Promotion and Microfinance of Kanchan™ Arsenic Filter in Rural Terai Region of Nepal

Water is the most precious of all the elements,
Just as gold is the most valuable of all goods,
And just as the sun shines brighter than any star.
(Greek poet Pindar)

Final Report

July 2005

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Abbreviations and Acronyms

ADBN Agricultural Development Bank of Nepal

CMF Centre for Microfinance

CRM Cause Related Marketing

GBB Grameen Bikas Bank

GBR Grameen Bank Replicator

GNP Gross National Product

H/H Household

INGO International non governmental organization

KAF™ Kanchan Arsenic Filter

NRCS Nepal Red Cross Society

NDM 2005 Nepal Development Marketplace 2005

NGO Non-government Organization

RMDC Rural Microfinance Development Centre Ltd.

RDB Rural Development Bank

SACCO Savings and Credit Cooperative Society

SFCL Small Farmer Cooperative Ltd.

SFDP Small Farmer Development Program

SOS Share Our Strength organization

SROI Social Return on Investment

TP Total Population

TW Tube Well

UC User Committee

VDC Village Development Committee

Country Profile

Economic and Social Context	
Average GNP per capita	Approx. $240
Population	25.3 million (est.)
Population density	172 inhab/km^2 (est.)
Literacy Rate %	53.74 (est.)

Inflation	
2004	4.0%
2005	5.5%

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A. Introduction

As a volunteer, during a break from work and graduate work at Stanford, and with the generous assistance and cooperation of the Kanchan™ Arsenic Filter (KAF™) team from Environment and Public Health Organization (ENPHO), Nepal and Massachusetts Institute of Technology (MIT), Department of Civil and Environmental Engineering, I have researched the social marketing and microfinancial environments related to the distribution of the KAF™ in the South Nepal Terai region, conducting market research and field work in Kathmandu and Birgunj (Terai). This report presents a summary of my findings and recommendations. In the interest of conciseness, contact information, sources used, and maps reside in the appendices.

Poverty in Nepal

The Himalayan kingdom of Nepal is one of the poorest and the least developed countries in the world. Poverty is pervasive and increasing. Estimates[1] suggest that 42 percent of the population live below the poverty line. The average GNP per capita is only 240 US dollars[2] and the limited economic opportunities of the population prevent savings. Nepal's poverty coupled with a weak social and health infrastructure and lack of functional governmental intervention programs towards water contamination and health related problems continues to hinder the country's economic development, thus contributing to the severe water, sanitation and hygiene problems. Additionally, the situation continues to deteriorate with ongoing political turbulence and conflict between the Maoist rebels and the government forces.

Arsenic Water Contamination in Terai

Groundwater is the primary source of drinking water in the Terai region of Nepal. Several studies of tube wells have revealed alarmingly high levels of arsenic as well as microbial contamination in the water. Adding to the problem is the fact that this type of contamination is not detectable (both odorless and tasteless) until the tube well water is properly tested. As a result, it is estimated that 0.5 million people are at the risk of arsenic poisoning and arsenic-related water diseases such as melanosis (dark and light spots on the skin) and keratosis (skin hardens into raised wart-like nodules). Arsenic contamination is also known to cause low IQ in children, and cancers and other vascular diseases may appear after long exposure to the substance.[3] MIT launched the KAF™ in 2002, with the collaboration of two local partners,

ENPHO and RWSSSP. In 2003 MIT and its partners were conferred a World Bank prize of $115,000 to further implement a pilot technology transfer model and investigate on a feasible and self-sustainable filter distribution strategy in Nepal.

Just recently ENPHO together with MIT have won the Nepal Development Marketplace 2005 (NDM2005). Building upon the success of the 2003 Development Marketplace project, this $20,000 prize granted by World Bank will be invested to expand activities in the following areas:

- Awareness and social marketing activities to educate villagers on arsenic and microbial water contamination of their tube wells as well as health and hygiene issues in the villages.
- Promotion and distribution of the filter to two arsenic contaminated villages: Murali and Langadi.
- Creation of a sustainable and effective micro-financing system for the poorest who cannot afford to pay for the filter.

Current Situation in Murali and Langadi

Murali and Langadi are two villages in the Parsa District that are highly affected by arsenic contamination in their tube wells. In fact, out of 457 tested tube wells in both villages, 43.5 percent have high levels of arsenic (>50 ppb) and about 66 percent show levels of contamination above the WHO guideline value of 10 ppb. In Murali, ten filters have already been distributed to the most affected households, whereas Langadi has yet to receive any. The VDCs statistics[4] together with the estimated number of filters needed for each village based on the number of contaminated tube wells are shown below:

Table 1: Tube wells contamination and population statistics in VDCs of Mudali and Langadi

VDC Name	***Avg. H/H size***	***Total No of TW***	***No of affected TW***	***No of TW to distribute***	***2005 Estimation***				
					Total No of H/H	***TP***	***Male***	***Female***	***Literacy %***
Mudali	*6.57*	*274*	*66*	*300*	*816*	*5,360*	*2,812*	*2,548*	*40.3*
Langadi	*6.45*	*185*	*137*	*300*	*553*	*3,564*	*1,817*	*1,747*	*34.1*

Mudali as compared to Langadi has had previous exposure to the arsenic issue via a workshop organized by Nepal Red Cross Society in conjunction with the Club of Mudali. Langadi, on the other hand lacks basic information not only about arsenic contamination and its effects, but also in relation to the most basic health care practices. According to these recent studies Langadi is

more "at arsenic contamination risk" than Mudali, as a higher percentage of the tested tube wells have arsenic content above Nepali guidelines.[5]

Thus, Langadi's groundwater condition demands an immediate and cohesive action of ENPHO and ENPHO's local partner, the Nepal Red Cross Society, to circulate knowledge of the arsenic hazard and promote the filter as the most effective arsenic mitigation solution.

Project Focus

I have focused my investigation on three main areas:

- Social marketing and promotion of the filter:
  - Situation analysis to assess internal strengths and weaknesses, external opportunities and threats (SWOT analysis), and evaluate past efforts
  - Identification of key promotional elements: message, target audiences, objectives and media channels
  - Promotion strategies: message and communication channels
  - Evaluation and assessment of the campaign results
  - Consideration of an another key target audience and its funding resources
- Rural microfinance schemes:
  - Outlook and structure of the micro-financing system in Nepal
  - Assessment of viability and sustainability of key programs in the Parsa District
  - Analysis and comparison of the microfinancial structure models based on selected criteria (outreach, viability and sustainability)
- Key players and their role in social mobilization efforts:
  - Nepal Red Cross Society (NRCS)
  - Centre for Microfinance (CMF)

Methodology

This report is based on secondary data of the Nepalese economy and financial systems and on information gathered in interviews with key individuals in both Kathmandu and Birgunj.

Lists of organizations and persons contacted (Appendix A) and of sources used and material studied (References, Appendix B and C) are attached.

B. Executive Summary

In the report that follows, I document a research study that aims to help Environment and Public Health Organization (ENPHO) to advance microfinancing and select promotional efforts to best deploy the Kanchan™ Arsenic filter in the villages of Langadi and Mudali. What I present is the result of interviews with local villagers, library and internet research, and discussions with ENPHO staff, Nepal Red Cross Society (NRCS), MicroFinance (CMF), and other financial institutions. Short-term and long-term recommendations are provided below.

Short-Term Recommendations

- **Execute village level awareness and promotional campaigns**

Mobilize the rural people, especially women, by educating them and working to change their beliefs in the current water drinking practices. Women are the primary target because they cover the important role of water caretakers and also because financial evidence shows their tendency of having high loan repayments rates.[6] Initially, the campaign must aim at increasing public awareness and altering beliefs such as "I have been drinking this water for many years and I have never been sick" or "this water filter is too expensive for me, I cannot afford it" to present them with a compelling reason to purchase the filter and use it. Subsequently, the campaign needs to educate the users on how to effectively mobilize savings and become financially self-sustainable in the long run.

- **Select and train personal communicators/facilitators that are familiar with local conditions**

These individuals play key roles in encouraging changes in terms of knowledge and behavior of the population. They may include NRCS social workers, entrepreneurs, user group members, active and motivated women, local microfinancial officers, and VDC delegates.

- **Adopt the saving and credit cooperative microfinancial scheme for funding the cost of the filter**

Capitalize on partnerships, such as the one with Red Cross, who have familiarity with local conditions and people, and are often part of social networks. Well established social links between the savings and credit cooperatives and the campaign's advocates have the potential to bolster contract performance and guarantee rural poor access to local financial institutions. The cooperative Sahi Bachat Tatha Rin in Birgunj offers this opportunity in connection with the local

Red Cross Society (see Savings and Credit Cooperative in the microfinancing section of the document).

- **Partner with CMF to strengthen and monitor the financial mechanism in the two villages**

CMF can help with financial planning, technical assistance, training, local networking, and strengthening the support systems for capacity-building of women in cooperatives.

Long-Term Recommendations

Over the long-term, ENPHO needs to consider the following options to make the program more sustainable and better understood by the affected Terai communities at large:

- **Partner with other local actors non-governmental organizations (NGO) and international non-governmental organizations (INGO)**

Collaboration and integration with other organizations to make the intervention in the villages holistic by combining different areas of interventions, such as water, sanitation and hygiene, health, credit, literacy, etc., not only facilitates the task of providing safe drinking water but also consolidate the efforts to reduce poverty in rural areas. In addition, partnering with other associations may serve to pool more resources and enable a larger scale awareness campaign in Nepal as well as in other countries with highly contaminated water supplies.

