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Impacts of domestic water supply on gender and income: results from a participatory study in a drought-prone region in Gujarat, India

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Abstract

In this paper the value of an improved domestic water supply was investigated for economic development and gender relations in rural households in a drought-prone area. A comparative study executed with participatory rural appraisal (PRA) methods with groups of women from 11 micro-enterprises in ten villages and five control villages showed that, when an improved domestic water supply does not function, the entrepreneurs groups have a statistically higher loss of the economic use of water and time than the control groups. The extra income that women gain when the supply works and is used economically helps poor families to bridge the dry season. It could further be quantitatively proven that male–female gender relations were significantly better in the entrepreneurs group. This was not so for mother–daughter relationships, which gave new insights into the need to address gender equality issues with the women themselves and with SEWA, the supporting agency. These findings support the view that rural poverty and the status of women would receive a significant boost if policy makers focused on providing employment opportunities for women along with improved water supplies.

Keywords: Asia; Gender relations; India; Micro-enterprise; Poverty alleviation; Water supply

1. Introduction

The goals of improving drinking water supplies are generally the improvement of people's well-being and health. The importance for economic development is far less recognized. This study aimed at investigating the value of more and more easily accessible water for economic uses especially by women in rural households in developing countries. A second objective was to assess the impact on gender

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relations. The overall objective was to see if, where and how domestic water supply projects need to be adjusted to maximize the economic benefits.

The research was carried out in the context of a domestic water supply services project in Patan district (formerly Banaskantha) in the northern part of Gujarat, India (Figures 1 and 2). Patan is an arid region with droughts occurring every three years on average. Agriculture and livestock are the main sources of income. Illiteracy is on average as high as 17% and is higher for women than men. The Santalpur Regional Water Supply Scheme was built in 1978. It supplied water for domestic use and livestock to 71 villages. In 1987, it was extended to another 48 villages.

Parallel to the implementation of the water supply, the Self-Employed Women's Association (SEWA) developed a micro-enterprise project for poor women. SEWA is a labour union of poor, self-employed women. In 2004 it had 468,445 members in Gujarat and 688,743 in India as a whole. The project helped poor women to organize and establish micro-enterprises in which they could use water and time gains productively for handicrafts, dairying and tree plantations. Other women organized for salt farming and gum collection and collectively negotiated for better prices.

SEWA's support covered the full market chain to help poor women establish and run their own enterprises. The women were assisted to organize around common interests, form democratically functioning groups, develop collective leadership and foster self-reliance through the emergence of new leaders from within the groups. Capacity building and leadership training were important elements. The women were given access to technology, information, education and knowledge and received training in financial management and planning, product development, quality control and marketing.



Fig. 1. Patan District in Gujarat.



Fig. 2. Gujarat State, India.

Groups were empowered to run their own enterprise so that they became owners and managers rather than just producers and labourers.

For ongoing development, external experts provided guidance in e-commerce, design development, market research and so on. The women were encouraged to build their own capital and security by gaining income, getting access to credit and bank services, creating assets in their own names, establishing emergency funds at group level and creating community funds and assets, such as water sources at community level. At the state level, SEWA influenced government policies for pricing and resource delivery. These interventions were needed because government policies did not reflect the needs and potentials of poor women and reduced the sustainability of their enterprises. For greater well-being and productivity, the programme also included activities for social security such as access to healthcare, childcare, insurance and loans for housing.

2. Supplying domestic water: A social or an economic service?

The supply of enough and safe water close to people's homes is a primary human need. At present, more than 1,000 million people, one-sixth of the world's population, have to do without. One of the

Millennium Development Goals is to halve the number by 2015. For policy makers and planners this goal is associated with social welfare, human dignity and public health. The number of people who die each year from diarrhoea, malaria and typhoid—all water-related diseases—equals the size of the population of Norway (Rottier & Ince, 2003). Every year, about 2,900,000 people, mostly children, die from diarrhoea alone.

Because the prime aims of improved domestic water supply are welfare and public health, economic development is still seldom the focus of the planning, design and management of a water service. Only recently, the Global Water Partnership has stressed the multiple use of domestic water supply for multiple benefits (IWMI, IRC & GWP, 2006). Meaningfully involving women in such uses contributes to effectiveness and efficiency of services and ensures maximum social and economic returns (Lewis & Kamal, 2006).

