



Linking Water Supply and Poverty Alleviation

The impact of women's productive use of water and time on household economy and gender relations in Banaskantha District, Gujarat, India

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sympathy with the people of the region who have been suffering greatly from a severe earthquake and repeated droughts and we hope that their courage helps them through this crisis. This study shows that linking economic projects with domestic water supplies is one way to a more secure livelihood for, and better gender relations in, poor families in low rainfall areas such as Banaskhanta.

Executive Summary

Introduction

The conventional objectives of domestic water supply projects are improved welfare and public health. However, having more water close to the home also has the potential to deliver significant economic benefits. This is particularly so in drought prone areas, where lack of water and long collection hours are serious constraints. In general, women still have limited opportunities to influence the design and operation of domestic water supply projects for their productive uses of water and time. This pilot research assessed in the field, with the women and men concerned, the relevance of women's productive uses of water, the time gains for the family, the impact of such uses on gender relations, and the implications for policies, project design and operations management.

Objectives

The immediate objectives of the study were:

- to assess the relevance of an accessible and reliable domestic water supply for the productive uses of time and water by women in drought prone areas;
- to assess the impacts of income-generating activities by women on gender relations within their households and their communities;
- to apply participatory learning tools with women and men so as to strengthen the capacity for participatory research of implementing organisations, including the women's enterprises themselves.

The longer-term objectives were to see if, where, and how domestic water supply and women's enterprise projects in drought prone areas need to be adjusted to maximise the economic benefits of the productive use of water and time.

Implementation

The study was carried out from June 1999 to April 2001 by the Foundation for Public Interest (FPI), the Self-Employed Women's Association (SEWA), and the IRC International Water and Sanitation Centre, with Joep Verhagen, MSc, and Dr. A.J. James. The Swedish International Development Authority (Sida) financed the research.

The study used Participatory Rural Appraisal (PRA) tools, of which some were especially developed for the study. In Banaskantha¹, women from 21 micro enterprises and five control villages took part. In addition, the team held semi-structured interviews with husbands and other men.

¹ The district of Banaskantha has recently been split into two. This research was carried out in the newly created district of Patan. For consistency's sake, the old name of Banaskantha has been retained in this report.

Findings, Conclusions and Recommendations

Water Supply

The study showed that improving domestic water supply is not just a welfare issue provided out of pity for women's drudgery in water collection, or for 'soft' concerns such as improving health, hygiene, and sanitation, but can also yield *economic* returns.

The conditions for achieving these returns are that:

- the water supply provides enough 'time savings' and the quantity and reliability of water required for economic use;
- the water project is linked with a micro-enterprise programme to support as the organisation and training of women, market research, marketing, quality control, and micro-credit facilities;

The research showed that a breakdown in the water supply caused enterprise members to lose an average of Rs. 50 per person per month in earnings. This suggests that inadequate operation and maintenance results in a loss of Rs. 2 million for 40,000 women in the research area. Actual losses are higher because the research included a period of extreme drought during which income from dairying, plantations and agriculture was virtually non-existent. In addition, in summer, each of the women had to spend, on average, seven hours per month extra on water collection work, time that they would otherwise have spent on reproductive and/or personal activities.

An improvement to the water supply, to the extent that women had to spend only one hour per day collecting water, would result in an improvement to their annual income with upper boundaries of between Rs.750 and Rs. 5520 per woman, depending on type of enterprise and local conditions. Alternatively, each woman would have a minimum of 45 extra eight-hour days per year, and a maximum of 152 days, to spend on activities other than water collection.

Women in Banaskantha pay for water only when they are short of this essential commodity. However, they have no influence on distribution and the reliability of delivery. Follow-up research is recommended whereby women have a voice in the distribution of piped water. The research would assess the impact of their participation on the degree to which the service would meet the women's needs and whether they would then pay for the water as a normal procedure.

There is a strong need for an integrated, holistic policy approach to rural economic and social development, in contrast to the sectoral approach that is currently applied by the Central and State Government. CBOs, NGOs, and other institutions with experience in improving water supply and supporting micro-enterprise development should be involved in

reforming current policies. These institutions should also be used as pathfinders before expanding the holistic rural development approach to a larger scale.

Gender Relations

In general, and in all the study villages, gender disbalances between women and men have become smaller over the last ten years. On a number of essential indicators, such as possession of assets, participation in decision taking, and community management activities, progress has been greater for members of women enterprises than for women in the control villages. The latter was seen by both women and men as the impact of the work of SEWA² and BDMSA, the association of Banaskantha's women DWCRE groups.

During a breakdown of the water supply in summer, women who are members of an enterprise received significantly more help from other household members (husbands, sons and daughters) than the women in the control villages. SEWA women also have a significantly greater say over the use of their time and over their own and the family's income.

These changes have, however, not extended to their daughters. In both enterprise households and in households in the control villages, daughters give most of the household help. Furthermore, other members of the household, such as husbands and mothers-in-law, still decide for 10% of the women in the enterprises how they must spend their time and/or own income from enterprise work.

The time spending tool proved to be a valuable aid for comparing activities and time spending of the various household members and could be easily linked to measuring control over time and income. SEWA may therefore consider using it in a wider sense than on water collection alone and applying it with mothers (and fathers!) to bring out gender differences in the division of work within the households.

The research further showed that a combination of an anti-poverty strategy and a women's empowerment strategy for rural development leads to greater gender equality. In the semi-structured interviews, only a few husbands stressed the welfare benefits of women's income generation projects i.e., the value of these projects for women's traditional gender roles such as better management of the house and greater cleanliness of the children. The majority, however, mentioned benefits that indicate a change in gender relations:

- Economic benefits, e.g., "We survived this drought because of women's income";
- A greater equality between the sexes, e.g., More and better communication between women and men, husbands asking and following advice from their wives, men taking over women's domestic tasks when women do productive work or have to go out;

² Appendix III contains a description of work of SEWA and of BDMSA.

- Women's empowerment, e.g., women are more respected in the household and the community, have more freedom of movement, have a greater say in and influence on agricultural and village decisions, and now advise men on hygiene.

Almost invariably, the groups of men saw these changes as positive. Those in the women's enterprise villages saw more changes than those in the other villages. Asked about the kind of changes, all groups described specific improvements in women's domestic roles and gave a number of instances of greater equality between women and men within households. However, only the male focus groups in the women's enterprise villages also always gave examples of poverty reduction from women's work. They also more often gave instances of women's empowerment.

From the findings the team concluded that gender programmes should start addressing women's immediate gender needs and link these with the improvement of gender equality. The latter refers not only to relationships between women and men, but also between different members of the female sex, for example between females with different ages and positions in the family. SEWA and BDMSA should include in their gender discussions, the relationship between married women and their mothers-in-law and between mothers and daughters

Poverty Alleviation

From the research findings, it became clear that women provide income to the family in four complementary ways:

- by doing agricultural work on the land of the household;
- by engaging in expenditure-saving activities e.g., fodder collection and vegetable gardening;
- by hiring themselves out as daily wage labourers; and
- by doing micro-enterprise work.

The work in the micro-enterprises provides family income at times when this is especially essential, i.e., in the dry season when income from other sources is absent. The women's production in the micro-enterprises is a valuable source of income for poor families and a means for women to meet their practical and strategic gender needs.

Conditions for achieving such benefits are:

- a reliable improved water supply with amounts of water and predictability of delivery adjusted to women's needs;
- a micro-enterprise support programme that goes beyond training, to cover a range of requirements and to assist micro-enterprises to pool their resources for crucial higher level services, such as quality control, marketing, market research, and market capital.

Water services are at their worst during the dry season and, as mentioned above, women, as primary stakeholders, have currently no influence on the reliability and distribution of water in comprehensive water supply schemes. Improving the drinking water supply can have important economic benefits in drought prone areas. However, it should then be part of a holistic, rural development approach in which women have influence on the design and operation of the service so that it meets their *domestic and economic* requirements.

In line with earlier gender research, the study showed that women who earn income through the productive use of time savings and of domestic water also generally decide on the *use* of this income. They use it primarily for household expenditure, followed by debt repayment and assets, and care and education for children. Women enterprise members spent significantly *more* of their income on childcare and education and debt repayment than women in the control villages and significantly *less* on personal items and health care. The latter finding may be the result of health education and health care being incorporated as part of the micro-enterprise projects, but this has not been investigated. Because they provide critical income for poor households, the development of women's enterprises combined with the improvement of domestic water supply should become *major entry points* for rural poverty alleviation programmes.

As the total amount of water in drought prone areas is limited, poverty alleviation policies should furthermore try to *unlink water and poverty* by providing income-generating opportunities that are less dependent on water and are based on market demand.

This study has further brought out that a *more holistic approach to watershed programmes* which includes a reliably improved domestic water supply and women's micro-enterprises in a gender context deserves to be researched as a strategy to bring rural households above the poverty line.

NGOs and other institutions with experience in such effective poverty alleviation have to be involved in the reformulation of current policies to incorporate these major changes. Again, these institutions should also be used as pathfinders in pilot exercises before scaling up the operation to a larger scale.

Drought Management

The project also found that money spent on *drought relief work* in the form of craftwork can be economically viable. Craftwork does not need water and women appreciate that it can be done at home in combination with their other tasks and at flexible hours. In this sense, it compares favourably with the current type of government relief work, which is inflexible, physically demanding and has lower returns. The policy implications are that SEWA, or other institutions, should provide craftwork *at times when other economic opportunities are at their lowest*. Part of government drought relief funds should be spent on providing *craftwork for poor women, provided* this can be done based on and adjusted to real market

demands, with an efficient plan for managing and marketing output. Institutions experienced in organising such relief work should be involved in reformulating policy.

