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**WATER, SANITATION AND HYGIENE:  
SUSTAINABLE DEVELOPMENT AND MULTISECTORAL APPROACHES**

**Microfinance for water and sanitation:  
A case study from Tiruchirappalli, India**

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*This paper looks at the development of a water and sanitation loan fund deployed through a network of women's self-help groups in Southern India. The success of the loan fund reduced barriers to credit from formal lending institutions and increased investment in water and sanitation facilities. Results from this case study indicate that micro-finance principles can be successfully applied to the water and sanitation sector. The objectives of this case study are to summarize what is known about this loan program and explore the possibilities and limitations of this new financing model for the water and sanitation sector.*

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This case study explores a micro-lending program carried out in and around the city of Tiruchirappalli (Trichy). Gramalaya, a Trichy-based water and sanitation-focused non-government organization (NGO), implemented this program in partnership with WaterPartners. The program involved the construction of water and sanitation facilities by mobilizing a network of women's self-help groups (SHGs) to utilize a revolving loan fund.

Similar forms of microfinance have become widespread in the past two decades, in India alone micro-finance reached 15 - 20 million clients in 2007, covering about 10% of the poor population (M-CRIL, 2007). Yet despite the rapid growth of micro-finance "[most] micro-finance products are targeted towards income-generating activities rather than water and sanitation which is usually not perceived to be sufficiently attractive by micro finance organizations" (Agbenorheri and Fonesca, 2005, p.1). There have only been few scattered pilot projects exploring micro-loans for provision of water and sanitation improvements have emerged in recent years (Fonseca et al., 2007; Kouassi-Komlan 2007). The innovative case study here highlights how the development of a water and sanitation loan fund and the mobilization of women's SHGs were able to reduce barriers to access to credit and increase investment in water and sanitation facilities.

## **Background**

Gramalaya, founded in 1987, works within three regional areas of Tamil Nadu. The population of these three areas totals 1.1 million. The average monthly income in rural areas is approximately \$75 and \$113 in urban areas. Access to improved sanitation in these areas is severely limited. Only 36% of the population had access to a basic toilet (Geetha, 2008). Those without household toilets used public facilities or defecated in open areas. Public toilets in urban areas were generally not well maintained, overburdened, and often required a fee. Due to privacy and cultural concerns, women and girls were often unable to defecate during the day, which subjected them to serious health problems and dangerous situations at night. While 90% of the target population was officially listed as having access to water facilities, many of the water systems in the area were overloaded, poorly maintained, or broken. In urban areas, women waited in long lines for water available only during certain hours, on certain days. In most poor neighborhoods, this process took two to three hours. In nearby rural areas, women and children often walked long distances to reach a poor quality water source.

In 2004, Gramalaya began its micro-loan program for water and sanitation improvements. This program was executed through its Women's Action for Village Empowerment (WAVE) Federation network. The WAVE Federation is a highly organized network of approximately 2,190 women's SHGs with over 32,000

members currently active in and around the city of Trichy. Gramalaya provided extensive training activities for the SHG members. Training activities included: community organizing, census data collection, community needs' assessment via community mapping, water testing, health education, household and community water supply maintenance, toilet construction techniques, management of loans, engagement of local government officials, and self-governance systems.

Gramalaya provided loans directly to SHGs, and SHG members distributed the loans among borrowers with all members sharing joint liability. The women directly paid for the construction work while Gramalaya monitored the construction. SHG members were key program planners and community organizers that helped stir community demand for safe water and toilets. As of December 2007, Gramalaya had disbursed nearly \$200,000 in loans directly, with an average loan size of \$91 per borrower. Loans were for 24 months with a 12 or 18 percent interest rate and were used to construct latrines, toilets, bathing facilities, water connections, and stand posts. Many borrowers constructing latrines also accessed a subsidy from the state of Tamil Nadu of a 1500 INR reimbursement. Before the program, loans for water and sanitation were not available in the formal market and could only be accessed at interest rates often over 120%.

