieu of a direct cash subsidy.

6) Three 75 kilogram concrete filter molds were available to use during the workshop. The molds had been manufactured in Birgunj Nepal. The cost of materials was 9750 Nepali rupees. The labour charge was 8250 rupees. The total was 18,000 Nepali rupees or C\$300 at C\$1:60 NRs. Some of the welds on the interior of the molds had not been ground smooth. Three participants indicated they had previous hands on experience with the larger concrete filter. Those three participants were delegated to be group leaders and the remaining participants were divided equally onto the three teams. Each group had the opportunity to screen and wash media and pour one filter.

The nighttime temperature in Kathmandu dropped to the low single digits (degrees Celsius) so the plan was to let the concrete set for 48 hours prior to stripping the molds. However, due to the city wide curfew and cancellation of the fifth day of training an attempt to strip the molds was made after 24 hours set time. All three interior molds pulled out well but the concrete was still very soft and the exterior of the molds was not removed during the course of the workshop. On the day following the workshop the mold stripping was completed. The nose pulled off on one of the filters. A second filter had a significant void just under the nose piece due to inadequate concrete distribution during the pour. The third filter was intact on extraction but had several small cracks and weep holes in it. On Friday January 19, 2006 CAWST staff poured a filter and extracted it on Sunday January 21. The filter was intact on extraction but had several weep holes in the body. The mix proportions used for the tree filters during the workshop was 22 litres gravel, 22 litres fine sand, and 11 litres cement. Only 11 litres of gravel remained for the Saturday pour so the mix used was 11 litres gravel, 11 litres coarse sand, 22 litres fine sand, and 11 litres cement. The Saturday mix appeared to be slightly too wet and this may have contributed to the poor quality. During the workshop some participants commented that 11 litres of cement would not be enough in this case.

A ¼" diameter soft plastic tubing line was used in the construction of the concrete filter bodies. The tubing line worked well and flows were unrestricted.

7) To disinfect the gravel and piping on the Gem 505 filter ENPHO pours two 2 bottles of Piyush (60 ml 0.5% chlorine solution into the water prior to installing the media.

8) Group size was very large (as many as 50 people in the classroom with facilitators, ENPHO staff, and MIT G-Lab team members). In the course of trying to cover all the workshop material within the limitations of the Kathmandu curfew it was proposed to the group that we instruct on the Gem 505 and new 75 Kg concrete filter simultaneously. Those most interested in the concrete filter would attend that session and those most interested in the Gem 505 would attend that session. Most of the organizations were represented by two people so if they desired each organization could have representation at both sessions. The group consensus was that everyone should get the instruction on both the Gem 505 and the 75 Kg concrete filter. The schedule was set so as to provide instruction on both filter body types. Both the Gem 505 and concrete filter bodies were constructed but only the Gem 505 installation procedures were practiced.

9) The Kanchan filter is constructed in a manner that allows for a maximum flow rate of 0.5 liters per minute. The flow rate is controlled by holes made in the outlet piping.