Capacity Building

The research has built the capacity of all involved organisations. This has happened especially in the development and use of participatory research tools for the collection of quantitative data. The team developed, tested and used several new PRA tools to collect gender related information, such as time spent on domestic and economic tasks, women's control over time and income, women's income use and changes in gender relations.

The use of these tools, instead of the commonly used questionnaires, made it possible to immediately review and discuss the findings with the concerned groups. This has contributed to their empowerment as they have become the co-owners of their own data and obtained a better insight in their conditions and the effects of their work. In addition, capacity has been built for teamwork and in the subject areas of the research.

The study did *not* investigate the overall division of work within households. It is therefore not possible to say whether, in comparison with men and boys, the total workload of women and girls has changed over time and within enterprise households in comparison with other households. For insights into this, a participatory action research study in this subject field is recommended. In such a study, local women and men would directly discuss the results of their own assessments and use it for action planning and implementation. It is further recommended that the current team gets the opportunity to prepare separate documents, in print and as a video, on the PRA tools and process used for the study and link this with training to SEWA facilitators for use in gender analysis and action planning.

Glossary

BDMSA	Banaskantha DWCRA Mahila SEWA Association
CBO	Community Based Organisation
Creore	Ten million; Rupees 1 Creore is about US\$ 220,000
DMI	Disaster Mitigation Institute
DWCRA	Development for Women and Children in Rural Areas
FPI	Foundation of Public Interest
GOI	Government of India
GSFDC	Gujarat State Forest Department Corporation
GSWDC	Gujarat State Women's Development Corporation
HDFC	Housing Development Finance Corporation
IRC	IRC International Water and Sanitation Centre
Lakh	Hundred thousand; Rupees 1 Lakh is about US\$ 2,200
NGO	Non Governmental Organisation
PRA	Participatory Rural Appraisal
RNE	Royal Netherlands Embassy
SEWA	Self Employed Women's Association
Sida	Swedish International Development Authority
SRWSS	Santalpur Rural Water Supply Scheme

Background

Water and Economic Development in Drought-Prone Areas

Time Spent by Rural Women

Rural women in low-income countries spend a large part of their working hours transporting water, fodder, and fuel wood. This is especially the case in drought prone areas where these commodities are scarce and become ever scarcer. In studies in Africa, it has been estimated that a typical woman spends from 1 to 4 hours per day on transport (Barwell, 1993). A study in Ghana found that rural men spent one third of the time and one quarter of the energy that rural women spent on load carrying.

Reducing women's transport loads can be an important condition for freeing them to use their time and energy for existing productive activities as well as for new economic undertakings. A World Bank Discussion Paper, for example, found evidence that "the labour resource released by reducing the transport burden of women would be reallocated to beneficial reproductive or productive activities" (Barwell, 1996: 29). Malmberg (1994) gives a number of examples on how women have reallocated the time they saved through better transport systems to other economic activities.

Using Time Savings from Water Collection for Productive Uses

One of the major types of transport undertaken by women is carrying water. Reducing the time that they spend on water collection may mean that more time becomes available for food production, childcare, nutrition, hygiene and health, and enhances the participation of women and girls in education and income generating activities, as well as their labour productivity. Cutting down the time women spend collecting water could, hence, unlock the productive potential of women's time and energy.

These benefits do not come about automatically. The Self-Employed Women's Association (SEWA), a labour union of poor self-employed women, which is based in Ahmedabad, India³, soon realised that the provision of water closer to the women's homes was not sufficient to bring about their economic and social development. In its own words: "The goal of the Santalpur Rural Water Supply Scheme (SRWSS) was not simply the supply of water for its own sake. The availability of water was meant to unlock the human potential that had dried up with the decrease of water supply. However, the scheme had assumed that with the provision of water the rest would take care of itself" (SEWA, 1999: 15). In a wider review of improved rural water schemes, Kamminga had come to a similar conclusion: "Considering [the] widespread constraints for women in most rural areas, additional measures will be indispensable in many cases to create the right conditions for women to increase their incomes" (1991: 11).

SEWA therefore directed its efforts towards improving the water supply as well as helping poor women organise, build their capacity and start and run micro-enterprises.

³ SEWA is a labour union with 2,00,000 self-employed women members. It helps disadvantaged women to achieve economic self-reliance by organising them, providing social security, providing income generating opportunities, and building their capacity. Its headquarters are in Ahmedabad, Gujarat, India.

Its aims were not only to help enterprise members find gainful employment, earn a livelihood, and become economically self-reliant, but also to empower them by giving them self-reliance in decision-making.

The Economic Value of Water

The economic value of water is usually measured by its share in the value of the output produced with the help of this commodity. Thus, the economic value of water to women can be measured directly when women use water in domestic industries such as brewing and food production (Nelson, 1980; Rogers, 1980; van Wijk, 1985), crop growing and livestock production (Boserup, 1970), and fishing (Matiza, 1994; Sida, 1996).

While such economic use is particularly significant to lower income women and their families, this method does not value the time that women and other members of the household spend fetching water for domestic and drinking purposes. There is, however, an indirect way of measuring the value of water to rural women: valuing the time released by reduced water collection for domestic purposes. Two indirect measures of the economic value of water are possible:

- Costs of worsened supply of domestic water - the income that is lost when, due to breakdowns in water supply, additional time has to be spent on water collection by women engaged in income generation.
- Benefits of improved supply of domestic water - the additional income provided by the productive use of time savings that result from an improved domestic water supply in areas where women have opportunities for the economic use of such time savings.

We refer to the extra time released to women because of an improved water scheme as 'time savings' or 'time gains'.

Banaskantha area, in the state of Gujarat in western India, is an area where an improved domestic water supply has greatly improved the availability of water and reduced the water collection times. It is also an area where women's micro-enterprises have offered new opportunities for the economic use of time savings from reduced water collection and the increased availability of domestic water.

The Study Area: Banaskantha in Gujarat, India

Although Gujarat is a high achiever in terms of overall per capita income⁴, its economic future is threatened by an ever-growing water shortage. In 1999, a large part of Gujarat suffered from the worst drought in 50 years. Droughts are a regular phenomenon: they occur, on average, once in three years.

These droughts usually hit the poorer sections of the population hardest. Their frequency erodes the interim livelihood gains of the poor and keeps them in the poverty trap. Banaskantha⁵ (see Figure 1) is one of the hardest hit districts in this respect. As illustrated in the next paragraphs, the area continues to be one of the most backward districts of Gujarat. More information on Banaskantha can be found in Appendix I.

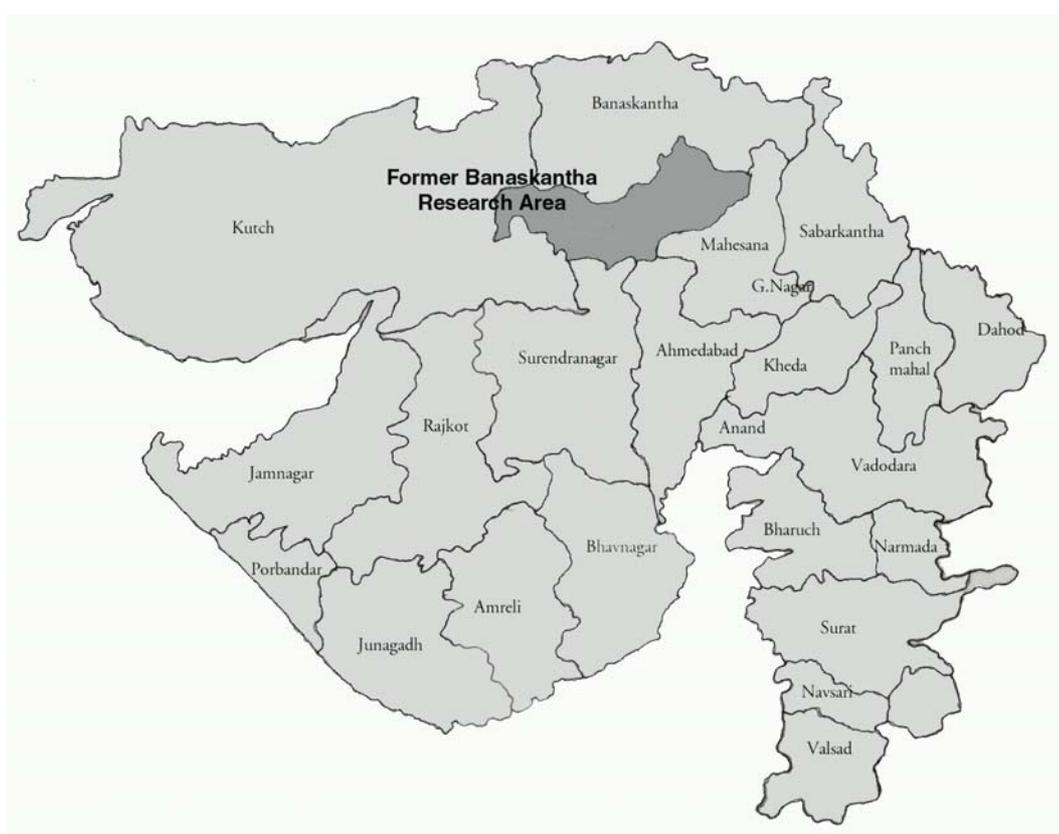


Figure 1 : The former Banaskantha District in Gujarat

⁴ Gujarat has the fourth or fifth highest per capita income (depending on the source of the ranking) among Indian states; the *growth rate* of its per capita income, however, is second only to the state of Maharashtra (Alternative Survey Group, 1999: 158 – 165).