## Methods

This paper utilizes pre- and post-program data to construct a case study of key program impacts, without any other comparison group. The study looks at program activities from 2004-2007. Data sources include census data collected pre-and post-program at program sites (N= 4,210), interviews with self-help group members and households (N=36), and program data from Gramalaya and WaterPartners. Census data was collected by trained SHG members. Program data was collected by Gramalaya, WaterPartners' staff during field visits, and third-party field auditors. Interviews and household questionnaires were carried out by WaterPartners staff.

## Results

Table 1 shows that since 2004, Gramalaya has disbursed nearly \$200,000 directly in loans to women's SHG members. A total of 667 loans have been supplied for water improvements, and 1,496 have been executed for sanitation improvements, benefiting over 10,000 people. Census data collected by SHG members in two villages indicate that the increased investment in water and sanitation facilities has resulted in an increase in household access to safe water and sanitation facilities and a reduction in self-reported diarrheal incidence among SHG members and their families (Table 2).

Over the course of its loan program, Gramalaya has realized an overall average repayment rate of 82%. While initial repayment rates under the program were quite low, under the most recent year of its loan program, Gramalaya's repayment rates have averaged nearly 100%. This significant increase in repayment rates is attributed in part to the micro-finance training Gramalaya received to further develop their loan program management capacity. As a result of the training, Gramalaya has installed new accounting and micro-financing computer software; developed and refined their lending models, processes, terms of loans and documentation; developed borrower loan cards and applications; hired additional staff members; and developed business plans. These start-up costs, here experienced as both low initial repayment rates and capacity building activities, associated with new product development will be important to keep in mind for other organizations attempting to replicate such a program.

Interviews with SHG members about their experience with the loan program revealed nearly universal acceptance of the terms of the loans offered by Gramalaya. All respondents reported reductions in time spent to collect water and to reach a place for defecation. Respondents reported that before the program, they did not have options to access capital for water or sanitation improvements. Overall, there seemed to be good, though not perfect, understanding of the terms of the loans and a high satisfaction level with the products. There were some signs of hardship in paying back the loan. For example, some reported taking on additional night jobs, mortgaging jewelry, and selling goats to make payments. The top complaints mentioned were that the loan did not cover the entire cost of toilets, and the time from application to completion of product was too long in urban areas.

Program activities have considerably increased the pool of loan capital available to poor women and their families for water and sanitation improvements in the program region. Gramalaya found a greater demand for its loan product than it could meet through its available loan capital. In response, they facilitated over \$390,000 in additional loans from commercial banks (43%), internal SHG savings (41%), and government

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subsidies (16%) for SHG members to install new water and sanitation improvements. This capital enabled the program to reach an additional 24,000 people and marked one of the most significant achievements of the program. Commercial loans had not been previously available to women in these communities for water and sanitation improvements. One SHG member who lives in Melandulavur reported in an interview with WaterPartners staff, “No one has approached the bank directly without a SHG for a loan because the bank is not in practice of giving those loans.”

Furthermore, the program’s success has drawn the attention of local financing institutions. Several commercial banks and a development bank are interested in providing significant additional capital for Gramalaya’s program. Gramalaya plans to leverage its revolving loan fund as a loan guarantee to obtain the additional capital from commercial loan sources. The banks have discussed aggregated commitments as high as \$2 million dollars in 2008, which would potentially serve over 60,000 people with water and sanitation improvements.

An additional major outcome of this program was Gramalaya’s decision to spin off a completely new organization, Gramalaya Urban and Rural Development Initiatives and Network (GUARDIAN), which is now registered as an MFI in India. The launch of GUARDIAN is especially noteworthy, as it is one of the world’s first MFIs designed specifically to provide micro-loans for water and sanitation projects. GUARDIAN will now operate and manage Gramalaya’s revolving loan program.