RECOMMENDATIONS

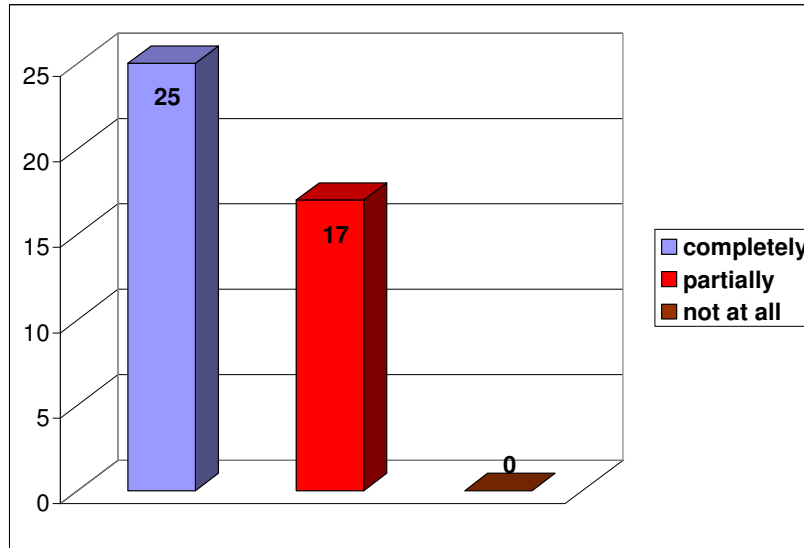
- 1) Grind smooth all welds on the interior of the concrete filter molds.
- 2) Increase the proportion of cement used in the concrete filter mix to 13 litres cement and reduce the gravel and fine sand components to 21 litres each. Pour several filters using a dry mix with these proportions and observe the results.
- 3) Restrict the number of participants in filter construction workshops to a maximum of 16 people. Additionally consider four to six people per concrete filter mold to be optimum. With two molds available 16 people would be divided into 4 groups of 4. Two groups would pour on day 2 of the workshop and strip on day 3, the remaining two groups would pour on day 3 and strip on day 4.
- 4) Adopt the methodology of disinfecting the gravel and tubing used by ENPHO on the Gem 505 Kanchan filter for all versions of all household size biosand filters.
- 5) Investigate and implement a viable alternative to using the sand as the flow governing parameter in the concrete biosand filter. Possibilities include but are not limited to using a smaller diameter tubing line, or pinching off the end of the 3/8" diameter tubing line and poking sufficient holes in the line to allow a maximum flow rate of 1 litre per minute from the filter before the media is installed.

APPENDIX A:

EVALUATION RESULTS

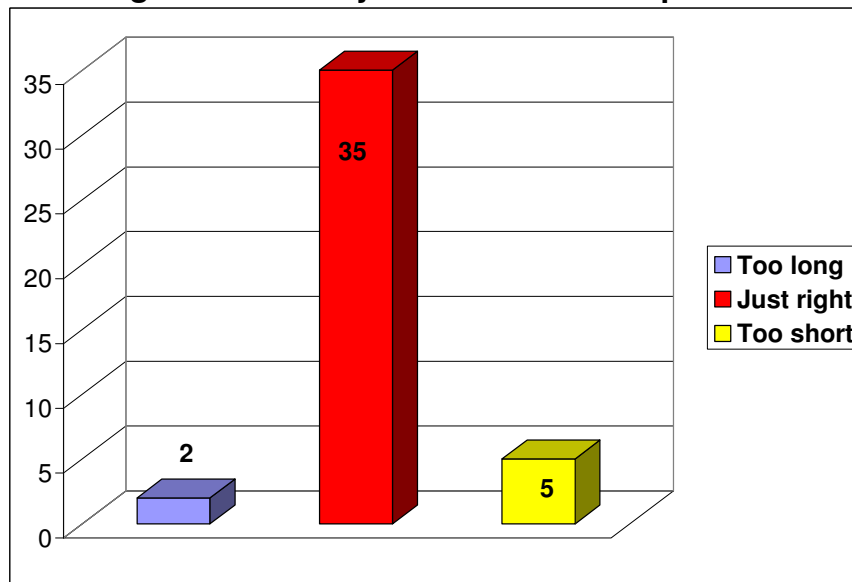
The following are a summary of the results of the evaluation distributed to participants at the end of the workshop. 42 including evaluations were completed (two from NRCS facilitators).