⁵ A new district of Patan has recently been carved out of Banaskantha district and the two blocks where the study was carried out, Santalpur and Radhanpur, are now in Patan. The project area is referred to as Banaskantha in the report to minimise possible confusion. All data in this section are derived from the first phase report unless mentioned differently.

About 90% of the population of Banaskantha district (2,162,578 persons in 1991) lives in villages. Many of these villages lack even the most basic infrastructure such as safe drinking water, electricity, and schools. Compared to the state average of 61%, only 39% of the people in Banaskantha are literate. The average is especially low because of the low literacy rates of women. Literacy of men (around 55%) is more than twice that of women (23%). The situation is worse in Radhanpur and Santalpur blocks, which are classified as desert areas. The overall literacy rate here is as low as 17%. No breakdowns for literacy of women and men could be found.

Agriculture and dairy production provide the economic backbones of Banaskantha. Some 52% and 23% of the population earn their living as cultivators and agricultural labourers respectively. Most farmers are small and marginal and since their income, and that of the agricultural labourers, depends critically on rainfall, their livelihoods are unstable by nature. When monsoons fail, entire communities are forced to migrate for six to eight months in search of work and/or fodder for their livestock.

Excessive groundwater harvesting by a small group of rich farmers has led to a rapid decline of the local groundwater table. Over extraction has made the water saline in a growing number of tube wells. It is also causing a rise in nitrate and fluoride levels.

The drought of 1999 illustrated again how dependent drought prone areas such as Banaskantha are on water. Most households managed to get sufficient drinking water and water for domestic use, although at what price has remained unassessed. The most severe impact was on the loss of livelihoods. Direct impacts were clearest in the cases of agriculture and dairying, which came to an almost complete standstill after the rains failed. There was also an indirect impact through the increased time that the women had to spend collecting water for their family and dairy cattle (DMI and Verhagen, 2000).

SEWA and BDMSA in Banaskantha

Banaskantha DWCRMA Mahila SEWA Association (BDMSA)

SEWA's activities in Banaskantha got a major boost in 1987, when they were invited by the Royal Netherlands Embassy (RNE) to initiate a programme that would directly target the needs of the rural poor.

The SEWA programme was in the same district as a project to provide a piped water supply to more than 100 villages being implemented by the Gujarat government under the Dutch bilateral development support programme in India. The SEWA programme was designed to make use of the opportunities provided by this improved water supply.

SEWA's programme consists of providing opportunities to women in poor households to use their existing resources and skills to develop their own micro-enterprise groups. The programme goes beyond the usual formation of women's groups and provision of information and skills training and includes continuous training and marketing facilities to sustain the enterprises, even during times of crisis and natural disasters.

SEWA programmes have four specific strategies:

1. *Organising poor women.* Individual poor women have no voice. As a trade union, SEWA believes that when the women are organised in a group and become aware of their position in society, it gives them collective strength and leadership.

Collective leadership is encouraged because it:

- entails the sharing and rotation of responsibilities;
- encourages participatory and democratic functioning;
- develops trust, sharing and openness;
- stimulates the development of each *aagewan* (organiser) and her team;
- encourages the development of new generations of leaders, especially of the self-employed women workers themselves.

Organising women is carried out at several levels so that self-employed women become a visible part of the mainstream. It takes place through specific networks of women groups, e.g. WIEGO, HOMENET, STREETNET and IUF. These networks unite groups that work in the same subject area.

2. *Capacity Building.* Women get the opportunity to build new capacities based on their existing skills. This is done by giving them access to technology information, education, knowledge, and relevant skills such as financial management and planning, product development and marketing. The capacity of women increases to the point where they can run their own organisations so that they become owners and managers, and not just producers and labourers. To enable the women to develop their organisations, guidance by experts is provided in e-commerce, design development, technology, etc.
3. *Capital Formation.* By gaining an income, gaining access to financial services (savings and credit services, insurance) and creating assets in their own names, such as land, houses, workshops, equipment, cattle and bank balances, the women create their own capital at the household and group level. The women are also encouraged to pool their common resources to establish emergency funds at the group level and community funds at the community level, and to create community assets, such as water sources, health centres and fodder depots. Linkages are established with SEWA Bank and several other micro-finance institutions to facilitate their access to financial services.
4. *Social Security.* To enhance the women's sense of well being, productivity, and security the programme also includes activities to promote social security. These provisions reduce the risks that sickness or sudden crises become a draw on fragile household economies. Social security activities include access to healthcare, childcare, shelter, and insurance through institutions such as Mahila Housing Trust and the Housing Development Finance Corporation.

At a higher level, SEWA facilitates policy-level interventions through women's representation in committees and boards at district, state, national and international levels. The aim of these interventions is to draw more attention to the needs of the poor women and better reflect these needs in policies and programmes.

Initially, SEWA ran the activities in Banaskantha itself. But from 1995 onwards, it started withdrawing in a phased manner and in 1997 BDMSA had completely taken over the coordination and support of its member groups. BDMSA is a federation of DWCRA groups⁹ in Banaskantha. It is associated with SEWA and has its headquarters in Radhanpur.

The objective of BDMSA – and SEWA – is to attain economic self-reliance for women through rural development programmes for and by its members. Like its mother organisation SEWA, BDMSA's programmes combine the four above-mentioned strategies: organising women for collective strength, capacity building, asset building, and social security.

Coverage

BDMSA works extensively in Santalpur and Radhanpur blocks of Banaskantha (now Patan) district. In Santalpur, where 100% of the population (more than 86,000 people) live in villages, BDMSA works in 68 out of 73 villages. In Radhanpur block, where 75% of the population (around 95,000 people) live in villages, BDMSA works in 47 out of 55 villages.

An indicator of the scarcity of water in the district is that less than 0.5% of the cultivable land in Santalpur is irrigated. In Radhanpur block, irrigation is available for 5% of the total amount of arable land.

DWCRA Groups and Income-Generating Activities

BDMSA organises the implementation of a large portfolio of activities. Much of these activities are financed under the programme for the Development of Women and Children in Rural Areas (DWCRA). This is a national scheme of the Government of India and an important instrument to target poor rural women. The DWCRA scheme gives loans to groups of rural women to start their own income generating activities. By 1999, 62 DWCRA groups and 160 savings-and-credit groups had been established (SEWA, 2000). In Banaskantha, these DWCRA groups generate income through activities such as crafts, nurseries and plantations, salt farming, gum collection and dairy production. Appendix III contains further information on these activities.

⁹ The DWCRA (or Development of Women and Children in Rural Areas) scheme was a component of the Integrated Rural Development Programme (IRDP). This has now been replaced by the SGSY (Swarnajayanti Gram Swarozgar Yojana) with effect from 1 April 1999. But even after the scheme has been formally withdrawn, the groups formed under the DCRA scheme continue to use the name. The work of SEWA and BDMSA is described in Appendix III.

The Study on Domestic Water Supply and Household Economy

In 1978, the Government of Gujarat initiated the Santalpur Regional Water Supply Scheme. The scheme provided 98 villages in Banaskantha with piped water through public taps in every village and a service managed centrally by the Gujarat Water Supply and Sewerage Board. In 1987, the scheme was expanded to provide water to another 48 villages and the town of Radhanpur.

The presence of 222 micro-credit groups in the area which allowed women to use the gains in water and time also for productive purposes made it possible to study the linkages between the two interventions.

Study Objectives

The study that was carried out to investigate these linkages had three equally important immediate objectives:

- to assess the relevance of an accessible and reliable water supply for the productive uses of time and water by women in (semi) arid areas;
- to assess the impacts of income-generating activities by women on gender relations within their households and their communities;
- To introduce participatory tools into data collection as well as analysis and capacity building within all implementing organisations, including the women's enterprises, for participatory research on water, production, economic development, and gender relations.

The longer-term objectives were to see if, and (if so), where and how, domestic water supply and women's enterprise projects in (semi) arid areas need to be adjusted to maximise the economic benefits of the productive use of water and time.

To our knowledge, this is the first study in India that seeks to quantify the economic impacts of improved water supply based on field-level data about women's enterprises. The only other study we found that compared the benefits of an improved water supply on micro-enterprise was carried out in two communities in Uganda (Davis et al., 1999). The differences between that research and this study are that this study focused on micro-enterprises of poor women, used participatory tools in data collection and linked the economic uses of water and time gains with changes in gender relations in the study households and in control villages. These elements gave it the character of a pilot in this important but undeveloped research area.

Study Questions

The pilot research addressed eight specific questions. These were:

- What are *women's time use patterns* for productive and reproductive (domestic) activities in women enterprise households and in households in other villages?
- What is the role of *other family members* (husbands, sons, and daughters) in reproductive work in both types of households?

- What is the effect of an *improved water situation* on women's time use and income?
- What are the implications in terms of time and money when the *water service breaks down*?
- Can women and/or men in enterprise households *influence* the delivery of water?
- Who, within the households, *controls* the time for and income from economic activities of women?
- For what *purposes* is resulting income used?
- What are the implications of productive uses of water and time at the domestic level for the *planning and management of rural water supplies* in arid areas?

Implementing Partners

The study was initiated by the IRC International Water and Sanitation Centre⁶ and SEWA. It was funded by the Swedish International Development Authority (Sida).