Women in the program expressed a sense of empowerment gained from participation. Many women for the first times in their lives entered banks to obtain loans. Work with the Federation also served as a launching pad for women to pursue community development activities and procure loans for income-generating activities previously not considered acceptable for women. Some SHGs have started their own businesses, including a rock quarry and a brick production company that supplies materials needed for toilet construction.

Community	Loan start date	Interest rate (%)	Loan amount disbursed (USD)	Amount due to date (USD)	Actual realized to date (USD)	Repayment rate (%)	Water loans	Sanitation loans
Ponnusangampatti	2004	12	12,440	14,398	7,577	51	72	67
Melakothampatti	2004	12	6,346	6,757	2,436	36	24	54
Thevarapampatti	2004	12	7,482	8210	5076	61	46	90
Morupatti	2004	12	28,380	30,282	23,275	77	137	213
Ayinapatti	2005	12	5,956	6,538	3,621	56	46	71
Melakarthigaipatti	2005	12	7,815	8,580	4,179	49	32	114
Melanaduvalar	2005	12	11,741	12,570	7,696	61	88	125
Kanganipatti	2005	12	9,181	10,077	3,676	40	51	118
Tiruchirappalli	2006	18	98,438	93,992	102,005	100	171	319
Kollapatti	2006	12	4,185	2,130	2,470	55	0	108
Kothampatti	2006	12	5,357	8,082	3,553	4	0	217
Total		---	197,321	205,751	167,021	81 (Avg)	667	1,496

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<b>Table 2. Census data on water and sanitation indicators from the villages of Melanaduvalar, Kangainpatti Melakarthigaipatti and Ayinapatti. Total population 4,210</b>		
<b>Indicator</b>	<b>Pre-program %</b>	<b>Post-program %</b>
<b>Water source</b>		
Household has a water connection in house	23	31
Household uses a public street tap	76	60
Household uses well water	1	8
Household takes less than 30 minutes to collect water	37	77
Household takes 30 to 60 minutes to collect water	56	34
Household takes more than 60 minutes to collect water	12	2
<b>Sanitation – primary place of defecation</b>		
Household's toilet	9	91
Open defecation (fields, railroad tracks)	90	9
<b>Health – number of times over six months they recalled someone in the family has suffered from diarrhoea (self-reported)</b>		
Zero times	14	68
Once or twice	55	15
More than twice	30	15

### **Discussion**

This case study demonstrates the potential of using microfinance to expand access to water and sanitation facilities. To that extent this paper contributes to a growing literature that sees an expanding role for microfinance in poverty alleviation. However the discussion here seeks to make clear the limits of that potential. First we address the limited potential of credit based approaches and then we examine the contribution of water and sanitation micro-credit to the goal of women's empowerment.

### **The potential of credit**

Gramalaya's success in achieving high repayment rates and the resulting openness of private banks to provide financing raises questions of how this result can be replicated. Specifically, what did the program provide that created room for market financing that was missing prior to the program?

Economists have explained the failure of credit markets as resulting from asymmetric information, namely the borrower has a better idea than the bank of the borrowers intention to repay the loan. Economic theories of efficient markets assume this information is freely available, when it is not lenders must either pay to collect the information or compensate for losses by raising interest rates. The cost of collecting borrower information is prohibitive of making numerous small loans. Raising the interest rate makes the loans prohibitively expensive to those borrowers who have no intention of defaulting. This results in adverse selection where only borrowers intending to default are likely to seek the loan.

Theories of credit based on asymmetric information conclude that when loans cannot be backed by collateral the market will unravel to inefficiently high interest rates and suboptimal level of financing (Mas-Colell, 2005). The use of collateral to ensure repayment results in the poor being locked out of the market even when their projects may be capable of high returns. (Bowles 2003). This seems to be a plausible explanation for the lack of credit in Trichy for water and sanitation prior to the program. Likewise a plausible explanation for the success of the program is that the creation of the SHGs and the use of joint liability loans overcame the barriers of asymmetric information. While determining who is and isn't a good

credit risk may be costly for a bank that information is often freely available to neighbours and fellow members of a small, intimate SHGs. In other words, peer information on a member's capability and willingness to repay the loan is freely available to their fellow SHG members, and the other member's willingness (or lack thereof!) to be jointly liable signals that information to the lender.