1. Did the workshop meet your expectations?



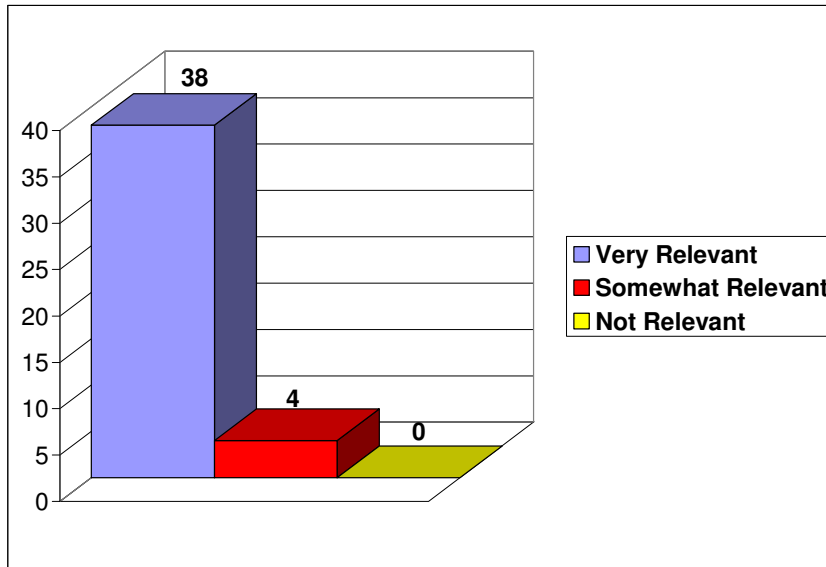
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2. What do you think about the overall length of the workshop? (considering the limits on your time and the topics discussed)



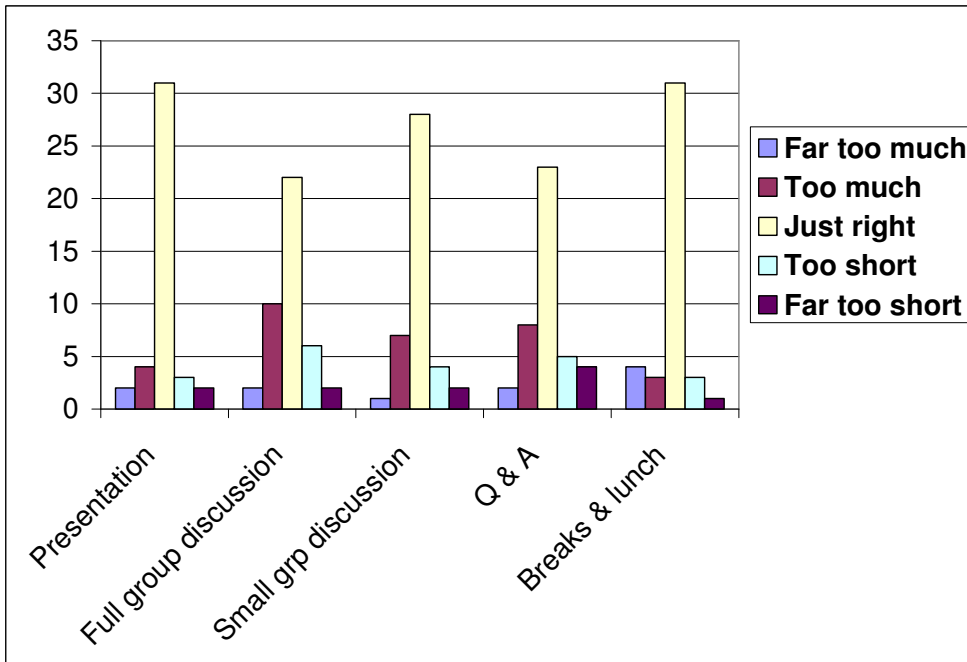
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3. How relevant was the workshop to your organizations/individual/project's needs?



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4. Rate the time allocation (balance) for:



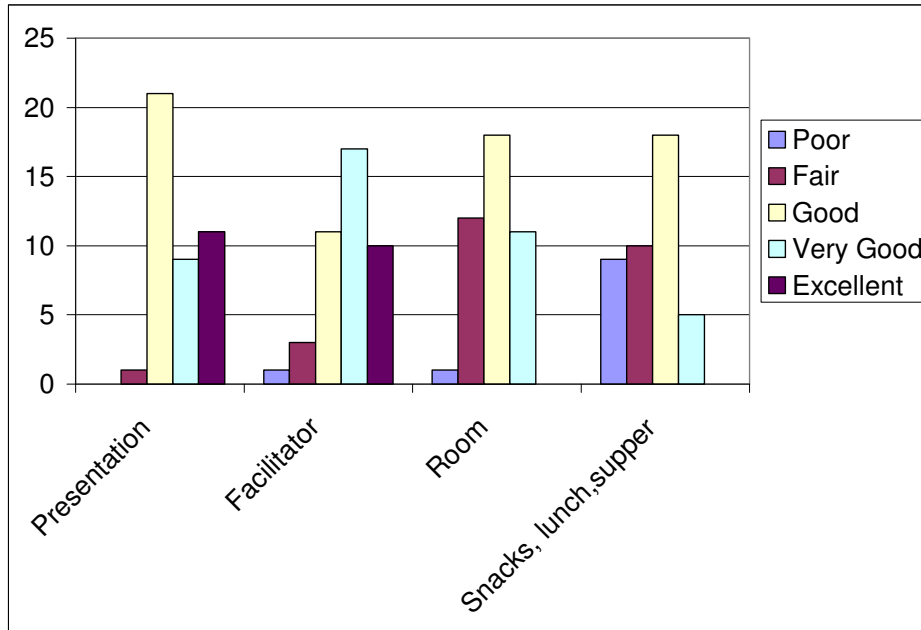
5. Which section or information was the most useful?

- Details on Kanchan Arsenic Filter
- Filter construction and installation
- Constructing Concrete Filter

6. Which portion of the workshop was the least useful?

- Nothing
- Microfinance and Marketing

7. How would you rate the following:



8. How would you change or improve the workshop? What would you like to see added or removed?

- Invite less participants
- Involve more community staffs
- Residential Training

9. Are there any topics on which you would like more information? Are there any other topics that would be of interest for a workshop?

- Arsenic Testing and mitigation approaches
- Public Health
- Lab Water testing techniques
- More information on concrete filter

10. If you had one minute to speak at the World Water Congress, what would you say?

- All people in the world must have access to safe drinking water
- Need to invest more on water and sanitation sector than in political issues
- Good water means healthy life and KAF can save life

11. Other comments about the workshop, CAWST or other issues in general?

- Training hall space is too congested because of many participants
- Facilitation is good
- ENPHO is doing important work for the nation and world. It can do if government supports its activities and CAWST continues to provide technical support to ENPHO.
- Need to provide handouts
- How to contact CAWST?
- Need training of trainers (TOT) by CAWST on water education

Kanchan™ Arsenic Filter Partner Organizations Training Workshop Schedule

Monday Jan 16

Tuesday Jan 17

Wednesday Jan 18

Thursday Jan 19

Monday Jan 16		Tuesday Jan 17		Wednesday Jan 18		Thursday Jan 19	
		8:30	Breakfast	8:30	Breakfast	7:30	Breakfast
		8:45		8:45		7:45	
9:00	Registration	9:00	Opening	9:00	Opening	8:00	Opening
9:15		9:15	Entrepreneurs speech	9:15	Q & A from yesterday	8:15	Microfinance
9:30	Opening - Introduction	9:30		9:30		8:30	
9:45	Expectation from participants	9:45	Awareness	9:45	Intro to microbiology	8:45	
10:00	Group agreement	10:00		10:00		9:00	Construct Gem505 - theory
10:15	Workshop agenda	10:15		10:15	Intro to epidemiology	9:30	
10:30	BREAK	10:30	BREAK	10:30	Microbial contamination in Nepal	9:45	
10:45	Water and its significance	10:45	Awareness	10:45	BREAK	10:00	
11:00		11:00		11:00	Microbial mitigation options	10:15	Install Gem505 - practical
11:15	Water Cycle	11:15		11:15		10:30	
11:30		11:30	Arsenic contamination in Nepal	11:30		10:45	
11:45	Water contamination	11:45		11:45	Hygiene and sanitation	11:00	
12:00		12:00	Arsenic health effects	12:00	Intro to concrete filter	11:15	
12:15	LUNCH	12:15	LUNCH	12:15	LUNCH	11:30	
12:30		12:30		12:30		11:45	
12:45		12:45		12:45		12:00	LUNCH
13:00		13:00		13:00	Construct concrete - practical	12:15	
13:15	Intro to KAF	13:15	Arsenic mitigation options	13:15		12:30	
13:30	Screen sand - practical	13:30		13:30		12:45	About CAWST
13:45		13:45	KAF technical details	13:45		13:00	Troubleshooting - practical
14:00		14:00		14:00		13:15	
14:15		14:15		14:15		13:30	Supply chain and pricing
14:30	KAF implementation model	14:30	BREAK	14:30		13:45	
14:45	Sales record bar chart	14:45	Water quality testing - theory	14:45		14:00	
15:00	Implementation pros and cons - small	15:00		15:00	Awareness	14:15	
15:15	group	15:15	Water quality testing - practical	15:15		14:30	Filters for families speech
15:30	BREAK	15:30		15:30		14:45	What is next?
15:45	Implementation pros and cons -	15:45		15:45	Marketing	15:00	
16:00	presentation	16:00		16:00		15:15	
16:15		16:15		16:15	BREAK	15:30	Closing & Evaluation
16:30		16:30		16:30	Entrepreneur contract	15:45	
16:45	Closing and evaluation	16:45	Closing and evaluation	16:45		16:00	
				17:00		16:15	BREAK
				17:15		16:30	Demold concrete filter - practical
						16:45	
						17:00	Adminstrative matters
						17:15	