Recent research confirms that improved domestic water supply also has potential economic benefits. In East Africa, for example, women saw their average water collection distances reduced from 428 to 405 metres. Male carriers needed such benefits less as they often have bicycles and hand-driven carts for water transport (Thompson *et al.*, 2001). The collection work competes with women's other domestic and economic work and children's school attendance (Sijbesma, 1998). If women can use the improved access to more water and reductions in collection time and energy for economic activities, a considerable growth of family incomes is possible. This goes particularly for poor women with no domestic help and means of transport.

Countries have nevertheless been interested in women's economic work for reasons of macro-economic development. Kabeer (1994) has described how the *welfare approach*, which emphasized women's roles of child bearing and caring, evolved into the *efficiency approach* under the forces of neo-liberalism and debt repayments. The free market economy was seen as the most efficient route to economic and social development for all. At that time, Boserup (1970) had shown that rural women were only invisible producers. After education and training, these women might help debt payments through their contribution to national productivity. Southern countries now have their own well-educated middle class working women, who have benefited from the greater diversification and stratification of neo-liberalism. However, large groups of women in the bottom strata have not benefited from market liberalism and many of them have remained chronically poor. Overall, poverty is affecting more women than men: 70% of the 1.25 billion people who live in poverty are women (Goutier, 1995) and single women heads of households are overrepresented (UNDP, 1990). Hannan (2000) therefore warns that gender concerns should also differentiate between women and not just between women and men.

Economic development through women's productive use of water and time gains does not happen automatically. To develop economic activities, women need more than water and time. Earning an income from domestic water use depends on their access to a whole chain of inputs: other resources such as land, seeds, fertilizers, animals, training, credit and extension services. On the output side, they need markets, marketing and transport. Because poor women have little security, they further need micro-insurance and basic primary health care. Prevailing gender relations tend to give women less access to such inputs and outputs than men. Women also tend to have less control over income and assets than men. For poor women, these constraints are even more serious, as they have fewer opportunities for the economic use of water and waste than women in middle class homes (Deere & Leon, 1980; Hitchcox, 1992; Sijbesma, 1998). Helping poor women to organize themselves around their economic needs is an important condition to address both gender and class inequalities (Kabeer, 1994).

There is further ample evidence that in the water sector neither the welfare approach nor neo-liberal development have been successful. Water projects with a welfare approach set up separate hygiene education programmes for women. They overlooked women's roles in water management and economic use and excluded them from decision-making. As a result, new water supplies often did not meet women's needs and women would reject them for valid reasons (Hannan, 2000). Nor did all women benefit equally. Women in better economic circumstances and living under less restrictive gender relations were better able to participate and benefit. Poor women had no time for health classes and village assemblies, or were socially excluded. When they did participate, it was financially difficult for them to practise the promoted improvements as they did not have the means to apply health messages nor could use water and time gains for better well-being. Furthermore, voluntary work introduced to reduce construction and maintenance costs and to enhance water supply efficiency often increased women's work without giving them an equal say in planning and management (Sijbesma, 1998).

Neo-liberal gender strategies, for example of the World Bank (2001), emphasize the economic roles of women, but do not acknowledge structural differences between women. The strategies do not recognize social and economic factors that explain why some groups of women are in a worse position than others. Nor do they mention the conscientization and organization of disadvantaged women and the redistribution of labour between women and men as possible strategies for improvement.

Feminist structuralists disagree with the idea that every woman can individually improve her position when economic and institutional constraints are reduced. In their perception, gender inequalities arise not only from the interaction between low economic development and the lower access of individual women and girls to good nutrition, education, health care, credit, agricultural extension, paid work, etc., but also from more structural inequalities. Better economic development and better chances for individual women through less restraining institutions and better education and health care will not end discrimination (Alvesson & Due Billing, 1997).

Views on how such inequalities can be reduced depend on one's socio-political gender perspective. For neo-Marxist feminists, economic suppression is overriding and gender inequalities will lessen once the economically disadvantaged improve their position. For dependency theorists, gender inequalities will continue as long as male employees, landowners and industrialists continue to depend on women's unpaid domestic labour. Mies (1986) stated that women's subordinated position stems from a combination of long existing patriarchy with the more modern development of capitalism. Patriarchy originally meant the rule of fathers, but over time has come to include the rule of men over women. The Subordination of Women Group went beyond the socio-economic determinants of gender inequalities. Besides class and gender, other social characteristics make members of one group structurally subordinated to another such as marital status, age and membership of certain races, castes, ethnic and religious groups.