Optimism over the success of previous joint lending approaches and the concern to prevent a repeat of the inefficiencies of development banks that had provided subsidized credit has led to calls for micro-credit institutions to become financially sustainable (Morduch 2000). If joint lending could combine market success with reaching low income borrowers it would undoubtedly be a win-win. Access to credit would be opened to the poor with requiring scarce development donor funds. The argument assumes that the poor require access to credit but not necessarily cheap credit. If that is the case interest rates can be raised to reflect the complete opportunity cost of the funds plus any transactions costs.

Despite that rosy picture, recent research should lower expectations on the potential of completely market based programs. The only two econometric studies have both found that low income borrowers have high demand elasticity to interest rates - a small increase in interest rates causes a large decrease in borrowing (Dehejia et al. 2005, Karlan and Zinman 2005). Looking from the lender side similar results have been found - efforts to forgo subsidies and become financially sustainable in the free market generally resulted in catering to high income clients. A survey of 124 MFIs attempting to become self-financing published in the *Microbanking Bulletin* found that less than 40 percent of those were focusing on low income borrowers. Of this group, only 37 percent were successfully becoming self-financing (cited in: Armendáriz and Morduch, 2007). Nor has subsidization led invariably to inefficiencies, Hudon & Traca (2006) find "that subsidies have contributed to raise efficiency, for the majority of MFIs in our sample." The study notes however that the evidence suggests also that there is a level beyond which increased subsidization taxes efficiency, at the margin." (Hudon, 2006.)

In light of the above discussion the debate should shift to a discussion how subsidies are used instead of they should be used. The anti-subsidization literature makes two valid and important points. First, across the board cheap credit below market rates results in inefficiencies as borrowers do not internalize the social cost of the credit. Second, subsidies that support marginal transaction cost undermine the lenders incentives for efficiency. Armendáriz and Morduch (2007) list three possible forms of "smart subsidies" that avoid these two problems and increase efficiency: first, subsidies to crowd-in private resources; second, to cover start up cost to the operations; and third, subsidies directed to low income borrowers. Gramalaya's program utilized all three forms of smart subsidies:

- *Funds to crowd-in private resources:* WaterPartners provided a \$200,000 grant to Gramalaya to start the capital base for the program. This small capital base was used by Gramalaya to access a significantly larger amount of capital from the private market. The need to repay the private market loans maintains disciplined efficiency while the crowding in results in high returns to the money granted.
- *Funding start-up costs:* Start-up costs are any cost that will decrease per a borrower as the program grows larger. Subsidies to cover start up costs help the microfinance institutions achieve efficient economies of scale. Gramalaya received a \$103,679 grant from WaterPartners that supported capacity building along with hygiene and health training programs. Additionally numerous other grants from other funders were used for the creation of the WAVE network.
- *Subsidies directed to low income borrowers:* For programs that target the poor - as most basic water and sanitation program will - the program will require ongoing subsidies at all stages of the program to keep costs reachable by the poor. This leaves the question of how to administratively target the subsidies to low income borrowers while maintaining lender efficiency. In this program interest rates were not subsidized but the borrowers creating latrines benefited from Tamil Nadu state grants of 1500 INR (roughly US \$36 at the time) per a latrine. This form of subsidy has useful properties for water and sanitation microfinance. First, by putting the subsidy a technology used almost exclusively by low income persons the subsidy is automatically targeted without the administrative cost of identifying the borrower's income. Second, by making the subsidy per a latrine it maintains incentives for the lender to maintain low transaction costs and wide outreach.

The combined amounts of these three subsidies are fairly large, yet given the success in mobilizing private funds both from borrowers and banks they seem well justified.