The implementation of the research was undertaken jointly by SEWA, the Foundation of Public Interest (FPI)⁷ and the IRC. IRC – being a global resource centre – provided inputs during the formulation of the project, design workshop, the training of field research team, the analysis workshop and the writing of the report. IRC further involved two consultants based in India, Joep Verhagen (MSc.) of HabiCom International⁸ and Dr. A. J. James⁹ to co-ordinate the fieldwork and data collection and analysis, and to work on the economic aspects of the research, respectively. FPI and SEWA, with extensive hands-on experience in the research area, channelled the external expertise in the local context. At the field level, women from 22 out of 77 women's micro-enterprises in Banaskantha district and their husbands took part, as well as women and men in five control villages.

The partners conducted the study in two phases. A preparatory and exploratory phase was carried out from July 1999 to February 2000. A detailed data collection and analysis phase followed from February 2000 to April 2001. Appendix I contains the detailed research schedule. Over the next two years, the results were presented at a conference and published in two articles¹⁰. In this final publication, the study and its findings, as well as the implications for rural development planning, are reported in detail.

⁶ The IRC is an interdisciplinary resource centre for knowledge development and exchange on community water supply, sanitation, and hygiene since 1968. It has mainstreamed women in development and gender approaches since 1977. The centre is located in Delft, the Netherlands.

⁷ FPI promotes and researches institutions which serve the interests of poor or weaker communities in India, such as poor handloom weavers, tribals, landless youths, and women in desert areas. It is based in Ahmedabad, Gujarat, India.

⁸ HabiCom International is an India-based consultant for water and enterprise-related research and development projects. It is located in New Delhi, India.

⁹ Dr. James is an environmental and natural resource economist who works as an independent consultant. He is based in New Delhi.

¹⁰ Wijk, Christine van, Reema Nanavaty, Jennifer Francis, Mihir Bhatt, Joep Verhagen, and A.J. James (2001). *Economic and gender benefits from domestic water supply in a semi-arid area*. In: Proceedings of the 27th WEDC Conference "People and Systems for Water, Sanitation and Health", Lusaka, Zambia, August 2001. Also available at <http://www.lboro.ac.uk/wedc/papers/27/14%20-%20Water%20Services/13%20-%20VanWijk.pdf>; James, A.J. et al., 2002. *Transforming time into money using water: A participatory study of economics and gender in rural India*. In Natural Water Resources Forum, Vol. 26, No. 3, pp. 205-217.

Conceptual Framework and Research Methodology

The Impacts of Improved Domestic Water Supply

Aims of Domestic Water Supply Projects

Conventional water supply projects, both private and government, tend simply to aim at providing drinking water to households in areas with poor water supply conditions.

These projects are expected to increase general social welfare, but not to generate specific social benefits. The design of such projects is therefore almost exclusively concerned with the technical feasibility for an investment with no attention to economic returns and/or socio-economic benefits.

In newer generations of water supply projects, planners have recognised that as domestic managers, women are centrally involved in the collection and use of water. Instead of being just general 'social investments', domestic water supply projects are therefore also justified by specific social benefits which may accrue. These benefits include positive impacts on 'women's welfare issues' such as relieving women's drudgery and giving them more time and water for domestic use. It is generally expected that women will use these gains to improve personal and domestic hygiene and spend more time on cooking, childcare, and other domestic work. The benefits from this domestic work have a positive effect on the welfare and health status of the whole family. The Santalpur Regional Water Supply Scheme project is one of the projects expected to have such beneficial impacts.

These social benefits were, however, expected to develop through natural processes once the basic technical infrastructure (i.e., pipes, taps and pumps) had been provided. In the Santalput project, no explicit and simultaneous provision was made to give local women and men each a say in the planning and design of the system and the operation of the scheme to ensure that the supply will actually meet their requirements. Inputs to improve health and hygiene remained limited to the provision of health education for women only.

It has not been considered how men, and gender relations between women and men, may influence the realisation of these benefits. From research it is known that under restrictive gender relations, women are not necessarily free to spend time and water gains on family welfare and hygiene. Instead, they may have to work more in male-controlled agriculture and dairying. When, as happens in such cases, they have no voice in how any extra income generated from this work is spent, they have no certainty that their work, and the extra income, will benefit them and the family as a whole.

Because women are seen as mainly domestic managers, their economic use of water and time gains and their control over and benefits of such uses seldom play a role in domestic water supply investments. Yet research by Rogers (1980), Kabeer (1994), Young (1993) and many others has shown that rural women have not single but triple roles, as domestic managers, economic producers and social service managers. Under appropriate conditions, easier access to water for domestic use may therefore provide women with more time and water for all three gender roles. These three gender roles,

domestic, economic and managerial, are central in the conceptual model that underlay the research in Banaskantha district.

Conceptual Model: Benefits from Water Supply Augmentation

The conceptual model or framework for the analysis of the linkages between an improved water supply and women’s domestic, economic and managerial tasks and the effects of these tasks is depicted in Figure 2. The upper half of the model depicts the usual benefits expected from an improved domestic water supply project: women’s relief from drudgery and more time for their reproductive (domestic) tasks and for their own personal use.

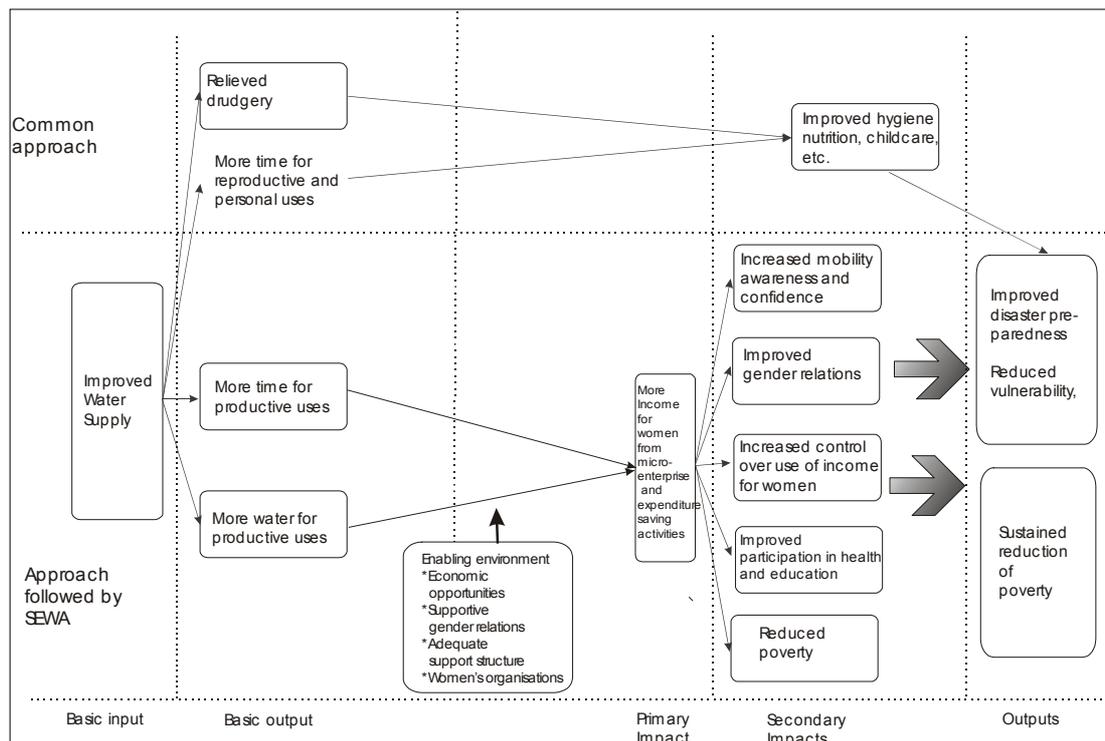


Figure 2 : Conceptual model of the study

The lower half of the model depicts the situation investigated in the present study. This recognises that within the family, women may also use water and time gains economically, e.g. for vegetable gardens, animal husbandry, the processing and sale of food and drinks, women’s small scale production enterprises, etc. Depending on culture, it also gives them the chance to seek outside work.

The resulting primary impact, more income (or, if the produce is used in the home, the saving of expenditure), is the conversion of part of the time savings and access to water into money. This economic effect may in turn bring secondary benefits in the context of an overall reduction of poverty. This project investigated what impact women’s organisation and earnings had on their social position and the gender relations within the household and community. Areas of specific attention were their mobility, their control over their own time and income, their say in household decisions related to non-domestic issues such as agriculture and household income use, and the use of income

for other basic needs such as education, health care, extra water and for security against risks.

In assessing the effectiveness of BDMSA's gender strategy, a comparison has been made between two types of households: enterprise households in villages where SEWA has helped establish income-generating groups and households in control villages, where SEWA had not been working. In addition, a comparison was made between current gender relations and the gender relations that were prevalent ten years earlier.

The conceptual framework of the study further adds, what is here called the 'enabling environment' which SEWA provides to its women members. The four strategies that constitute this environment were described in section 1.3.

In assessing the gender relations, the study builds on four main gender approaches that are distinguished in the gender theory (Kabeer, 1994; Moser, 1993):

1. *The welfare approach* focuses on women's reproductive roles as mothers and housewives: improving health and hygiene, cleanliness, nutrition, care for and education of children in general (without special attention to girls). Women's other roles (economic and community development) are not addressed. Relationships between men and women, and the inequalities therein, that often limit women's possibilities to improve domestic welfare, are not addressed.
2. *The anti-poverty approach* stresses the contributions that women make to the family income, and what that means for them, their husbands, and children. This approach assumes that when women's economic position changes, gender relations will improve automatically.
3. *The gender equity approach*, under which women and men get the same chances to participate in, and have influence on, the development process and that work and benefits are equitably divided. Gender equity refers not only to women as compared to men, but also to equity between women themselves.
4. *The empowerment approach* helps disadvantaged women to unite, become aware of their underprivileged and subservient position, and undertake action to achieve a more equitable world for all women and men.