- **Educate the rest of the world on the arsenic water contamination problem**

Corporate sponsorships and media partnerships (some examples are: Evian bottled water, Nike, Heinz, American Express, popular American and/or European radio channels, and the popular Oprah show) can significantly contribute to boost project scale by both creating awareness as well as increasing vital additional funding sources in the Western world. The documentary just recently filmed by Global Water Trust on the arsenic contamination of groundwater in the Terai region of Nepal may represent the right opportunity to begin exposing this challenge to the rest of the world.

- **Measure the Kanchan™ filter's social return on investment (SROI)**

The SROI analysis would be very useful in supporting the development of larger scale financing initiatives for the KAF™ in Nepal and Bangladesh, also highly affected by arsenic contamination. The social purpose value and return may require extensive interviews and field surveys as well as creative methods of determining benefits and estimating their value.

C. Nepal Development Marketplace 2005 Project

ENPHO has recently been granted the Nepal Development Marketplace (NDM) award to continue its work in providing safe water to the highly contaminated villages of Mudali and Langadi in the Terai region of Nepal, through the distribution of the Kanchan™ Arsenic Filter. The 20,000 US dollar prize will be used specifically to subsidize the distribution of the filters in the two villages, sustain expenses in the promotion and awareness campaign, provide technical training to local groups and organizations, and pay for salaries of staff members operating in the District.

Partner Role

A primary partner of ENPHO, the Nepal Red Cross Society (NRCS), plays the role of local social mobilizer in all respects. In fact, it assists ENPHO on logistics, awareness programs, training and education workshops, and performance evaluation of community related activities. NRCS also works to bring together local authorities and stakeholders, Village Development Committees, and community based local NGOs to ensure collaboration and a cohesive drive towards the same goal.

Project Sustainability

The uneducated must be informed about the importance of drinking safe water, and taught that, despite good looks and taste, there may still exist unseen threats in their tube well water harmful to their health. The approach needs to be a holistic and coordinated effort that leverages partnerships with the local NGO, VDCs, microfinancial institutions, entrepreneurs, and local village groups. This multiple intervention approach activates the specific channels and support structures needed to achieve a viable and sustainable filter deployment.

D. Social Marketing and Promotion

The awareness program for the arsenic water contamination problem and the direct promotion of the Kanchan™ filter are crucial activities of NDM2005 project. Providing filters for families is a necessary condition for improving health of the rural population. However, providing filters alone is not sufficient; as it does not improve health if the practices are unhygienic. Thus, the awareness campaign needs to educate them not only on the arsenic health risk found in tube wells water they collect and drink daily, but also on basic hygienic practices and handling of water around the house.

In order for this educational effort to be sustainable and successfully accepted by villagers with low or, as in the case of Langadi, no awareness of arsenic water contamination at all, we need to educate, motivate, and persuade the population to make a permanent change in knowledge, attitudes, and behaviors towards water, sanitation and hygiene practices. The effort required of villagers in fully understanding the risk of arsenic water contamination and at the same time agreeing in changing their traditional drinking practices is significant. Even though it is clear that the rural community and society as a whole would benefit if its members are healthy and better educated in water, sanitation and hygiene practices, the primary beneficiary of this behavior change is the individual villager. Accordingly, the individual benefits need to be attractively and clearly presented to attain a behavior change. To create awareness of these personal advantages, community involvement is fundamental to gain acceptance and educate the target audience in its familiar settings.

Women and Water

"Women make up 50 percent of the world population. They put in nearly two thirds of the world's total working hours and produce half of the developing world's food. (My name is Today - Institute of Child Health)

For women fetching and carrying water is part of their daily routine. Men rarely participate in the collection of water-it is viewed as exclusively women's work. They often travel long distances to reach a source of water only to often find it polluted and unsafe. Women are usually the ones that nurse the sick and take children to the village health post. Taking care of poor health caused by polluted water adds to an already overworked day. In fact, women are responsible for both domestic as well as agricultural work, and collecting water has a priority

over other daily activities. Research studies by INSTRAW and UNICEF (1988), Fong et al (l996), and Shibesh Chandra Regmi (1999) have explained the importance of women's participation in project planning and implementation to ensure its success and sustainability in the long run. Oftentimes they are not involved, even though they are knowledgeable about the quality of water sources and its availability, and understand the implications related to drinking unsafe water to their health, time and energy more than men do. They are the ones that most likely place a high priority on improving the quality of groundwater and sanitation practices, because it is an issue that concerns them directly. Thus, it is clear that women have to become active partners in the awareness and promotional campaign to help the community of Mudali and Langadi. With proper training on basic water, sanitation and hygiene practices, the proper use, operation, and maintenance of the filter, they can become health promoters and spread the knowledge throughout their village. In addition, women need to be involved, along with men, in the management of user's water committees. As members and primary users of water, they have to be empowered to make decisions and concerned to also protect women's interests and needs inside the community. However, social, religious and cultural factors severely limit women's participation in such projects. Men, in particular, endorse a negative stereotype of women and believe they cannot take up new public roles, but only be relegated to the family chores.[7] In order to change this deep-rooted belief, the awareness campaign should also aim to illustrate the advantages of women's participation in community life, specifically addressing the importance of their contribution in the NDM project. Men should also be encouraged to share women's work in the house thereby freeing-up some of their time to be part of the awareness program. In conclusion, women's involvement in this project (as health promoters or water committee members) not only can help to make the project successful but also positively impact their status in the community by gaining in confidence, skills, and respect.

SWOT Analysis of NDM2005 Awareness Campaign Project

Table 2: SWOT Analysis of NDM2005 project

Campaign Focus & Sponsorship Organizations	Internal Strengths	Internal Weaknesses	External Opportunities	External Threats
Safe Drinking Water (ENPHO/NRCS)	*Resources*: Staff has expertise and is well respected in the local villages. *Current Partner:* Support in health awareness campaign by providing staff and expertise. *Past Performance:* Encouraging results from past KAF™ users' surveys indicate strong acceptance and endorsement of the filter.	*Resources*: External and internal funding resources are limited. *Issue Priority:* Problem of arsenic and microbially contaminated water is neither addressed nor considered a top priority by the government and VDCs. Trainings to date have been predominantly conducted by men to men and have not reached women as equitably as possible.	International concerns for water, sanitation and hygiene and health are continuously growing. More NGOs and other organizations may have interest in partnering with ENPHO.	Worsening of political turbulence and conflict between Maoists and Government may hinder the ability to deliver any program to target population. NRCS' efforts and activities are not effective; villagers are not participating and/or indifferent to the awareness activities.

Review Past and Current Efforts

Previous surveys have measured attitude and experiences relative to the KAF™.

The review of 424 KAF™ household users carried out during the DM2003 project, indicates that the filter performance is outstanding and people are satisfied and approve of the water filter solution provided to them. Table 3[8] below reports the results from the surveys conducted from December 2004 to January 2005.

Table 3: KAF™ Users Survey Results:

	BETTER	SAME	WORSE
Appearance of KAF™ filtered water vs. tube well water	93%	7%	0%
Taste of KAF™ filtered water vs. tube well water	95%	5%	0%
Smell of KAF™ filtered water vs. tube well water	89%	11%	0%
User's health conditions after drinking filtered water	78%	22%	0%

	YES	NO
Filter still in use after 1 year	94%	6%
Operating filter is too much work?	65%	35%

Some of the KAF™ users' comments are:

- Tube well water makes cooked rice black whereas KAF™ filtered water keeps the cooked rice white.
- KAF™ filtered water is cleaner, cooler and better tasting.
- KAF™ filtered water does not stain utensils.
- After drinking KAF™ filtered water other types of water tastes poorly.
- KAF™ would not be exchanged for anything else, not even money.[9]

In view of these encouraging responses, it is crucial for this project to build a strong message and deploy channels of communication that are penetrating and effective in both villages. The message and communication strategies are well covered in the Promotion section of this report.

Key components of awareness and KAF™ promotional campaign

The brief illustrated below (Table 4) defines the scope and provides direction for message design and media selection for the NDM awareness campaign.

Table 4: Awareness Campaign Key elements:

Key message: There are two parts to this message: *Part 1*: The water you perceive **as clean** may not be **safe**. Water contains many chemical and microorganisms hazardous to your health. One of the harmful chemicals found in your tube well is **Arsenic**. This poisoning chemical slowly kills people and its related illnesses are shocking and painful. The other microorganisms found in your water cause diarrhea, typhoid, cholera, dysentery, etc. You and your family are at high risk. *Part 2:* But you can mitigate the water contamination by using the Kanchan™ Arsenic Filter. It is practical and easy to use, and it drastically reduces arsenic and microbial contamination from your tube well water.
Target Audience: Target audience is the villagers of Mudali and Langadi in Parsa District that are affected by arsenic water contamination in their tube wells. This target audience comprises both men and women and can be segmented even further into the following two sub-groups: *Primary target group (early adopters):* This segment includes the potential filter users, largely women, who have a pivotal role in water collection and management. They are very concerned with providing good quality and safe water to their families, and for that reason they are also more receptive to the adoption of the filter to alleviate the contamination. They also have the potential to become change agents in their own community.
Secondary target group: This segment comprises village opinion leaders and well-respected individuals who can enhance the credibility of the program (i.e. user committee's leaders,

elders, school teachers, etc.).
Third target group: This segment includes the villagers that, even after the awareness and workshop training are not willing to pay for the filter or may not understand the serious health consequences caused by long exposure to arsenic contaminated water. Both primary and secondary target groups need to exercise social peer pressure, woman-to-woman marketing initiatives, etc, to persuade this group to change beliefs.