PARTICIPANT LIST

	Participants	Organization	Title	Address	Project Country	Phone/Fax	E-mail	Working Language
1	Hemant Uppreti	Gramin Sewa Nepal	Member	Khailad-3,Hulak Bhajani, Kailali	Nepal	(+977) 091-580134,Fax 091-580135,Ktm no. 01-4444830,Fax 01-4421070	grameen sewa@hotmail.com.np	Nepali
2	Manoj Kumar Chaudhary	Gramin Sewa Nepal	Health Motivator	Khailad-3,Hulak Bhajani, Kailali	Nepal	(+977) 091-580134,Fax 091-580135,Ktm no. 01-4444830,Fax 01-4421070		Nepali
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		Multipurpose co-operative Ltd.					
14	Kapila AC	Pragatisil Women Development Multipurpose co-operative Ltd.	Deputy manager	Makrahar, Rupandehi	Nepal	(+977) 071-562356,071-560011,Fax 071-562542	Nepali
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22	Ramananda Thakur	Nawa Jivan Jyoti Yuva Club		Mudali, Parsa	Nepal	(+977) 051-5260157	Nepali

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30	Madan Gopal Chaudhary	Aviyan Sewa Kendra	Business	Ramgram, Nawalparasi	Nepal	(+977) 078-520124, Fax 078-520102, 520631		Nepali
31	Ram Kumar Baniya	Nepal Red Cross Society	Section Officer	Gaur, Rautahat	Nepal	(+977) 055-520482, 055-520855		Nepali
32	Rajendra Mahato	Nepal Red Cross Society	Health Worker	Gaur, Rautahat	Nepal	(+977) 055-520482, 055-520855		Nepali
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34	Ramkumari Rai	CHE Program, Friendly Society	Trainer	Kusunti, Kathmandu	Nepal	(+977) 01-5543967		Nepali
35	Tek Bahadur Chand	Forum for Awareness & Youth Activity (FAYA Nepal)	Program Coordinator	Kailali	Nepal	(+977) 091-22874, 091-524329	fayanepal@hotmail.com	Nepali
36	Krishna Murai Chataut	Forum for Local Development (FOLD)	Accountant	Mahendranagar, Kanchanpur	Nepal	(+977) 099-521615, Fax 099-525514	khmurari_nepal@yahoo.com	Nepali
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							yahoo.co m	
38	Rajesh Kumar Gupta	Jana Sewa Club		Piparpate 2, Bara	Nepal	9841367282		Nepali
39	Govinda Pd. Chaudhary	Bhawani Integrated Development Center	Field Coordinator	Bhawanipur, Siraha	Nepal	(+977)033-561789,Fax033- 56728, 033-561789	9852830 829	Nepali
40	Surendra Pd Chaudhary	Bhawani Integrated Development Center	Office Secretary	Bhawanipur, Siraha	Nepal	(+977)033-561789,Fax033- 56728, 033-561789	9933300 06	Nepali