The model gives four pre-requisites for converting additional water supply into economic and other benefits:

- a) An adequate water supply that saves time and provides water for economic use (mainly by women) within households;
- b) Opportunities for generating income from such productive uses;
- c) Gender relations within the household that allow the use of such opportunities;
- d) A support structure that ensures that women can operate sustainably and make gains in a competitive market.

The third and fourth pre-requisites mean that, unless women are able to use their time savings for economic activities, the first two conditions will not necessarily result in additional household income. Women need the freedom to use their additional time productively if they so wish. If men do not allow women to train and engage in economic activities, freeing up time alone will not yield economic benefits. In addition, an enabling economic environment is needed in which disadvantaged women are able to operate in a competitive market in a profitable and sustainable manner. In the study area, the enabling environment was created by SEWA through product development, quality control, marketing, capacity building, and so on.

A complication is that, as with an enabling environment, opportunities for income generation can be constrained by external factors such as market conditions, government regulations, etc. Marketing, for example, is still a concern.

Research Methodology

General

“Rural areas are difficult, expensive, and time consuming places in which to conduct investigations. Generally, a compromise has to be made in selecting the sample size, the scope of survey, and the accuracy of measurement in order to provide reasonable data with the resources and time available” (Cairncross et al. 1991: 9).

In an area as remote as Banaskantha, characterised by a poor infrastructure and long distances, this is especially true. Given the limited time and resources, a complete survey with appropriate sample sizes and extensive data collection was not possible. Instead, detailed case studies were made, using both outside assessments (for the economic data) and participatory methods (for water and gender and for part of the enterprise data).

Design of the Study

The pilot research had originally been planned as comparative case studies of five types of women’s micro-enterprises: handicrafts, milk production, salt production, gum collection, and tree plantations. Appendix V gives the details on how the productivity in each of these enterprises relates to water and which characteristics may affect their economic performance.

For each type of enterprise, a comparison was to be carried out between well-performing enterprises in situations of 'better' and 'worse' water supply. Because not all enterprises function equally well and because a selection of only better functioning enterprises would seriously bias the results, the same number of enterprises was chosen from the the worst performers, again with a better and a worse water supply. In addition, five control villages were included, where SEWA had not provided any economic support, but which were also connected to the Santalpur water scheme. The comparison between the situation of the enterprise households and households in the control villages made it possible to see to what extent women in the latter villages had undertaken economic activities on their own, without the help of an 'enabling environment'.

The cases were further chosen for their comparability with regard to their general socio-economic conditions as based on their 1991 census data (Appendix IV). Each enterprise group had comparable levels of training, commitment, leadership, access to markets, etc.

Table 1 gives an overview of this study design with the originally selected 24 villages. The comparison took place over two time periods: in summer, when the water supply conditions may worsen, and during the monsoon when the water situation usually improves.

Assumptions were that productivity would be highest under a better water situation and good enterprise management, but that even in a worse water situation or under worse management, the women might make an extra income from enterprise work in contrast to women in villages that had no women's enterprises. It was further assumed that gender relations in women's enterprise households would show significantly positive differences in comparison with those in the households in control villages. Interviews with women leaders in ten other, weaker, enterprises would be held to assess what role they believed that water supply played in the under par performance of their enterprises.

Because no systematic data were available at central level, the nature of the water supply situation and the nature of the enterprise were defined and used to make a preliminary selection of the cases. The correctness of the selection was later verified during field visits.

Based on extensive discussions with the BDSMA staff members in Banaskantha, who have an extensive knowledge of the research area, a 'good enterprise' was defined as a functional enterprise that performed relatively well according to the BDSMA staff with respect to productivity, quality of the products, income, and leadership.

Table 1 : Initial list of selected villages

		Villages with BDMSA enterprise		Control Villages
		Well-functioning	Poorly functioning	
Water situation	Better	Handicrafts: Par Gum: Parsund Plantation: Zanzarsar Dairy: Moti Pipli Salt: Ranmalpura	Handicrafts: Barara Gum: Dhokawada Plantation: Sarkarpura Dairy: Kolapur Salt: Piprala	Abiyana Dhrandva Kamalpura Sherpura Manpura
	Worse	Handicrafts: Madhutra Gum: Patanka Plantation: Zandala Dairy: Garamdi Salt: Madhutra	Handicrafts: Bavarda, Barbara Gum: Varanosari Plantation: Gadha Dairy: Vaghpura Salt: Garamdi	

A 'better water situation' was defined as the presence of more water sources in the village with a better reliability, accessibility, and water quantity and quality. Using these criteria, BDSMA staff selected a total of 19 enterprise villages. They also chose five control villages (Table 1, Madhutra features twice because it had two enterprises).

During the first, exploratory phase of the research, the quality of the water supply as well as the quality of the enterprise was verified together with the women from that team, and the village selection was changed where necessary. The visits resulted in two changes to the original selection of cases:

- One more handicraft enterprise was added because the craft enterprise in Par was a special case. This is part of a Darbar community in which women are not allowed to go out of the house and so men collect the drinking water;
- It was found that one of the original well-functioning enterprises was actually functioning poorly. This enterprise was added to the selected list of poorly functioning enterprises and a new, well functioning enterprise was selected.

The exploratory phase further revealed that the distinction between better and worse performing enterprises varied over time under the influence of many factors. Moreover, the most serious drought in 50 years and external interventions in the form of emergency water projects and relief work seriously changed the conditions of the study. It was therefore decided to reduce the research to eleven case studies involving two enterprises of each of the five types of enterprises plus the special case of Par and five control villages (Table 2). This group included two of the originally poorly performing enterprises (Dhokawada and Garamdi). The changing conditions meant that results also declined in some of the other enterprises.

Table 2 : Adjusted list of villages

Villages with BDMSA enterprise				Control villages
Case studies		Leader interviews		
Crafts:	Par Dhokawada Madhutra	Crafts:	Barara Bavarda Barbara	Abiyana Dhrandva Kamalपुरा Sherपुरा Manपुरा
Gum:	Parsund Patanka	Gum	Dhokawada Varanosari	
Plantation:	Zanzarsar Zandala	Plantation:	Sarkarpura Gadha	
Dairy:	Moti Pipli Garamdi	Dairy:	Kolapur Vaghpura	
Salt:	Madhutra Ranmalपुरा	Salt:	Garamdi Piprala	

Within each village, participatory methods were used with a group of seven women members out of a total of 10 to 15 women. Ideally, these women should have been invited based on random sampling. Because the same activities had to be repeated with the same group, it was feared that dropout could be a problem. For that reason, it was decided to go instead for selection through discussions with the group leaders aiming at continuity and at getting a cross-section of the group

Sources of Data, Methods, and Tools



The study used a combination of primary and secondary data. Secondary data of the 1991 census served to determine whether all villages had the same level of development and whether differences in economic performance and gender relations might not be explained by these factors (see Appendix IV for census data). Secondary data (the records of the enterprises) were further used to determine the locally specific value of time gains.

Wherever possible, participatory research methods were used with the women concerned. Representatives of women enterprise members further participated in the design of the research tools, the analysis of the collected data, and the discussion of the findings and conclusions of the study.

Participatory methods and tools were used for time use data, gender data, and part of the enterprise data. Non-participatory methods were used to collect data from the census and the enterprise accounts (Table 3).

Table 3 : List of methods and tools used in the study

Type of method	Name of tool	Description and purpose of use
Participatory	Time activity profile	The team developed a large clock on which the women could indicate the typical amount of time women devote to water related activities, household related activities, income generating activities, expenditure saving activities, personal activities and SEWA activities. It was also used to measure who assists the women in what activities and how much time this involves. Information on time and activity profiles was collected twice; at the end of the summer and the end of the monsoon.
	Gender tools	Were used to measure control over time gains and over types of income, changes in gender relations and women's roles in communities. To ensure that women could give their answers freely, individual matrix voting was used; later on, the entire group discussed the answers anonymously.
	Typical household economic profile	The women in each village chose the typical household, based on a set of criteria such as household size, economic position, size of land holding, and so on. The women of these households then helped to work out the composition of the household's income.
	Enterprise tools	Participatory tools were developed for individual types of enterprises to discuss enterprise-related issues such as: costs of fodder, number of cows (dairy and non-dairy) the gum trees (gum), additional income from sale of fodder (plantation), and so on.
Non-participatory	Census data analysis	Selected data from the Census 1991 were collected to check whether all villages have a more or less similar socio-economic background
	Accounts analysis (crafts, gum, dairy)	Enterprise accounts were used to calculate- in combination with the data collected with the enterprise tools – net rates of returns of the micro-enterprise activities.
	Semi structured interview with group leader	This method was used to collect data on factors that caused under performance of micro-enterprises.