Communication Objectives:

To know: There is arsenic and microbial contamination in the tube well. The contamination is hazardous to your health. Also, iron on the water gives it a bad smell and taste. This pollution makes people sick and kills many children under the age of five. It can happen to you or to your children. Also, arsenic-related illnesses are awful and painful.
To believe: The KAF™ is the solution for water contamination. It makes the water safe to drink and also look and taste good. It is also very easy and practical to use. By using the filter the family can make tasty food and drink good quality water.
To do: Decide to buy the Kanchan™ filter and use it regularly.

Benefits to Promise:

You will improve the quality of your life due to better physical health, a more productive use of energy and time once spent in caring for the sick, and an improved household economy.[10]

Supports to Promise:

- Graphic visuals depicting real, shocking physical consequences of arsenic contamination to the human body.
- Real stories from villagers and children who have been sick due to waterborne illnesses and have not been able to perform daily duties or live a satisfactory life.

Media of communication:

Broadcast: local radio
Signage & Display: posters, billboards, and wall paintings in local market kiosks, school, and houses
Personal Selling: word of mouth, face-to face meetings carried out by NRCS representatives, woman-to-woman marketing and training, and water tasting and cooking events
Special Events: street drama performances with local actors , music concerts, social and religious events, and health screenings

Positioning:

Water is the elixir of life. To survive you need to have good and safe water every day. The water you drink may be clear, but it is not SAFE. It is contaminated by arsenic and microorganisms that you cannot see or taste. Because of this poisoning some people get very sick and some even die. Your children are at high risk. But now the solution to this problem is KAF™. This filter will mitigate the water contamination of your tube well and give you and your family arsenic-free & good quality water, and a longer and more productive life ahead of you.

Promotion Strategy:

Message Strategy

It is important to craft a communication message that captures the attention of the target audience and persuades them to adopt the filter for household water treatment.
In order to deliver an effective and penetrating message we need to:

- Make sure the promotional and motivational message is vivid, personal[11], and involves both genders.
- Leverage the good taste, smell, and overall outstanding appeal of KAF™ filtered water.[12]
- Frame the message to show that the individual is losing by not acting.
- Make sure that the message especially in visual promotions (signage and display) incorporates both *emotional elements* eliciting some negative feelings (e.g., fear of getting ill and dying) which may motivate the desired behavior (they want to drink safe water), and *non verbal elements* such as visual cues, graphic images showing the physical effects of arsenic and other water-borne diseases on the human body, such as sick babies in their mothers' arms after being exposed to contaminated tube well water, etc.

Communication Strategy

It is very difficult to convince others of the value of adopting a change in behavior. The change requires moving the villagers from a position of opposition ("KAF™ it is too expensive or my tube well water does not make me ill") to one of advocacy. People in one village I visited, for instance, believed the arsenic filter was too expensive and they couldn't afford it, while some others did not know what water contamination implied as they have never got sick by it. As a result, barriers to entry and/or adoption costs may exceed the perceived benefits for many villagers. In this project, the cost objection has been partially lessened with the provision of a subsidy scheme to pass on the filters to poor villagers.

Opinion Leaders and Change Agents

The adoption process has a very slow progression for two reasons:

1) Villagers lack basic information on water, sanitation and hygiene practices.

2) Poor people are reluctant to buy the filter, because of the costs. Effective communication strategies combined with a core group of highly committed individuals advocating and propagating the social and health cause may increase the impact of the awareness campaign. For maximum effect, the message needs to be channeled through credible, influential and motivated local opinion leaders (local village leaders, respected women, social workers, and NGO facilitators) as well as organizations such as Red Cross, to ensure the success of the program.

The communicator needs to stimulate villagers to take active part in workshops and community discussions. For instance, community water tasting events can be instrumental in convincing even the skeptical villager of the appeal, good taste and smell of filtered water. At such events the communicator should encourage an exchange of impressions and observations among the group.

Change agents (preferably women) need to work closely with other female members of the community and provide personal support and guidance. Besides this group of carefully selected change agents, also the early adopters, the first villagers to endorse the KAF™, need to become campaigners for the social acceptance of the program. This additional group of enthusiastic and satisfied individuals can accelerate the process of diffusing the program to the rest of the community. For instance, women change agents, while engaging with other female villagers in face-to-face meetings, can show them visual images of arsenic effects on human body as well as educate them on how to operate and maintain the filter. The role of opinion leaders and change agents is crucial in the early part of the awareness campaign before turning to conventional marketing techniques to generate demand for the filters. If done correctly, a significant portion of the target audience now understands and internalizes the personal advantages and benefits central to the awareness campaign. This audience is now receptive to product awareness through advertising and accessibility to local microfinancial organizations.

Communications Media

After opinion leaders and change agents have actively spread the word and persuaded other peers to follow, the program needs to deploy media channels and advertising instruments to reinforce the change and bring awareness of the Kanchan™ water filter.

Radio, is the most effective medium of communication in rural Terai as it has a wide coverage, most people and communities can afford it, and it reaches illiterate people in a way most printed media cannot. However, the drawback of radio is that it does not give villagers the opportunity to directly interact with the speaker. Therefore, a more selective medium, such as *personal selling techniques*, executed by change agents as mentioned above, can deliver detailed information, address barriers and concerns, build trust, and stimulate the demand for the filter. The message needs to be simple, vivid and personal. For instance, sad stories of villagers being affected by water contamination, and the daily struggle of women to provide safe water to the family.

Special events, such as *street drama performances*, that have been demonstrated to be very effective in HIV campaigns, can be instrumental in achieving behavior change objectives in the two villages. Local trained people should take the role of actors and represent:

- A "slice of life" (shows the villagers in their daily settings). A mother cries while holding her sick child, who is poisoned by contaminated water that she previously collected for him. Good actors act out this scene and emphasize the emotional aspects, the desperation and sadness of the mother.
- A "lifestyle change" (shows how the KAF™ fits with a villager's every day routine). The wise Kanchan™ filter user collects the water from the tube well, filters it properly, then employs the safe and good filtered water to make tasty and odorless food for the family.
- A musical (uses songs or musical performances to deliver the message). A popular song or tone chants about the arsenic and microbial contamination found in tube well water and suggests how to mitigate the problem.

In addition, *posters and simple drawings* should also be used in conjunction with the others outreach efforts as a follow-up technique to offer more intensive information to uninformed rural people.

Monitoring and Evaluation

It is important to measure the impact of such a campaign prior to its launch and after the execution of all its activities by observing the responses to campaign elements, such as change in attitude, knowledge, and behavior. Proprietary evaluations and associated monitoring studies of the Kanchan™ filter project may be quite expensive and time-consuming, thus I suggest the possibility of shared-cost studies with other organizations that operate in the same field and the deployment of graduate students from universities in Kathmandu and surrounding areas to conduct field research studies. The creation of a monitoring and evaluation plan of the filter campaign in the villages can be designed, for instance, as a mandatory project of an MBA course. For this project, students are required to work in teams and conduct qualitative and quantitative analyses as well as build accurate databases to track changes and keep results up to date.

Awareness campaign in the Western world and other funding sources

This paper so far has highlighted the importance of addressing and educating the rural villagers of the Terai on the groundwater pollution and its impact on health. Yet, I believe it is as important to inform, appeal, and engage the Western world in pulling resources to combat the water pollution problem afflicting Nepal. The documentary filmed just recently in Terai by Global Water Trust will present the issue to a broad and refined Western audience, and thus greatly increase exposure for this serious water concern. Once public awareness broadens in US and in other Western countries, the attention needs to be directed towards exploring additional external funding sources. American corporate giving represents an important opportunity for water, sanitation and hygiene, and health issues. It is important to be able to reach and subsequently appeal to this target audience by relying on existing contacts and relationship networks, such as MIT's set of connections, World Bank, Red Cross, United Nations, individual wealthy donors, Oprah show, etc. It is necessary to prioritize potential sponsors who represent the greatest opportunities for funding the project as well as a natural bond between the cause and the organization itself.

Share our Strength (SOS) is an organization that mobilizes individuals, corporations to contribute their resources and talents to fight hunger and poverty. It may be useful to contact SOS and discuss the possibility of working together to fight arsenic water contamination and poverty in Nepal.