In the intervention described in this paper, the assumption was that the subordination of poor women would lessen when they could organize, develop their capacities and improve their economic position. To this purpose, a socio-economic development project for poor women was linked to a planned rural water supply project.

3. Methodology

To determine the impacts of the intervention on women's lives, comparative case studies were carried out with women from 11 enterprises in ten villages and control groups in five relatively similar control

villages. Data were collected on the average time and income losses of the two groups on the days that the water supply did not function and the time used for domestic and economic tasks, leisure and rest on the days that the system worked, the income from the economic activities, the division of control over the women's time use and income within the families, and the changes in gender positions and relations, in their own experience and according to adult males in their households.

Participatory rural appraisal (PRA) methods were used to collect data on the use of time and income and control over income earned. Other methods used were the review of the account books of the enterprise groups on income and expenditures and focus group discussions with male spouses and fathers to assess the impact on gender relations. A *t*-test was used to test the statistical significance of the differences between responses from women's groups in control and project villages (Table 1). A positive value for *t* means that the women entrepreneurs spent more time on productive work than the women in the control villages.

4. Findings

4.1. Value of income lost due to poor water supply

The results showed that over the year the women entrepreneurs used significantly more time for economic activities than the women in control villages (Table 2). This time was lost when the water supply was not working. The number of hours lost from income generating activities was valued at the average prevailing wage rate of Rs. 40 per day. Thus calculated, women in the enterprise villages lost an average of Rs. 50 per month in earnings or costs merely due to breakdowns in regular water supply in the three summer months of April to June.

4.2. Value of time saved due to improved water supply

If the water supply was working well, the women entrepreneurs could earn from Rs. 750 (US\$15 (US\$19 at today's rate)) to Rs. 5500 (US\$112 (US\$138)) per person per year, since not all enterprises were equally profitable. Incomes were highest in the lean season, when work in the family-owned fields or wage-labour on others' fields had ended. This extra income for the women filled an important gap in the livelihoods of these poor households. In the control villages, no women had started micro-enterprises and none of them had their own incomes. Wages earned from other work are under pressure, however, because the water supply does not function well and women have no influence on its centralized management (James *et al.*, 2002; Verhagen *et al.*, 2004).

4.3. Changes in gender relations

Gender relations between men and women improved in all villages, including in the control villages, but the changes were greatest in the entrepreneurial families. Women entrepreneurs received significantly more help in water collection from male family members during breakdowns of the water supply (Table 3). They also had a greater say over the use of their own and their family's income than the

Table 1. Women's activities in study and control groups (equal variance in enterprise villages and control villages assumed).

Women's activities	Independent samples test								
	<i>t</i> -test for equality of means							95% confidence interval of the difference	
	Levene's test for equality of variances		<i>t</i>	Df	Sig. (2-tailed)	Mean difference	Std error difference	Lower	Upper
<i>F</i>	Sig.								
Reproductive other	1.201	0.292	0.367	14.000	0.719	0.227	0.620	−1.100	1.554
Reproductive water	0.931	0.351	0.397	14.000	0.697	0.273	0.687	−1.200	1.745
Total productive	2.159	0.164	−0.267	14.000	0.793	−0.295	1.106	−2.667	2.076
Income generating	4.930	0.043	2.675	14.000	0.018	3.286	1.228	0.652	5.921
Expenditure saving	3.226	0.094	−3.796	14.000	0.002	−3.582	0.943	−5.605	−1.558
Productive water use	2.160	0.164	0.661	14.000	0.519	0.273	0.412	−0.612	1.157
Total personal	0.458	0.509	−1.627	14.000	0.126	−1.182	0.726	−2.740	0.376

Table 2. Women's time spending by season and study group (enterprise villages, $N = 77$ women; control villages, $N = 35$ women).

Type of activity		Summer		Monsoon	
		Enterprise villages	Control villages	Enterprise villages	Control villages
Reproductive activities	Other	4.3*	5.1*	5.2	5
	Water collection	2.8	3.5	2.8	2.5
Total productive activities	Income generating	7.5*	5.4	3.4*	0.1*
	Expenditure saving	1.1	1.9	3.6*	7.2*
	Productive water	0.4	0	0.3	0
Total personal activities		7.5	8.2	8.6	9.8

* Data marked are significantly different.

women in the control villages, except for the group of daughters and daughters-in-law. Women entrepreneurs also invested significantly more in childcare and education and less in health care, which they got through their cooperative. They further spent less money on personal items (Table 4). Another impact was that they had more assets and fewer debts, although these differences were not significant at the 1% level.