There were a number of reasons to design and use participatory methods and tools:

- Their design and use enhanced the research capacity of FPI, SEWA, and the women's enterprises. Although the two institutions had used participatory tools to collect qualitative information, they had little experience in using such tools to collect quantitative data;
- The joint development of tools made it possible for all to contribute their knowledge with regard to content as well as to the feasibility of their use;
- The methods and tools made all participants learners and owners of the knowledge, not just the external researchers;
- The use of these methods and tools recognised local women and men as actors and modellers of their own environment and not just respondents in an extractive study that served only the purpose of organisations and individuals outside the community;
- They could be used with literate as well as non- and semi-literate women and men, so even the most marginal women in the groups could participate. At the same time, they offered the women who had acquired numerical literacy the opportunity to practice and demonstrate their new skills. This applied also to younger women in a culture where they were usually expected to remain in the background when older women were present;
- They stimulated everyone's creativity and pleasure in and commitment to the study;

- Local workers, women, and men could continue using the methods and tools for other purposes. The efficiency and effectiveness of the tools therefore went beyond a one-time survey.

These advantages amply compensated for the greater demand that the methods made on all participants as compared with the much more automatically used conventional survey questionnaire.

The methods and tools were jointly developed in a design workshop in February 2000, using the experiences from the first phase. Since the workshop participants had very different backgrounds, the design process led to a fusion of global knowledge and local knowledge. SEWA and FPI benefited from IRC's global experience with collecting quantitative data in a participatory manner, while IRC learnt from the extensive local knowledge of SEWA, FPI, and some of the female entrepreneurs from the groups in Banaskantha.

Planning and Organisation of the Fieldwork

Table 4 shows the schedule of information collection in summer (April-June) and during the monsoon (August-September). Two mixed teams visited one village a day, at a time that was most suitable for the women. Since the women did not have any work in agriculture because of the ongoing drought, they could spend up to three hours a day with the team.

Table 4 : Schedule of information collection

Period	Phase	Type of activities
Preparation	Design workshop	Design of research tools
April – June	Data collection	Gender tools Time/activity profile summer Typical household profile Enterprise tools Accounts analysis
July	Mid-term review	Review of research tools
August – September	Data collection	Time/activity profile monsoon Typical household monsoon Enterprise tools monsoon Accounts analysis
November	Analysis workshop	Analysis of collected data

In all cases, women were asked to refer to the present situation when using the methods. A mid-term review checked whether there were any gaps in the data collected and whether it was necessary to develop new tools to fill any gaps.

Limitations of the Study

Because of the exploratory character of the study, the limited resources available, as well as the unforeseen conditions, some limitations apply to the findings of the study. The first such limitation is the presence or absence of irrigation systems. The nature of irrigation water supply is known to have a strong impact on economic development in rural areas (van Koppen, 2000). In the study, this impact was not considered as less than 5% of the cultivatable land is irrigated and that mostly by rich farmers only. The study is therefore only indicative for (semi) arid areas with rain fed agriculture.

In villages with BDMSA supported enterprises, information was collected only from BDMSA women members. While this may have introduced a bias, this information was essential to the study. There was a further risk that because no random sampling was used, the members in the participating group were not representative for the enterprises as a whole. On the other hand, there is no clear reason to assume that this was the case, because the purpose of the study (insight for the groups themselves as well as for the organisers) and the need for average enterprise members and not 'top performers' or 'contributors' were well-discussed with the group organisers. This gave more protection against bias in recruitment than is usual with participatory appraisals which are generally organised on the basis of self-selection. More certainty would have been had on this point, however, if the criteria for selection had been triangulated within the group.

If the research design and group composition introduced some bias towards better economic results, this would have been counteracted by the fact that the information was collected during consecutive drought years, when enterprises, especially plantations, dairying, and agriculture suffered. The reduced income from these water-related enterprises was reflected in the loss of income during the time of breakdown. Income would have been higher when the women had enough water to sustain their enterprises.

In addition, the government provided relief work during the summer months when income-generating opportunities are normally nearly non-existent in a drought prone area such as Banaskantha. As will be seen in the findings, this affected women's time use patterns in both study and control villages. Nevertheless, significant differences could still be found.

Findings

Time Use Patterns

To get insight into the first study question, 'What are women's time use patterns for productive and reproductive (domestic) activities in enterprise households and in households in the control villages?', time/activity profiles for a typical enterprise/ control village household were drawn up together with the 16 groups of women.

In the time/activity profiles, four different categories of activities were distinguished.

- *Reproductive activities*, including childcare, cooking, cleaning, household work, etc. It should be noted that though livestock is seen as part of the household, livestock related activities were categorised as productive activities to recognise the contribution that is given by women to the household budget. Water collection for reproductive purposes – drinking and domestic water – has been distinguished as a separate sub-category.
- *Productive activities*, which included income generating activities – enterprise activities and labour work – as well as expenditure saving activities – such as livestock rearing, garment making, agricultural work on own land, and so on. Water collection for productive uses was a separate sub-category.
- *Personal activities*, such as social activities and rest.
- *Management activities* in the communities; this category also included organisation related activities such as training, meetings, accounting, etc.¹¹

For the first three types of activities, data were collected as hours spent during a 24 hour day. Data on management activities were collected on the basis of a three-month period.

The data were compared for the two types of households for summer and monsoon and for a better and worse water situation. The main findings of this comparison were as follows:

- Women in both enterprise households and households in control villages had a working day of 15 to 16 hours throughout the year. On average, women spent three hours a day fetching water.
- To this should be added the average time which other household members contributed to water collection: daughters one hour 23 minutes, sons 12 minutes, and husbands 15 minutes. This brought the total average time spent on water collection by the households in the study to almost 5 hours a day. This high figure for water collection occurred in a situation where, on paper, all households have

¹¹ For more detailed information please refer Appendix VIII.

year round access to a piped domestic water supply meant to reduce the drudgery of water collection and to improve health and hygiene.

- Contrary to normally observed patterns in rural areas, the women in the participating groups spent more time on income generating activities during the summer than during the monsoon. While agricultural work was less than normal due to the failure of the monsoon, enterprise work and the relief work provided by the government provided work opportunities in summer.
- The time/activity profiles of women in women’s enterprise households and women in control villages differed significantly with respect to the time the women spent on income generating activities. During the monsoon as well as the summer, enterprise members spent significantly more time on income generating activities. This is shown in more detail in Figure 3 and Table 5. The findings stress the importance of the micro-enterprise activities, especially during lean periods such as the summer and droughts.

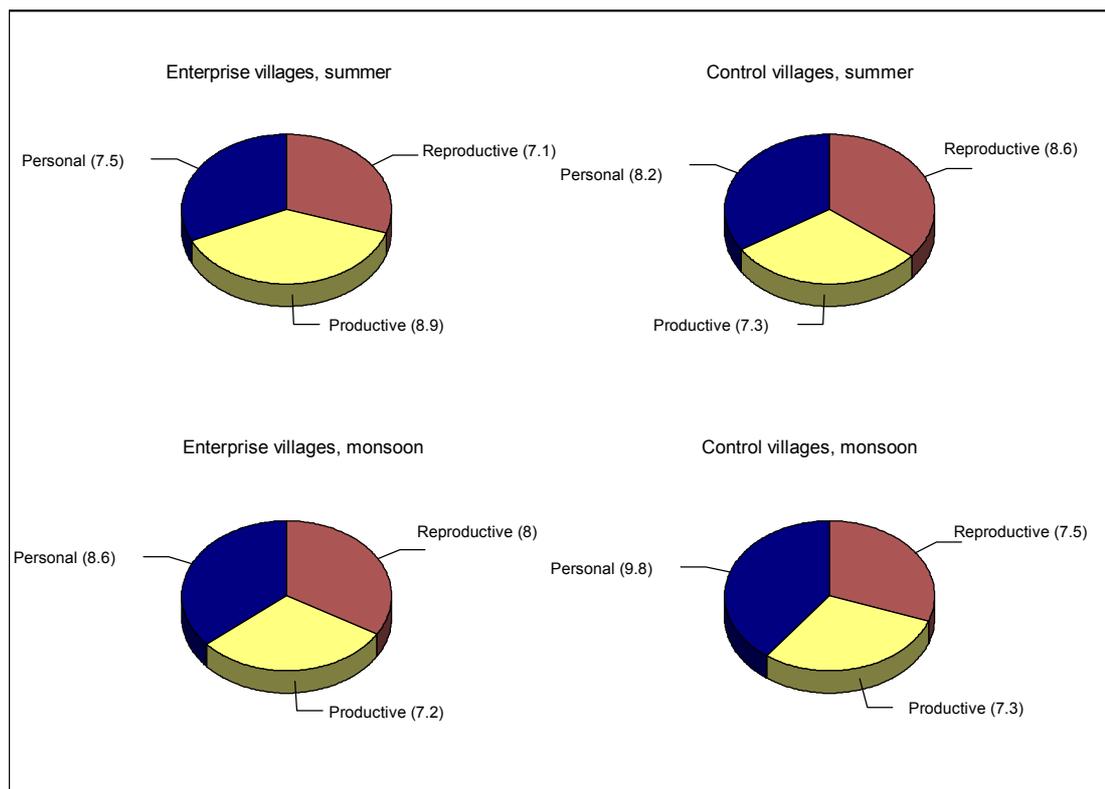


Figure 3 : Women's activities during summer and monsoon

A comparison between women in 11 enterprise villages (N=77 women) and five control villages (N = 35 women)

- Women in the control villages spent significantly more time on expenditure saving activities during the monsoon. In addition, they spent significantly more time on reproductive activities during summer.

More detailed tables on the time/activity profiles, including tests on significance of differences can be found in Appendix VI.