Some corporations known to be heavily involved in philanthropic causes are Evian, Nike, American Express, Avon, Tyson Foods, Barnes & Noble, Macy's, Yahoo!, T.G.I Friday's, Kraft Foods, America Online, etc. There are three primary market-based approaches that ENPHO in partnership with a company can deploy to create community wealth in support of its cause. Firstly, ENPHO can partner with a corporation using the Cause-Related Marketing (CRM) approach. This scheme is based on the premise that buyers care about civic virtues and support a company demonstrating social responsibility. A firm has the capacity to rapidly disseminate information, raise funds, and increase exposure for the water, sanitation and hygiene issues through their product marketing channels. For instance, a company selling bottled water such as Evian, can be a potential partner to ENPHO. In a hypothetical scenario, a percentage of sales of a bottled water company's product goes to ENPHO to support its filter distribution and water, sanitation and hygiene projects. Hence, Western consumers have the opportunity to be involved in improving rural villagers' water and sanitation practices by choosing to buy, in this example, Evian natural spring bottled water. Secondly, ENPHO can work together with a corporation using in-kind contributions, which usually involve the offer of a service (video production), equipment and supplies (printer and paper), or the endowment of specific resource such as staff time for consulting , space for messages and material, and distribution of tangible items at retail sites. A valuable corporate contribution to ENPHO can be providing space for messages on a well-known product. An example is placing water, sanitation and hygiene, and arsenic-related awareness ads on a prominent location such as a bottled product, or snack food box. Thirdly, ENPHO can be awarded cash contributions to support dissemination of information and educational programs in rural Terai. Also, another possibility is the donation of free internet or retail advertising space devoted to this cause.

E. KAF™ Business Model

The cost, affordability and willingness to pay for the Kanchan™ household water filter are relevant premises for its implementation, use and sustainability. The Kanchan™ household water filter needs a method for cost recovery in order to be sustainable. KAF™'s cost structure is shown below (Table 4). The approach used to reduce the financial burden is to utilize subsidies provided by World Bank to cover 50 percent of the cost of each filter. This leaves 50 percent to be provisioned by the user, potentially through financing by an appropriate and sustainable

microfinance organization. However, this subsidy will not create a market demand unless the communities truly understand the health risks of water contamination and then make the next mental step of identifying the Kanchan™ filter as the best method of alleviating this risk. Various approaches and microfinancial services for cost recovery and financial management of the KAF™ are illustrated in section F.

KAF™ Subsidy

The support and the subsidy granted for the provision of Kanchan™ filters to the very poor that have no access to safe drinking water is a necessary step to contribute effectively to poverty reduction and encourage socio-economic growth in the long run. However, the subsidy of Kanchan™ Arsenic filters should be transitory and that ultimately the access to safe water should not depend on an external financial support. I see the subsidy as an essential approach in the project initiation phase, to help break the vicious circle and create a situation where external financial support is not needed anymore. The objective of such a project is humanitarian first, help communities to have access to good and safe water, and then also help them get out of poverty if they can use water for productive uses. There is also overwhelming evidence[13] from many studies of underdeveloped countries, that large and untargeted subsidies are captured not by the necessarily by the poor segment, but by the "relatively" poor who are financially stable and not in need of financial support. Thus, the subsidy should only target the very poor and not play a dominant role in providing safe water "for the relatively poor" as long as the cost of the filter meets the willingness and capability to pay of users. The amount of funding should be determined by a good understanding of the supply and demand along with the propensity of households to pay for the filter. This can be accomplished by surveying the KAF™ users as to their price and attribute (value feature) sensitivities.

Notably, in 2004 G-LAB Team of MIT Sloan School of Management developed a detailed VDC level of subsidy model based on four major drivers, namely market size, filter cost, adoption and willingness to pay of the users, and entrepreneurs gross profit margin per filter (on the total cost of the filter) to estimate the number of filters and the amount of subsidies needed per district. This model and the VDC prioritization analysis can tremendously help ENPHO identify the level of subsidy required to supply the filters and focus on specific areas that require the most urgent attention.

Once the poorer households have been targeted (especially women headed households) the subsidy program needs to include innovative mechanism, such as providing borrowing mechanisms that are simple, easy to understand and integrate with local socio-economical conditions. In a nutshell, yes, the poor need a subsidizing scheme to gain access to one of the most basic human needs, safe drinking water, and support in improving water, sanitation and hygiene services in the quest to reduce poverty. But the issue is also on how to use it effectively as the extent, form and procedures are vital for it to succeed.

Table 5: KAF™ GEM 505 Cost Breakdown

Item	***NRS***	***$US***
Container, Basin & Lid	567*	8.22
Piping System	160	2.32
Sand & Gravel	40	0.58
Iron Nails	390*	5.65
Bricks	5	0.07
Piyush (disinfection)	35	0.51
Transportation	50	0.72
Labor	50	0.72
Documentation	20	0.29
Tools	15	0.22
Cost per Unit	**1332**	**19.30**
Profit 10%	133	1.93
Selling Price	**1465**	**21.23**

Note: *Increase in prices since the last update. They usually fluctuate as much as 30% above current price. Assume exchange rate of US$1 = 69 Nepalese Rupees (NRs)

The Kanchan™ Arsenic filter is a poor prospect for commercial finance because currently there is no resale value for purified water which leaves the individuals cash flow and repayment probability as the only means for loan justification. Therefore, institutional banks do not value the financing of KAF™ as an economically sound investment. Nevertheless, the concept of social return on investment (SROI) of the Kanchan™ filter has potential as a societal cost avoidance mechanism. A careful identification and understanding of the value of the social benefits may prove quantifiable and potentially fuel creative ways to gain more support among banks.

F. Rural Microfinance in Nepal

Microfinance Environment in Nepal

This section provides an assessment of the current microfinance environment in Nepal. Microfinance services generally fall into three segments: formal, semiformal and informal. The formal sector is characterized by a high level of regulation and supervision that provides some level of recourse to borrowers and savers. Some examples of organizations within this sector include, commercial and rural banks, Grameen Bikas Banks (GBB), Grameen Bank Replicators (GBR), Small Farmer Cooperatives Limited (SFCL), cooperative societies, Rural Microfinance

Development Center (RMDC), development banks (state-owned or private), non-government organizations(NGOs), urban-based financial companies, and insurance companies.
Organizations within the semi-formal sector are neither formally regulated nor supervised but are at times licensed. The semi-formal activities operate using external or internal funds. External funding is usually provided by the government or international non-governmental organizations (INGO), whereas internal funds are supplied by the rural people themselves through group savings and credit activities. This sector includes Savings and Credit Cooperatives (SACCO), Village Banks (VB), and non-government organizations (NGO).
The informal sector is generally characterized by the absence of any form of regulation and legal control. This market operates in rural areas of Nepal and it may be of commercial or non commercial nature. Traders, shopkeepers, commercial moneylenders, crop buyers, friends and family may be included in this group.

Microfinancing KAF™ in Murali and Langadi

Several studies show that when credit is channeled properly, microfinancing is an effective way to alleviate poverty, widen ownership, and distribute resources. Within Nepal there is a broad variety of both formal and informal institutions active in the microfinance sector, each with its own mechanism to make financial services accessible to the rural poor.

A successful KAF™ microcredit scheme for the rural people of Terai needs to target the poorest. This can be accomplished with careful study of all households in each ward and then by establishing a priority ranking according to both poverty and arsenic contamination levels.

Also, a well functioning water financing scheme needs to be accessible, flexible and sustainable. It should not only provide the funds for the payment of the filter, but also empower poor villagers to become self-reliant and capable of taking care of their own water, sanitation and hygiene, and health-related concerns to better themselves and build a brighter future. Monitoring and evaluation plans also need to be implemented to ensure financial viability of the program.

Women are a very important segment of the village population and must be targeted in this project for two reasons:

1.Women in the Terai are significantly poorer than men and have little access to education and credit and savings services. Studies[14,15] have shown that Nepali women's access to microfinancial services in a sustainable and effective manner can both alleviate poverty and empower them by substantially increasing their level of decision making in the household.
2. The collection and handling of water is regarded as a female's job. Female members appear to be the ones most concerned with its quality and supply.[16] They may be the viable instrument for a well-functioning microfinancing water mechanism in the villages.
Encouraging reports[17] and direct interviews with the rural people of Mudali show enlightened community members are willing to embrace the filter. They understand the concept and importance of having access to safe and good quality water and many villagers are willing to pay for it.

Microfinancing Models

In this section, I begin by identifying and describing four different microfinance programs that are offered and currently functioning in the Parsa District. Secondly, I analyze their strengths, weaknesses, opportunities, and threats also in the light of the current political environment. Then, I compare the different financing schemes based on the following parameters:

Institution	Objective	Program type	Cost of loan
Staff size	Parsa District coverage	Target client	Loan term
Financial services	Non-financial services	Savings method	Loan repayment schedule
Eligibility criteria	Funding type	Loan size	Loan guarantee

After comparing the various options, I perform a qualitative assessment and evaluation of the financing models based on selected criteria (outreach, viability, and sustainability). Finally, based on my findings and discussions with both CMF and other microfinancial institutions, I give a recommendation as to the most viable and promising microfinancial mechanism for the distribution of KAF™ in the villages of Murali and Langadi.

Savings and Credit Cooperative (SACCO)

Savings and Credit Cooperative (SACCO) has been the most popular and fastest growing microfinancial model in the Terai area. Generally a SACCO is a small, private, community-based organization owned and managed by its associates with funding coming from collection of members' savings, shared capital, and membership fees.