4.4. Perception of male family members on gender impacts

In focus group interviews, the husbands of both groups of women all stated that women's positions had improved. Husbands of women entrepreneurs saw more changes and stressed more often women's economic roles, gender equity and increase in women's influence than men in control villages (Table 5). A chi-square test proved that these differences were significant. The men's own positions had also improved as they had gained new knowledge from their wives, earned more respect because of their women's higher status and had been stimulated to become more active in village affairs themselves.

Table 3. Help from other household members for women's tasks (enterprise villages, $N = 77$ women; control villages, $N = 35$ women).

		Normal periods		During breakdowns of water supply	
		Enterprise village	Control	Enterprise	Control
Summer	Husband	1.59	2.05	1.95	1.15
	Girls	4.11	3.40	4.64	2.15
	Boys	1.25	0.30	0.73	0.30
	Total	6.95	5.75	7.32*	3.60*
Monsoon	Husband	0.73	0.90	1.02	0.70
	Girls	3.68	2.20	3.97	1.80
	Boys	0.32	0.15	0.34	0.15
	Total	4.73	3.25	5.33	2.65

* Data marked are significantly different.

Table 4. Women's spending of own income over a number of categories (enterprise villages, $N = 77$ women; control villages, $N = 35$ women).

	Enterprise villages (% of income)	Control villages (% of income)
Personal items	5.4*	14.2*
Childcare/education	7.3*	3.8*
Health care	7.0*	12.4*
Domestic expenses	34.3	35.2
Social events	9.6	10.4
Working capital	8.0	6.8
Assets	10.3	7.0
Water	5.4	2.6
Savings	2.9	1.4
Debt repayment	10.0	6.2
Total	100.2	100.0

* Data marked are significantly different according to a t -test.

4.5. Differential impact on women within households

Unmarried and young married daughters benefited least. Daughters still helped most in collecting water (Table 3). In making decisions on the use of saved time and generated income, they were the women who made decisions together with others depicted in Figure 3.

The findings support neo-Marxist rather than neo-liberal gender theory, but show that socio-economic determinants alone do not lessen gender inequalities for all women. Marital status affects the position of women along with the economic factors. This is in line with the theory of women's subordination which argues that other processes such as socialization play a role as well (IDS, 1995). As a result of such processes, mothers tend to educate their daughters in the same way as they themselves have been educated, or as one women's group formulated it: we forget that they are women like we are.

The research outcomes thus showed that an enterprise project for poor women can lead to significant positive economic and gender impacts if the water supply works well, but that both women and project organizers need to ensure that newly married and unmarried women benefit equally well.

5. Conclusions

Domestic water supplies are important for economic development, poverty alleviation and equity. To realize their potential, however, water supply projects should be designed and managed not only for

Table 5. Changes in women's position according to male focus groups ($N = 11$ focus groups in enterprise villages; $N = 5$ focus groups in control villages).

Type of gender approach		Welfare	Anti-poverty	Equity	Empowerment	Total
Average number of statements from men on changes reflecting this approach	Women's enterprise villages	3	2	3	4	12
	Control villages	2	0	4	0	6



Fig. 3. Control of women over different types of income (enterprise villages, $N = 77$ women; control villages, $N = 35$ women).

welfare and public health, but also for economic development and gender sensitivity within households. Economic gains can be realized by linking water supplies with micro-enterprises, especially in water scarce and poor areas. Micro-enterprise development should focus especially on women as they use water and time domestically and economically and can gain time and energy from improved water supplies. Enterprise projects must go beyond credit supply to cover the whole chain of production, management and sales. Work should further be concentrated in seasons when families need supplementary income most. For a more reliable and equitable water distribution, women entrepreneurs must be able to influence the planning, design and management of traditional *and* improved water supplies as a group. Within the groups, more attention is needed on gender relations among the women themselves. Policy that is sensitive to these aspects of economic development and gender relations in villages targeted for improved water supply will have a greater impact on both poverty alleviation and women's empowerment.

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