Table 5 : Women's detailed activity profile by season and study group

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 indicated with * are significantly different*

The findings did *not* support the assumption that women in villages with a better water supply spent less time fetching water than women in villages with a worse water supply. (Table 6) The differences in water situations may not have been large enough to significantly influence water collection time. The present study used qualitative ratings for classifying a water supply as better or worse, so the scope of the actual differences is not known. It is further possible that the particular economic status of the household resulted in different time allocations to domestic tasks, including water collection, and personal activities. Other factors, such as a decision to use a better water situation to collect more water rather than reduce collection time, may also play a role. These are all points for further study.

Table 6 : Time spent on collecting water in better and worse water situations.

		Women's collection time for:	Summer	Monsoon
Quality of the water supply	Worse	Reproductive fetching water	2.20	3.00
		Total water	2.20	0.00
		Productive water	0.00	3.00
	Better	Reproductive fetching water	2.91	3.05
		Total water	3.18	0.32
		Productive water	0.27	3.36

Assistance from Household Members

To answer the second study question, on the role of other household members (husbands, sons, and daughters) in reproductive work, the groups prepared time/activity profiles Table 7).

The main findings on the help the women received were as follows:

- During a breakdown of the water supply in summer, the women in women's enterprise households received significantly more help from other household members together (husbands, sons and daughters) than the women in the control villages.
- The help given to the women, which constituted a change in gender relations in the enterprise households, did not extend to lessening the burden on the

daughters. In both SEWA households and in households in the control villages, daughters gave most of the household help.

Table 7 : Help from household members for women's tasks

(Enterprise villages, N = 77 women and control villages, N = 35 women)

		Normal		Breakdown	
		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 indicated with * are significantly different. For more information, please refer to Appendix VI.*

This study did not look into the overall workloads of women and girls as compared to men and boys, as this was beyond its scope. However, the developed time/activity tool lends itself well for such broader analysis. When the enterprise groups use the tool with women's groups as well as their husbands, both groups will gain insight into how workload and tasks are divided within the household as a basis for discussion and action.

Economic Value of Domestic Water: the Cost of a Worsened Supply

Both the implications, in time and money, of a breakdown of the water service (study question 4) and the economic and social benefits of a reliably improved domestic water service (study question 3) were calculated as described in Section 1.1. Furthermore, the team looked at the importance of a good water supply for the quality of the enterprise in qualitative terms.



The cost of a worsened water supply was taken to be equal to the income forgone when, due to breakdowns of the piped water supply, women had to suspend income-generating activities in order to collect water from other, farther sources.

This definition was used to value water supplied in summer, which was taken to last for the three months of March, April, and May (91 days). The number of hours lost for income generating activities was valued at the average prevailing wage rate of Rs. 40 per day. The time-activity profiles made clear, however, that additional time for fetching water was not taken from productive activities only, but from reproductive and personal activities as well.

Furthermore, the money that women spent on buying water to save time for income generating activities was added to the costs of a worsened water supply.¹²

In Ranmalpura, for instance, the 2.5 extra hours the women spent in collecting water during supply breakdowns came partly from their economic activities (1 hour) and partly from personal or household activities (1.5 hours). Since Rs. 40 per (8-hour) day is Rs. 5 per hour, the loss of time for economic activities translates to Rd. 5 for the 46 days of no supply – or Rs. 227.50.¹³ In addition, each woman reportedly spent Rs. 4 to buy water. This added up to Rs. 231 per woman for the whole summer. Finally, there was a social cost of losing about nine 8-hour days of personal and reproductive time –a loss of 45 minutes per day in summer.

In Par village, women are by social custom not allowed to go out to collect water. Hence, each woman engaged in SEWA craftwork spent an average of Rs. 186 on buying water during the 13 days when there was no water supply. The findings have been depicted in Table 8 below. They can be summarised as follows:

- 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 summer. Extrapolated to the area as a whole, a poor operation and maintenance and other problems of an improved water supply may mean that the 40,000 SEWA members in Banaskantha forgo a total income of Rs. 20 lakh¹⁴ a month.
- In addition, the women lost, on average, a total of 7 hours of time for personal and reproductive activities.

Economic Value of Water: Benefits of Improved Water Supply

The benefits of an improved supply of domestic water were defined as "the additional income earned using time saved by improvements in water supply, given opportunities for income generation". These benefits were calculated on the assumption that the quality of the water supply could be improved to the point where women would have to spend only one hour a day collecting water. The subsequent time gains, calculated on the basis of the time-activity profile, could be allocated either to productive activities and/or a combination of reproductive and personal activities

¹² For loss of income due to water shortages during salt production an alternative method was followed. The results are presented in Appendix IX.

¹³ Actually, there is no water supply on alternate days – i.e., 45.5 days out of 91, which gives the figure of Rs. 227.50. The 46 days given in the Table is after 'rounding off'.

¹⁴ Approximately US\$ 44,000

Table 8 : Social and economic costs of water supply breakdown in 15 villages

Village	No. of days without water supply in summer	Extra hours spent to collect water (per day)	Consequently less hours spent on		Value of Forgone Income	Water Purchase Cost	Cost per woman of water supply breakdowns over summer season		
			Productive Activity	Personal/reproductive activity	Potential income lost due to breakdowns in summer (@ Rs. 40 per 8-hr day)	Average spent by each woman in SEWA group to buy water in order to continue micro enterprise (Rs.)	Economic Cost Water purchase cost + Value of forgone income	Social Costs No: of 8-hour days lost of personal/reproductive time	
Par	13	0.0				186	186	0	
Dhokawada	7	0.5	-0.5		16.25	5	21	0	
Madhutra	46	2.0		-2.0		121	121	11	
Parsund	3	4.5	-4.5		73.13		73	0	
Patanka	13	2.0		-2.0			0	3	
Zanzarsar	3	2.0		-2.0			0	1	
Zandala	13	0.0					0	0	
Moti Pipli	7	2.5		-2.5			0	2	
Garamdi	46	3.0	-3.0		682.50	300	983	0	
Ranmalpura	46	2.5	-1.0	-1.5	227.50	4	231		
Abiyana	2	2.0		-2.0			0	1	
Dhrandva	13	2.0	-2.0		130.00		130	0	
Kamalpura	26	2.5		-2.5			0	8	
Sherpura	0	1.0		-1.0			0	0	
Manpura	7	0.0					0	0	
Average breakdown days in summer (all villages)					16.19	Average costs (all villages)		116	2.31
Average breakdown days in summer (SEWA villages)					19.50	Average costs (SEWA Villages)		162	2.60
Average breakdown days in summer (non-SEWA villages)					9.56	Average costs (non-SEWA villages)		26	1.74

Consequently, two alternatives upper bounds have been calculated:

1. the maximum additional income that a woman could earn, assuming all her extra time is devoted to economic activities;
2. the maximum time that could be freed for personal and reproductive activities.

Below, a description has been given of how the time spent on economic activities was valued. An assumption for these calculations was that the women would allocate their time on purely economic motives and, therefore, would allocate time to the activity with the highest net rate of return.

Different calculations had to be made because possible activities and the returns from these activities varied across villages and within villages, across the year. In case of crafts, dairying, and gum collection, rate of returns were calculated from data collected for summer and monsoon. The hourly rates of return in the period September till March were taken to be the average of those in the summer and monsoon period. The hourly rate of return for different kinds of labour – agricultural and non-agricultural (including government relief work) – was taken to be Rs. 5 per hour (Rs. 40 for an 8 hour day).

The estimation of the value of water was thus based on three main assumptions:

1. Water supply can be improved to such an extent that women need to spend only an hour a day collecting water;
2. Women have the freedom to allocate the time savings according to their own preferences;
3. Economic opportunities are available when required.

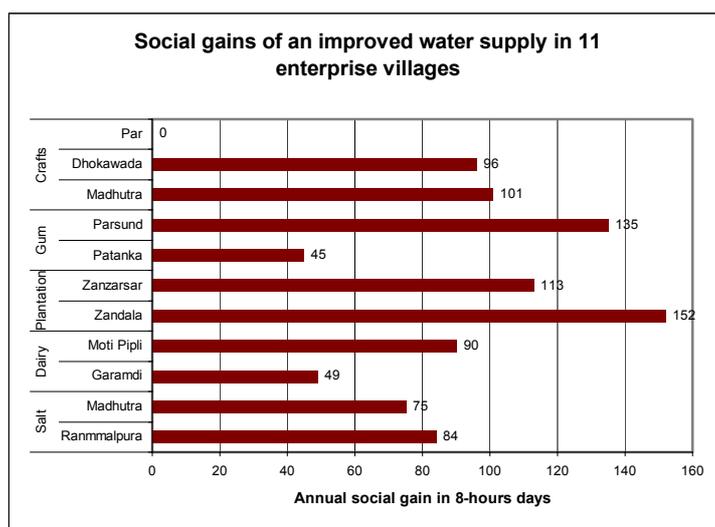


Figure 4 : Annual social gains of improved water supply in enterprise villages

Estimates are therefore hypothetical and range broadly across all possible options. If the women had been asked how they would in fact allocate the time savings, these calculations would have been more precise and realistic.

The results of the calculations have been presented in Figure 4 and 5. The main findings are as follows:

- With an improved water supply that reduces water collection time to 1 hour a day, women in the 11 selected enterprise villages could earn a maximum monetary benefit of between Rs. 750 and Rs. 5,500 per household per year, depending on the nature of opportunities available in their village, if all this additional time was used entirely for income generating and/or expenditure saving activities;
- For the 40,000 SEWA women in Banaskantha, this translates to around Rs. 1 Crore annually, if the time saved was all to be invested in economic activities;
- they would gain between 45 and 153 additional 8-hour days annually, if this time saved is not used for economic activities.
- a detailed seasonal analysis shows that the maximum economic impact from an improved water supply could be achieved by providing income-generating activities during the summer period, when no economic opportunities were available in drought prone areas¹⁵.