My findings

The private, non-government SACCO I visited in Birgunj namely, *Sahi Bachat Tatha Rin* serves several villages in Parsa District (Bisrampur, Ramgadhawa, Sabaithawa, etc.) under the policy of lending to individuals rather than to groups. It has its own governing body and the staff includes nine individuals who are responsible for managing the programs and collecting the money from the villagers. In order for a villager to get a loan he or she needs to become a shareholder, which entails an upfront investment of NRs100, additionally, each member is also required to contribute to a savings account in order to generate funds for the program. The savings and resources originated by the cooperative are deposited in savings accounts at the local Himalayan Bank earning 9 percent annual interest. The amount of savings contribution varies, but a minimum of NRs10 per day is mandatory.

A loan is extended to an individual only when guaranteed by another member. On the record, Shyam Pokhrel is both the chairman of the cooperative as well as of Nepal Red Cross, and twenty-eight Red Cross representatives are also members of the financial institution. NRCS's involvement and active contribution on both the financial as well as the social front greatly enhances the probabilities of a successful project outcome. In fact, not only can NRCS be the social, health and KAF™ advocate, but also the loan guarantor for the two villages. This cooperative grants loans regardless of the purpose, even though most of the approved ones are associated with income-generating initiatives. This is a key factor in the KAF™ microfinancial model given that the filter will not directly change the economic condition of rural people as most other microfinance projects do.

The size of loans varies starting with a minimum amount of NRs500 up to a maximum of NRs30,000, well within the range of financing required for the Kanchan™ filter (NRs750). The length of the loan granted by *Sahi Bachat Tatha Rin* does not extend beyond 2-years, as the limited source of capital, which mostly consists of the collective members' savings, is small and insufficient to ensure longer-term viability. According to Shalik Ram Sharma, CEO of the Center for MicroFinance, the loan recovery period of NRs750, can reasonably be set to three months up to a maximum of twelve months.

The cooperative provides money to borrowers at a 16 percent interest rate and reports a 98 percent repayment rate, proving that member involvement and sense of ownership of the

invested capital has a strong effect on loan recovery and a positive impact on the financial sustainability of the organization.

The office staff revealed that most loan takers are men, while the majority of women requesting loans are usually shopkeepers. The lack of participation and contribution to this financial network by women begged the question of whether this SACCO was working towards increasing women's access to the financial marketplace. The answer was that the cooperative has been actively working towards the integration of a larger number of women into their programs. In support of that claim, a member of the staff emphasized that four of the nine staff members are women and it is they who are responsible for collecting money from house to house and interacting with the borrowers on a daily basis. The cooperative uses a very simple reporting and record keeping system comprised of an individual passbook in conjunction with an annual statement of assets and liabilities that is given to every member. The passbook is used to keep track of deposits and payments; each transaction is confirmed with the collector issuing a receipt to the borrower. Another consideration that arises is due to the lack of experience and microfinancial education of the volunteering staff members; all lacked either a high school education or any business and financial background. Nevertheless, the lack of microcredit knowledge and financial management expertise can be lessened by appropriate training and educational programs promoted, for instance, by an organization such as CMF.

Small Farmer Cooperative Limited (SFCL)

Another type of self-governing cooperative that has been a subject of my investigation while in Nepal was the Small Farmer Cooperative Ltd. This multipurpose organization generates its internal funds through the mobilization of savings, shared capital, and membership fees. SFCL offers both financial (savings mobilization, loan investments, insurance services) as well non-financial services (tea farming, women empowerment programs, construction of irrigation systems, rickshaw lending product for landless members, and milk collection centers) to its members. Studies[18] and interviews have shown that this member-owned financial entity has been very successful in the Terai and has promoted the economic and social well-being of its members. It has expanded throughout Nepal's 75 Districts, resulting in approximately 170 registered SFCLs[19] today. This program emphasizes women's participation and contribution of

women to the cooperative's activities; female membership in SFCL is growing and today stands at 33 percent.

My findings

In my preliminary investigation I visited San Kisan Bikas Bank (SKBB), an apex institution that has been created for the sole purpose of channeling funds provided by Agricultural Development Bank of Nepal (ADBN) to SFCLs in rural areas. The SFCL's organizational structure employed through joint liability groups of small farmers at village level, inter-groups at ward level, and the main committee at the VDC level can be a powerful tool in establishing a sense of discipline and cooperation in the villages. This type of governance structure can strengthen the idea of ownership and group solidarity as mechanisms to maximize repayments. Also, its sound loan practices, such as frequent interest collections and incentive programs for early repayments, work to foster a strong sense of discipline among borrowers in the villages of Mudali and Langadi. In terms of outreach, this microfinancial mechanism targets the poorest sections of the rural population, including women, as the KAF™ distribution model for poor people intends to do.

However, the worsening business climate and political instability caused by the ongoing Maoist/government conflict has adversely affected SFCL's ability to operate and perform effectively in both Mudali and Langadi. As a matter of fact, the SFCL in Mudali is not functioning at the present time, and it is unknown if or when it will resume its activities. In Langadi, the SFCL was in the process of being established, but the initiative has been abandoned for the above mentioned reasons. Currently, the adoption of the SFCL model for the distribution of the Kanchan™ filter is neither feasible nor realistically doable.

Village Bank (VB)

Village Bank (VB) is a member-governed and independent institution, not formally registered, and usually promoted by an INGO or NGO. VBs are flexible in determining the rules of admission, levels of savings and loan interest rates, as they are sensitive to local economic conditions. As a result, the village banking model varies according to the areas and the organization(s) encouraging it. Currently, more than 1,500 village banks have been established in Terai.

What is most unique about this form of banking is that the informal cooperative savings schemes are owned and run completely by local women. In fact, women represent 95 percent of the membership. An example of this kind of initiative is the Women's Empowerment program run by the group PACT Nepal that trained village banks on record keeping and savings mobilization. Each VB consists of 25-35 women who elect a president, treasurer, secretary, and controller from among themselves. They decide how frequently to collect savings, usually weekly or monthly, and what the deposit amount should be per period, usually ranging from NRs10 to 25 per week. The model approves loans only to women members for periods of three to five months (it rarely goes over five months) at an average of 22 percent interest per year. Because they borrow from the community to which they belong, the interest on the loan stays within the group, ensuring regular savings and timely repayments on their behalf. Most village banks are less than five years old and still have kept high repayment rates. These results are even more striking when compared to high default rates and the number of bad loans of government-owned banks such as Nepal Bank Limited and ADBN.

My findings

I questioned some local women in the village of Pathalaiya in the Bara District that are active members of their village bank. Some interesting information emerged from that conversation: The village bank mechanism of their community requests that every villager deposits NRs10 per week into a savings fund (in Pathalaiya there are three-hundred adult villagers making weekly deposits). The village bank leaders are twenty-five women who manage funds, monitor loan activities, and lead community meetings every two weeks. Loans are given to female members at 22 percent interest for any borrowing purpose. The maximum amount any member can borrow is NRs1000. In this VB, the repayment period extends to a maximum of four months and the default rate has been minimal, meaning the villagers are motivated and willing to mobilize their resources effectively. The women also make a monthly contribution to their personal savings (on average NRs200) at the local Everest Bank and, in order to save, they carefully monitor where and how their money is spent. An INGO supports the village bank with proper training and educational workshops for the female members. The women told me that the decision on loans and spending are still made by the men in the family, even though they are responsible for repaying the loan.

The strength of this model lies in the social network that unites the women together as a family group. One major rule is that at the end of the loan period everyone must repay the whole amount borrowed from the group. A female villager explained to me: "we always repay loans, no matter what happens, it is about the respect and commitment we have towards the other community members and we do not want to violate them. If we do not have money we borrow from another source."[20] Alternative sources of loans are family, friends, and other forms of informal lending groups.

According to these findings, the strength of this VB model depends heavily on the efficacy and rigor of the community banking rules. Creation of compelling incentives for early payments, along with penalties for late deposits or repayments, helps keep the default rate at low levels and betters the village banking discipline.

The limitation I see in this VB mechanism lies with its ability to achieve long-term sustainability and outreach, which in my view is only possible through connecting with the formal financial system and with the formation of federations of several similar VBs in the area. But the implementation of such an initiative cannot be brought about in a short timespan, especially under the current unstable political conditions that have affected many microfinancial activities in Terai. For the scope of this paper, this VB model could be applicable in Mudali and Langadi only if:

- Mudali and Langadi already have a village banking scheme functioning or the capacity and desire to implement their own model with proper NGO/Red Cross support.
- The villages can count on a group of self-motivated, active women to facilitate the task of launching the VB model.
- Other non-profit organizations are willing to support the Red Cross in providing non-financial services (educational and social mobilizing workshops) necessary for the village bank to emerge and operate effectively.

Rural Development Bank (RDB)

Rural Development Bank (RDB) applies the Grameen Bank Bangladesh model or a modified version to provide credit exclusively to poor women. In Nepal, both government and local NGOs have replicated this concept exclusively in support of profitable activities and small case enterprises. They offer individual loans on a group-guarantee basis along with both compulsory

and voluntary savings schemes. RDB's programs follow a rigorous methodology that includes training and weekly meetings for savings and loan repayments activities. Presently, there are four Rural Development Banks actively operating in Parsa:

- Swabalamban Bikas Bank (government and privately owned bank)
- Nirdhan Utthan Bank (non- government and privately owned)
- Deprosc Development Bank (DEPROSC) (non-government and privately owned)
- Simrik Development Bank (non-government and privately owned)

My findings

I have visited DEPROSC, a privately owned and non-government institution that promotes development across the Terai region, including the Parsa District. This bank adapts a modified Grameen Bank model to lend to uniform congregations of women, grouped in village centers, which brings in additional peer solidarity and pressure to ensure credit discipline. The loan repayment rate of 100 percent emphasizes the viability of this banking model and its effectiveness in the rural plains.