For the poorest of the poor even subsidized loans may be a barrier to access – the credit approach used here should not be expected to completely replace grant based projects if the goal is to achieve universal access to water and sanitation. Credit is only appropriate for those whose total income is capable of covering the subsidized cost of the water/sanitation project over all other necessities, but who have not been able to carry out the project due to a lack of liquidity or motivation of some members of the household. Appropriate solutions for some communities and individuals will simply be too expensive to be self-financed. As discussed above, the success of the microfinance model results from using peer information of the SHG to determine who is and isn't a good credit risk; or in other words, it succeeds precisely because it excludes those unable to pay. Credit-based work for those who can afford it can free up subsidized resources for the neediest communities.

### **Women's empowerment**

Popular discussions of micro-credit often uncritically proclaim gender targeting of loans as a source of empowerment of women. Yet appropriate gender awareness demands a more thoughtful application. There are three common rationales behind gender targeting of microfinance loans. First, numerous studies have shown the income in the hands of women is more likely to be used on human capital expenditures such as food and education for the children and less likely to be used for luxury consumption items such as alcohol and cigarettes (Kabeer 2004, Armendariz and Morduch 2005). Second, by allowing the women to purchase assets the loans are seen as increasing her bargaining power when there is conflict in the household. Third, women are seen as more likely to repay the loans.

But in the case of water and sanitation projects only the third of these arguments apply. The first argument assumes the loan is for an income generating asset where the family is split over how to spend the net income over the cost of the loan. However in the case of water and sanitation projects there is generally no income generated, any saving in cost (of health care, water, ect) is a public good enjoyed by all regardless of who takes out the loan. Targeting the loan to women and hence making their budget the source of the loan's repayment may force them to cut back on household expenditures for food and their children's education. The second argument - increased bargaining power in case of household conflict - assumes that the asset can be privately controlled by the woman. However in water and sanitation projects it creates a public good for the household. The addition of a toilet or water connection increases the bargaining power of the home's owner, which will often not be the woman. One borrower we interviewed was living with her father and unemployed. She explained that each month she asked her father for money to repay the loan. Although she reported success in the program in a case of conflict that arrangement could be disempowering.

Because of these observations we agree, partly, with one critic of microfinance who noted it is not empowering to “dab a small amount of debt on a poor woman” (Adams, quoted in Armendariz and Morduch, 2005, p. 193). But while the loans may not inherently be empowering a well organized SHG network can empower. Numerous times representatives and members of the WAVE network referred to a sense of empowerment in making decisions that shape their households and communities. In attempting to replicate this project, it should not be thought that this result will flow automatically from gender targeting the loans. Instead, it was a result from overall gender awareness that aimed specifically at empowering women.

### **Conclusions**

Results of this case study suggest that when tied to participatory community-groups, a viable market can be made for credit for water and sanitation improvements. Development of a water and sanitation loan fund and the mobilization of women's SHGs were able to reduce barriers to access to commercial credit and increase investment in water and sanitation facilities. To the extent that the findings of this study can be generalized to the developing world at large, they have important implications for NGOs, MFIs, the commercial sector, and policy makers who can incorporate these finance models to help accelerate access to safe water and sanitation facilities. One of the most significant conclusions derived from this program is that when capital became accessible, women chose to take out loans for safe water and sanitation improvements and were able to repay those loans. Efforts to replicate this program should recognize the important role subsidies played in making success possible. Given the importance of reaching the poor in water and sanitation projects subsidies will generally be required at all stages of the program. To ensure the ongoing subsidies are targeted to the poor and maintain incentives for lender efficiency and wide outreach we suggest the subsidies

being tied to Watsan technology used exclusively by the poor (i.e. simple latrines) instead of to the loan's interest rates.

This being said, credit will not be a solution for all those in need of safe water and sanitation, but it can help leverage limited financial resources to reach millions of people in need of safe water and sanitation improvements. Catalyzing the start of this credit market appears to be a powerful tool for increasing access to water and sanitation and improving health outcomes.

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