However, the use of a microfinance mechanism for water and sanitation provision is neither endorsed nor understood by RDB mainly because the social return on investment of the distribution of the Kanchan™ filter cannot be easily measured in dollar terms. Essentially, a development bank does not believe in the potential of creating sustainable finance systems for a water, sanitation and hygiene provision, activity considered as only charitable and non-productive in its scope. In point of fact, the social purpose value of this project is hard to measure as it is difficult to assign a monetary value to the following: gathering accurate information about a portion of measurable household savings, determining the benefits and their estimated values, whether from reduced need for medicine and medical services, increased productivity at work and in the house, or overall improved well-being of the individual. Still, I believe RDB should be supportive of ENPHO water, sanitation and humanitarian goal and finance the project, but convincing the organization of supporting this cause may seem an unrealistic solution.

SWOT Analysis of microfinance models existing in Parsa

Program	Strengths	Weaknesses	Opportunities	Threats
SACCO	Member-based with strong sense of ownership and participation, low operating costs, flexible savings and loan terms, easy procedures, no collateral required, proximity and familiarity with local conditions, sustainable model, local coverage	Limited capital-base, limited financial expertise of staff, lack of appropriate institutional structure for expansion, only short term lending (<=2 years)	Potential access to external funding (national banks, NGOs, individual wealthy donors) to increase fund base, potential support from CMF in training and supervision, potential partnership with NRCS in social mobilization activities, formation of federations to expand outreach	Little monitoring from the government may cause financial non-compliance, Maoist conflict and political instability
SFCL	Extensive outreach, low operation costs, member-based with strong sense of ownership and participation, no collateral required, strong 3-level organizational structure, strong support system by ADBN, variety of financial and non-financial products, proximity and familiarity with local conditions, incentive credit programs, sustainable model, mobilization of women, recognized in the country as an emerging and viable grassroots financial organization	Dependency on ADBN, complex procedures, products are not designed for long-term borrowing, it takes a long time (in average 3 years) to establish a SFCL organization and train local people	Introduction of new savings and credit programs, creation of incentive programs targeting primarily women members	Political interference and economic situation may deteriorate further due to Maoist ongoing conflict.
VB	Easy access to funds, lack of complex procedures, proximity and familiarity with local conditions, no collateral required, participation and management of women, strong sense of ownership, limited local coverage	Limited capital-base, lack of legal regulations, inability to survive without external intervention	Potential access to non-financial services and funding through the intervention of INGOs and NGOs, potential government intervention and legalization of VBs	Repayment problems may arise due to heavy volunteerism and lack of legal and institutional framework
RDB	Well established across all the Terai region, simple, well defined procedures and financial and non-financial products, personal loan services, strong NGOs network, better protection on covariant risk	High loan costs, high operating costs, no flexibility in loan costs & terms, focused only on income generating projects, lack of sense of ownership	Potential access to external funds, strong network and support from INGOs for non-financial services	Political interference affecting viability and growth

Comparison of the microfinancial programs

Institution	Savings and Credit Cooperative (SACCO)	Small Farmer Cooperative Ltd. (SFCL)	Village Bank (VB)	Rural Development Bank (RDB)
Objective	Provide the poor rural people access to financial services	Provide the poor rural farmers access to financial services	Support empowerment and socio-economic development of local women	Support the economic development and emancipation of women by guaranteeing them access to microfinance services for income generating activities
Program Type	Cooperative	Cooperative	Informal Group	Development Bank
Staff Size	On average 2 to 7 volunteering individuals	varies	No staff Only 25-35 female group leaders	270 (13 in head office, 57 in the field)
Parsa District coverage	Yes	Not active	Yes	Yes
Target Clients	Rural poor	Rural small farmer men and women	Women	Poor rural women involved in productive activities
Financial Services	Savings, "door to door" loan collection services	Savings, loan, insurance	Savings, loan	Savings, "door to door" loan collection services, insurance
Non-financial services	Financial training and workshops	Social mobilization, seminars, group meetings	Group meetings and social mobilization possible only when supported by an INGO	Social mobilization, , leadership development, user's group management, health sanitation awareness, education development, etc.
Savings Method	Compulsory and optional	Compulsory and optional	Compulsory only	Compulsory and optional
Eligibility Criteria	Relatively poor (ceiling not fixed)	Small farmers	Rural poor women	Rural poor women
Funding Type	Internal generated funds	Internal generated funds	Internal generated funds	Internal and external generated fund (RMDC and commercial banks)
Loan Size	From NRs500 to 30,000	Up to NRs30,000	Up to NRs1000	Up to NRs30,000 (with no collateral)
Cost of Loan	16%	15 to20%	22%	18-25%
Loan Term	Up to 24 months	Up to 24 months	Up to 5 months	Up to 12 months
Loan Repayment schedule	monthly	quarterly	monthly	Monthly
Loan Guarantee	Member guarantee, peer pressure and group savings	Peer pressure and accumulated group savings	Peer pressure and accumulated group savings	Group guarantee and accumulated savings

Qualitative assessment of key microfinancial mechanisms

In this section, I evaluate the four different microfinancial models using a set of criteria (outreach to the poor, financial viability, and sustainability) that are necessary for a successful implementation of microfinancial scheme. I weigh these factors against the four models to generate a ranking based on the probability of success of each scheme. This weighting criteria selection is my best assessment, after discussing it with ENPHO.

Studies show that organizations reaching the poor most of the time are not viable, while viable institutions disregard the poor.[21] Therefore, it is important to understand that to increase the probability of success, this project may have to emphasize one microfinancing mechanism over another as the project moves through its lifecycle. To characterize the changing value of the microfinancing, the project is segmented into three phases and criteria were given a corresponding weighting. Therefore, there may not be an overall best-made financing model of the KAF™, however, there may be a "best model" for different phases of the project. The phases emphasize the following in succession: outreach, financial viability, and sustainability.

Key Criteria used in 3-phase microfinancial model ranking

Weight			
Phase 1	**Phase 2**	**Phase 3**	**Criteria & Description**
50%	20%	20%	**Outreach to the poor:** Extent to which the poor, have access to financial institutions and their services. Outreach indicators include all the following categories: micro-entrepreneurs, small farmers and the landless, and women.
25%	50%	30%	**Financial viability:** Extent to which an institution covers its costs, has its loans repaid on-time, and makes a profit. Viability indicators include: high on-time repayment rate, proximity of location, familiarity with local conditions, easy access to services, simple and easy to follow procedures, low operating costs, internal resources, provision of training in financial management, diversification of savings and loan products, and standardized accounting and reporting systems.
25%	30%	50%	**Sustainability** Extent to which an institution, in addition to being viable, fully mobilizes its own financial resources internally (equity, savings, reserves from profits) instead of depending on external contributions from government or donors. Sustainability indicators include: savings mobilization, incentive loan repayment programs, legal institutional framework, and existence of partnerships with other NGOs, government institutions, and village groups.

Key criteria indicators compared with the microfinance mechanisms

	Microfinancial mechanisms			
Key Criteria	**SACCO**	**SFCL**	**VB**	**RDB**
Outreach:				
Women	X	X	X	X
Poor farmers	X	X	X	
Landless	X			
Entrepreneurs	X	X		
Outreach score	*4/4*	*3/4*	*2/4*	*1/4*
Financial Viability				
High on-time repayment rate	X	X	X	X
Proximity of location	X		X	X
Familiarity with local conditions	X	X	X	X
Easy access to services (door-to-door)	X	X		X
Simple and easy to follow procedures	X		X	
Low operating costs	X	X	X	
Internal capital only	X		X	
Provision of training in financial mgmt.		X		X
Diversification of savings & loan products		X		X
Standardized reporting system		X		X
Viability score	*7/10*	*7/10*	*6/10*	*7/10*
Sustainability				
Savings mobilization	X	X	X	X
Incentives loan repayment programs				X
Legal institutional framework	X	X		X
Network of local partners (NGOs, village groups etc.)	X	X		X
Sustainability score	*3/4*	*3/4*	*1/4*	*4/4*
Total score	**14/18**	**13/18**	**9/18**	**12/18**

Assessment of probability of success of the financial models in the 3-phase development

This is the grading scale applied to the evaluation that follows:

Probability of success scaling method	
low	0 to 0.20
medium	0.20 to 0.40
high	0.40 and higher

Table 6: Probability of success of the microfinancial models in a 3-phase development process

PHASE 1 OUTREACH FOCUS

Weight criteria	Outreach		Viability		Sustainability		
	50%		25%		25%		
Financial Program	**Outreach**	**Outreach score**	**Viability**	**Viability score**	**Sustainability**	**Sustainability score**	**Probability of success**
SACCO	1.00	**0.50**	0.70	**0.18**	0.75	**0.19**	**high**
SFCL	0.75	**0.38**	0.70	**0.18**	0.75	**0.19**	**medium**
VB	0.50	**0.25**	0.60	**0.15**	0.25	**0.06**	**medium-low**
RDB	0.25	**0.13**	0.70	**0.18**	1.00	**0.25**	**low**

PHASE 2 VIABILITY FOCUS

Weight criteria	Outreach		Viability		Sustainability		
	20%		50%		30%		
Financial Program	**Outreach**	**Outreach score**	**Viability**	**Viability score**	**Sustainability**	**Sustainability score**	**Probability of success**
SACCO	1.00	**0.20**	0.70	**0.35**	0.75	**0.23**	**medium**
SFCL	0.75	**0.15**	0.70	**0.35**	0.75	**0.23**	**medium**
VB	0.50	**0.10**	0.60	**0.30**	0.25	**0.08**	**medium**
RDB	0.25	**0.05**	0.70	**0.35**	1.00	**0.30**	**medium**

PHASE 3 SUSTAINABILITY FOCUS

Weight criteria	Outreach		Viability		Sustainability		
	20%		30%		50%		
Financial Program	**Outreach**	**Outreach score**	**Viability**	**Viability score**	**Sustainability**	**Sustainability score**	**Probability of success**
SACCO	1.00	**0.20**	0.70	**0.21**	0.75	**0.38**	**medium**
SFCL	0.75	**0.15**	0.70	**0.21**	0.75	**0.38**	**medium**
VB	0.50	**0.10**	0.60	**0.18**	0.25	**0.13**	**low**
RDB	0.25	**0.05**	0.70	**0.21**	1.00	**0.50**	**high**

According to the results of qualitative assessment presented above, savings and credit cooperative appears to be the "best financing mechanism" available in Parsa across all the three phases (with probability of success in order of high, medium, medium). The next suitable financing schemes according to this analysis are both SFCL and RDB. However, the absence of

local functioning SFCLs in Mudali and Langadi and the lack of endorsement of the project in behalf of RDB, make them unrealistic financing preferences for the Kanchan™ filter at the present time.

G. Key players and the importance of Social Mobilization

During my investigation I have also discovered that social mobilization is a crucial element in the preliminary implementation phase of the project. It is a necessary and integral component of the project to ensure villagers' involvement and responsiveness to the financial and community development initiatives. Social mobilization should be carried out by the staff of the microfinancial organization, ENPHO, trained NRCS representatives and active VDC delegates. This network structure of social mobilizers should undertake activities such as overseeing user's group committee's meetings, raising consciousness about the potential benefits of participating in microfinancial programs and training a carefully selected and motivated group of locally respected village facilitators (village leaders). Once this selected group of local village leaders receives proper orientation and training, they can disseminate the information and educate the other villagers on the principles of savings and borrowing practices.

Role of Centre for Microfinance (CFM)

CMF should play a substantial role in the successful implementation of the social-financial mobilization initiative in Parsa. This organization has extensive experience and knowledge of the microfinance environment in the Terai as well as possession of a strong local microfinancial network. It is a very well-suited organization to help ENPHO design a viable and effective microfinancial scheme for the distribution of Kanchan™ filter in Murali and Langadi. CMF should be contracted and held responsible for training the local social-financial mobilizers.
A critical component to the success of a microfinancial mechanism is in the key parties receiving the proper financial management and monetary training required to run this program successfully. I would recommend that selected representatives of both the chosen microfinance institution and Nepal Red Cross participate in the two-day training program organized locally by CMF. The overall cost of the training is $600, not including training materials. Average cost of training material is around $200.[22]

Role of Nepal Red Cross Society (NRCS)

Nepal Red Cross has been a valuable partner to ENPHO, as it has been capable of fine-tuning its role according to the circumstances and needs in the promotion of the Kanchan™ filter. In its educator's role, NRCS teaches local people the importance of drinking safe water and the value of hygiene and good health. In its technical trainer's role, NRCS, together with local entrepreneurs, educates the villagers on the proper use and maintenance of the filter. As the microfinancial mechanism becomes part of the Kanchan™ distribution model, the Red Cross needs to take on two new roles:

1. NRCS should be the physical link between the project, VDCs, user committee (UC) of the village, and the microfinancial body itself. A selective and motivated group of Red Cross representatives should be chosen and trained respectively to carry on this responsibility. These individuals should clearly understand the scope and goals of the KAF™ distribution and promotion model, the needs and requirements of villagers via close involvement with its representative body, such as the village UC, and the microcredit mechanism and its works.
2. Upon proper training and directives provided by CMF and the staff of the microfinancial organization, the Red Cross should take upon itself the role of change agent and meet regularly (every two weeks) with the UC group to encourage resource mobilization savings and loan investment initiatives.

H. Recommendations and Conclusions

Recommendations

To successfully distribute the Kanchan™ filter, ENPHO must initially subsidize the end users. This, however does not negate the need to target resources and partnerships understanding that this project will require a phase approach that emphasizes outreach, financial viability, and sustainability. Broad and extended distribution of the KAF™ in the villages, relies on a successful implementation of these three components into the project scheme as described below.

Outreach:

- Target the poorest rural segments that cannot afford to pay for the filter. In this respect, rank the households according to their poverty and water contamination levels. Then, give priority to the poorest with the most contaminated wells. In view of the importance role that women play in both supplying water and management of a household and the positive correlation between the loan recovery rate and the participation of women in the marketplace, more poor female representatives must be brought into the savings and lending schemes.[23]
- Offer convenient service with having "mobile loan and savings officers" who visit the borrowers from door-to-door.

Financial viability:

- Tailor the savings and lending package to the poor villagers' individual needs and avoid the general approach of "one size fits all".
- Use simple, transparent procedures along with less formal borrowing methods.
- Operate with internal funding to develop a strong sense of ownership and self-interest for managing risk and maintaining high on-time repayment rates.
- Make village authorities and leaders share responsibility for compliance with the terms of the loan contracts. For example, the institution can require that 10 percent of the loan amounts be guaranteed in the form of compulsory savings, backed by written approval of an authoritative figure in the village.
- Deliver reliable financial advice and help the borrowers understand the savings and loan terms and conditions. This is a key factor in encouraging rural poor rural people to buy into plans to provide safe and clean water to their households. Thus, financial training and assistance

should be provided by the local financial entity and NRCS through the complementary and monitoring intervention of CMF.

Sustainability and Efficiency:

- Improve the quality of both outreach and sustainability of the model by incorporating social and educational constituents into the program. Intervention at the village level needs to be holistic, combining areas such as instructive and social development, improvement of market access, financial and non-financial training for the poor, and the establishment of strong linkages between the involved parties: ENPHO, Nepal Red Cross, the microfinancing institution, CMF, and the local village committees. Social mobilization of peer pressure can greatly improve on-time repayment rates.
- Widen the mobilization of savings with the introduction of new deposit practices and prompt payment incentives. For example, as was carried out in Indonesia[24], the creation of a locked "piggy bank", located in the houses of the borrowers in which they can deposit surplus cash at any time, and each week a mobile loan officer collects the additional savings. In the specific Indonesians microcredit case, this savings mobilization effort led to double the amount of disposable savings of the villagers.
- Build a monitoring mechanism for assessing the impact of the financial program. In this respect, the local microfinance body should operate under the supervision of CMF.

Furthermore, my findings show that there are a number of actively functioning local SACCOs and multipurpose cooperatives in the Parsa District worthy of consideration.

Table 7: Comparison of operational cooperatives located in the Parsa District

Name of Cooperative	Type of Cooperative	Location/ VDC[25]	Proximity to Murali & Langadi	Comments
Sahi Bachat Tatha Rin	Savings & Credit	Birgunj N.P.	20 km	• Red Cross involvement and stake in the cooperative makes it a very attractive option. • The cooperative's regulations incorporate both Mudali and Langadi villages.
Not available	Savings & Credit	Pockhariya	Nearby VDC	Investigate whether Mudali & Langadi have a bylaw that incorporates them into this type cooperative. If not, get permission from Division Cooperative Office in Birgunj. See Appendix A
Not available	Multipurpose[26]	Pokhariya	NearbyVDC	Investigate whether Mudali & Langadi have a bylaw that incorporates them into this cooperative. If not, get permission from Division Cooperative Office in Birgunj. See Appendix A
Pragatisheel Women Multipurpose Coop.	Multipurpose	Masihani	Adjacent VDC	• Managed and owned by women. It has been functioning very effectively. • Investigate whether Mudali &Langadi have a bylaw that incorporates them into this cooperative. If not, get permission from Division Cooperative Office in Birgunj. See Appendix A

As the CEO of CMF mentioned, the loan recovery period for half of the cost of the filter (NRs750), should be agreed to be from 3-month to a maximum of 12-month duration. As the borrowers are a very heterogeneous group of individuals, the loan disbursement plan should be implemented according to the borrower's financial situation and needs. Thus, the loan duration should be flexible and designed to meet the needs of the poorest.

Below, as an example, I use the Sahi Bachat Tatha Rin cooperative's financial scheme. I select three scenarios with repayment periods of 3 months, 6 months and 12 months. This basic calculation (not based on a declining balance) uses a 16 percent loan cost.

Name of Institution	Sahi Bachat Tatha Rin
Type of program	Saving and Credit Cooperative
Interest Rate	16%
Loan Amount	NRs750

Repayment Period[27] **(on a monthly base)**	**3-month**	**6-month**	**12-month**
	NRs260	NRs135	NRs72.50

As the above calculation shows, the monthly payment structure for all three loan repayment schedules requires a relatively small and affordable monthly disbursement. Furthermore, Shalik Ram Sharma (CEO of CMF) pointed out that most rural poor are capable of repaying the total amount of the loan in just a week of hard work. But, what was even more interesting to discover during the field trip to the village of Murali, was that among the population there was a high demand of bottled Coke. We investigated further and we learned that villagers buy on average 240 bottles (200 ml size) of Coke per month at an average cost of 12 NRs/ 200 ml bottle. Therefore, while the village population is extremely poor, evidence shows that some of them have the capability to save funds for purposes other than just the very basic needs. It is reasonable to believe that with proper orientation, savings mobilization, and regular follow-up on behalf of the cooperative's field staff, VDC authorities, and Red Cross representatives, this microfinance program can result in a successful and sustainable mechanism for the distribution of KAF™ in the villages of Murali and Langadi.

Conclusion

Limited access to safe water supplies and sanitation services are one of the primary causes of poverty and diseases in Nepal. Awareness of the arsenic contamination of drinking water in the Terai region of Nepal has grown in recent years, thanks to the work of National Arsenic Steering Committee, MIT, ENPHO, the Department of Water Supply and Sanitation, NRCS, and World Bank, thus driving the need for increasing the distribution of one the best proven household water mitigation solutions, the Kanchan™ Arsenic Filter. In order to successfully promote and deliver the filter, social marketing and rural microfinancing systems must be implemented in a coordinated effort to ensure social acceptance of the filter and financial sustainability of the program.

In summary this report has accomplished these tasks:
Firstly, this document has provided suggestions on how to design and implement a successful KAF™ awareness and promotional campaign in the villages of Mudali and Langadi. It includes an evaluation of the social environment, the target audience, the message, the communication and media channels. Additionally, described within is the importance of utilizing corporations, wealthy donors, and other non-profit organizations of the Western world to pool greater resources and to increase exposure and global awareness of arsenic water contamination in Nepal.

Secondly, this report has recommended the most suitable microfinancial mechanism for Mudali and Langadi through a study of the microfinancing rural systems existing in the Parsa District. I believe the savings and credit cooperative financing model can be instrumental in helping the poor mobilize their funds more effectively and learn to make sound decisions about their water, sanitation and health issues. In addition, other supportive financial bodies include: local entrepreneurs, CMF, Red Cross, informal village associations and user's group, and VDCs.

However, more factors must be in place to ensure a successful financial implementation. The credit system has to exclusively serve the poorest with the provision of easy access to services. For instance, loan officers visit the villages, get to know the borrowers one by one, and build a business relationship based on trust and mutual understanding. This promotion of a personal network of partners and social linkages with the local financial bodies is indispensable and ensures a coordinated and effective social intervention mechanism. This way, the community has a vested interest which can mobilize all local resources to ensure viability. In addition, the political and socio-economical instability of the country must be fully appreciated and the effect on the ability to implement all the elements of this program and sustain them over a longer period fully evaluated. To conclude, further market and field research is necessary to best characterize the Kanchan™ filter's social return on the investment and better understand the nature of the benefits, and how their perceived value can be measured.

I. Appendix A

List of Contacts for Savings and Credit Cooperatives in the Parsa District

Sahi Bachat Tatha Rin, Birgunj. Contact: Shyam Pokhrel, Chairman of the Cooperative and of the Nepal Red Cross.
Pragatisheel Women Multipurpose Cooperative, Masihani. For further investigation on the current status of this SACCO contact the Division Cooperative Office in Birgunj: Mr. Durga Prased Jaiswer. Tel: 051-522262.

For further information on the other two SACCOs in Pokhariya contact the same entity and individual listed above.

SFCLs in Mudali and Langadi:
For further investigation on the status of these institutions contact Mr. Durga Prased Jaiswer. Tel: 051-522262

Social Mobilization and Microfinancial training/workshops:
Center of Micro-Finance:
Shalik Ram Sharma, CEO
GPO Box 20933, Bhatbhateni
Kathmandu, Nepal
Tel: 977-1-4434041
Fax: 977-1-4443984
Mobile: 977-9851049034
Email: shaliks@cmf.org.np

J. Appendix B

Arsenic Contamination of Tube Wells in Langadi and Mudali (Parsa District)

District: Parsa

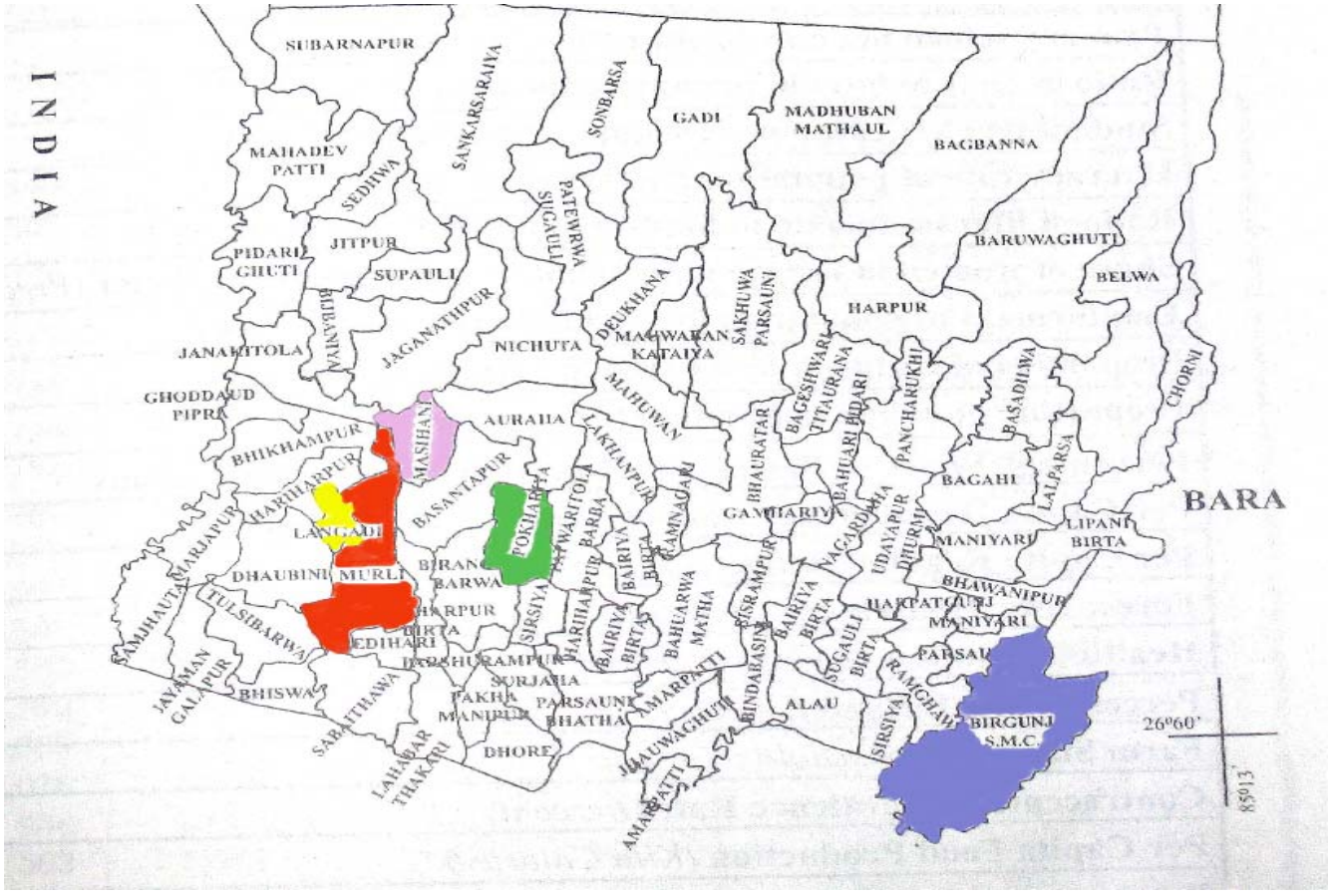
S.N.	VDC	HH No.	Population			Tube wells			Arsenic Concentration					
			Male	Female	Total	Private	Public	Total	0-10 ppb	%	11-50 ppb	%	>50 ppb	%
1	Langadi	495	1629	1552	3181	132	53	185	49	26.5	1	0.5	135	73.0
2	Mudali	732	2481	2088	4569	206	66	272	110	40.4	98	36.0	64	23.5
Total		***1227***	***4110***	***3640***	***7750***	***338***	***119***	***457***	***159***	***34.8***	***99***	***21.7***	***199***	***43.5***
Population per HH			*6.316218*											
										Total HH using TW >50ppb			*597.0*	

K. Appendix C

<u>Map of the Parsa District: location of viable microfinancial cooperatives close to the VDCs of Murali and Langadi.</u>

Legend:

- Murali
- Langadi
- Masihani
- Pokhariya
- Birgunj N.P.



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[25] Refer to *Appendix B* for a map of the Parsa District and the location and distances of VDCs from one another.

[26] Multipurpose cooperatives, besides providing savings and credit activities, also engage in other economic initiatives such as trading among villagers of consumer goods, fertilizers and kerosene.

[27] Loan Repayment formula: (Loan amount/No. of installments) + (Loan Amount*Rate)/No. of installments.

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