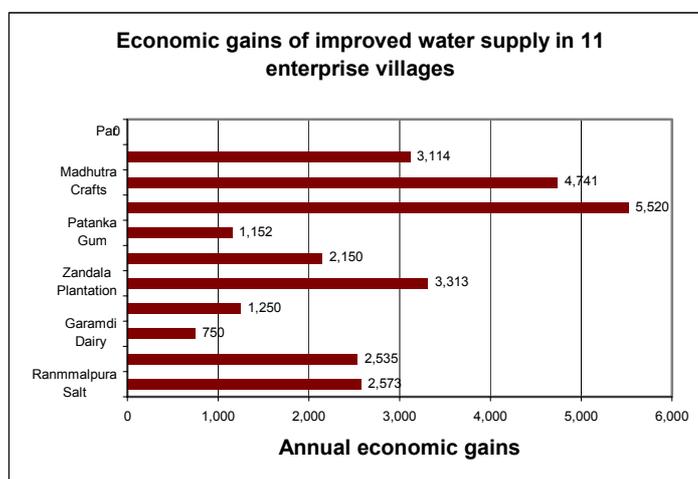


Figure 5 : Annual economic gains of improved water supply in enterprises villages

The Quality of the Water Supply and Enterprise Performance

The semi-structured interviews with the leaders of the poorly performing enterprises were used to determine which of the four factors - gender relations, water, economic

¹⁵ Appendix X studies gives a case study on the production of Micro Concrete Roofing tiles as another source of income

opportunities, and enabling environment - might be related with a sub-standard performance of their enterprises. The results of these interviews have been presented in Table 9.

Table 9 : Factors negatively influencing the performance of women's enterprise

(Data on 11 women's enterprises that show under-par performance)

Water situation	Number of villages	% of enterprises that experience problems related to				Average number of problems in these enterprises
		Gender related problems	Water	Facilitating environment	Economic Opportunities	
Better	6	83	83	100	83	3.5
Worse	5	50	83	67	33	2.8
N	11	8	10	10	7	3.2

The findings were as follows:

- In all cases, there was a combination of factors that caused the enterprise to underperform. On average, three factors hampered the functioning of an enterprise;
- Enterprises in villages with a worse water supply had more problems than enterprises in villages where the water situation was better. The problem of water itself was, however, an equally large problem in both types of villages; in other words, the water situation might be better, but it was still problematic enough to affect the women entrepreneurs.

Gender Relations

With regard to gender relations, it was already seen that during breakdowns in summer help from other household members in the enterprise villages - husbands, sons and daughters together- was significantly higher than in the control households.

In line with the study questions, the analysis of the gender data focussed on five further issues:

1. What influence had the women, as compared to men, on the delivery of water?
2. Did the women have sufficient control over their time savings to use them for income generation?
3. Who had the control over the resulting income?
4. For what purposes was resulting income used?
5. How did the gender relations in villages where BDMSA is active compare to the gender relations in the control villages?

Influence on Water Delivery

To assess the influence of women and men on local water management, the groups scored who decides on the various aspects of the water supply; women, men or both (Table 10).

The main findings were that:

- Women in enterprise households were more involved in the management of community water resources than women in the control villages
- The exception was in the use of water, which was entirely a women's issue in both types of villages. Apart from the use of water, all differences were found to be significant (for details, see Appendix VII).

Table 10 : Women's role in management of community water resources

(Data from 11 enterprise villages, N = 77 and five control villages, N = 35)

	Enterprise village			Control village		
	Men	Women	Both	Men	Women	Both
Decisions on the investment in traditional water sources ¹⁶	33.8%	18.2%	48.1%	64.7%	11.8%	23.5%
Use of water	1.3%	93.5%	5.2%	0.0%	97.1%	2.9%
Follow up after piped water supply breakdown	48.1%	20.8%	31.2%	88.2%	2.9%	8.8%
Decision about construction of traditional water sources	37.7%	24.7%	37.7%	85.3%	11.8%	2.9%
Decision about upgrading of traditional water sources	41.6%	27.3%	31.2%	76.5%	2.9%	20.6%

The findings from Table 10 can be summarised as follows:

- In the control villages, the usual situation was that, apart from water use, the men were the main decision makers on all community water issues;
- In the women's enterprise households, such decisions were more often made by men and women jointly;
- For follow-up after a breakdown of the piped water supply, new construction, or upgrading of traditional water sources not only the men, but also the women in these households might take the lead;
- Village women in all study villages had at the time of the study no say in the scheduling of the water delivery and the distribution of the available water over the villages. This was the case even though they are the primary users of the supply for reproductive (domestic) and productive uses and the intended beneficiaries of the service. The management of the water supply is totally in the hands of the Gujarat Water Supply and Sewerage Board, without participation of, and accountability to, the village government and the consumers.

¹⁶ Traditional water sources include sources such as well, ponds, etc.

Secondary data from an earlier study showed that the preferred source of domestic water of women were standpipes provided by the Santalpur piped water supply. This is shown in Table 11 below.

Table 11 : Sources for drinking water during different seasons in the study villages

	Monsoon ¹⁷	Summer	Winter
Drinking water			
Standpost	47.6%	40.5%	41.4%
Well	7.9%	10.4%	11.8%
Pond	18.0%	3.6%	5.0%
Sources in neighbour village	4.8%	10.4%	10.9%
Other sources	5.0%	4.3%	10.5%

Source: FPI et al, 2000

Control over Time

To assess the control that women entrepreneurs had over their time savings, three categories of diminishing control were distinguished. Women were taken to have the highest degree of control over their time savings if they alone decided on how they would spend this time. They had less control if women together with someone in the household decided on how time savings would be spent. They had the least control, if someone else decided about how women spend their time savings. The results of the assessments of the women's groups have been presented in Figure 6.

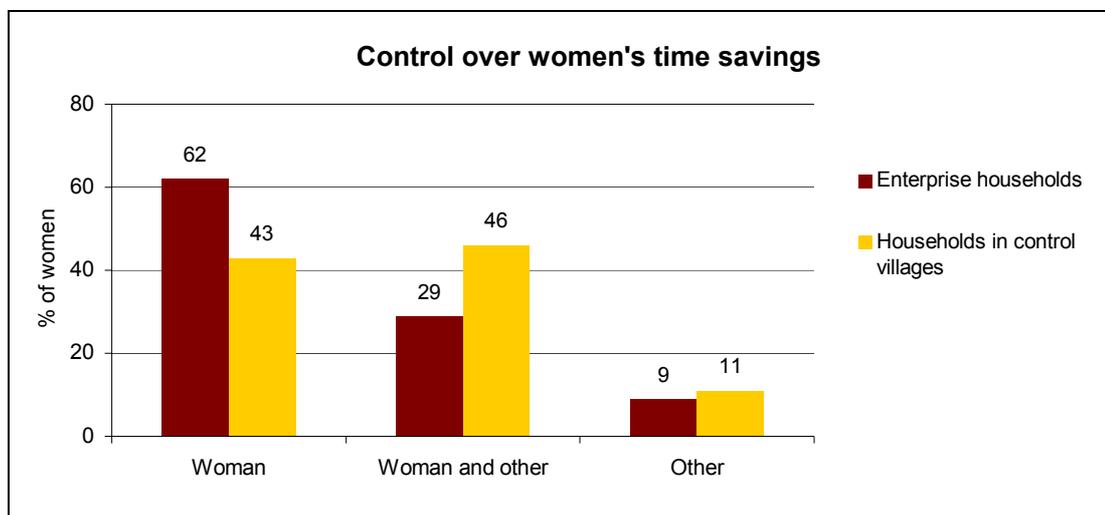


Figure 6 : Control over women's time savings by different household members

A comparison between women in 11 enterprise villages (N=77) and five control villages (N = 35)

¹⁷ Figures do not add up to 100% because only the most important sources are shown in the table.

The findings on the women's control over their time savings were as follows:

- In women's enterprise households and in households in the control villages, 91% and 89% of the women respectively, had a degree of control over their time savings. There were no significant differences between the two groups. Hence, in all villages women might decide, alone or with others, to spend (part of) their time savings on income generating activities.
- Women in enterprise villages were, however, more likely to be able to decide by themselves about how they use their extra time.
- In both types of villages, a similar percentage – approximately 10% – of women had no say in how they might spend any saved time. There were indications that this group consisted mainly of unmarried and/or recently married women, who according to local customs still have a subordinated position in their household. Gender relations between mothers and daughters, and for daughters in law have apparently changed less than between husbands and wives, also in SEWA households.

Control over Income

To assess the degree of control over income, a similar method of analysis was followed as described above. In addition, three different types of income were distinguished: income earned from the enterprises, income earned by the women from other sources, such as agricultural labour and/or government relief work, and the income of the entire household.

The findings from this analysis, depicted in Figure 7 below, were:

- Women in control villages had not started any independent, entrepreneurial activities;
- Women in enterprise households had a relatively high level of control over the income from the enterprise related economic activities but much less control over the total household income;
- In comparison with women's enterprise members, women in the control villages had less control over their own income and the household income;
- In enterprise households, 9% of the women did not have any say in the spending of the income generated through their enterprise activities. Probably, this was the same group that did not have any control over their time, but this was not determined during the study.

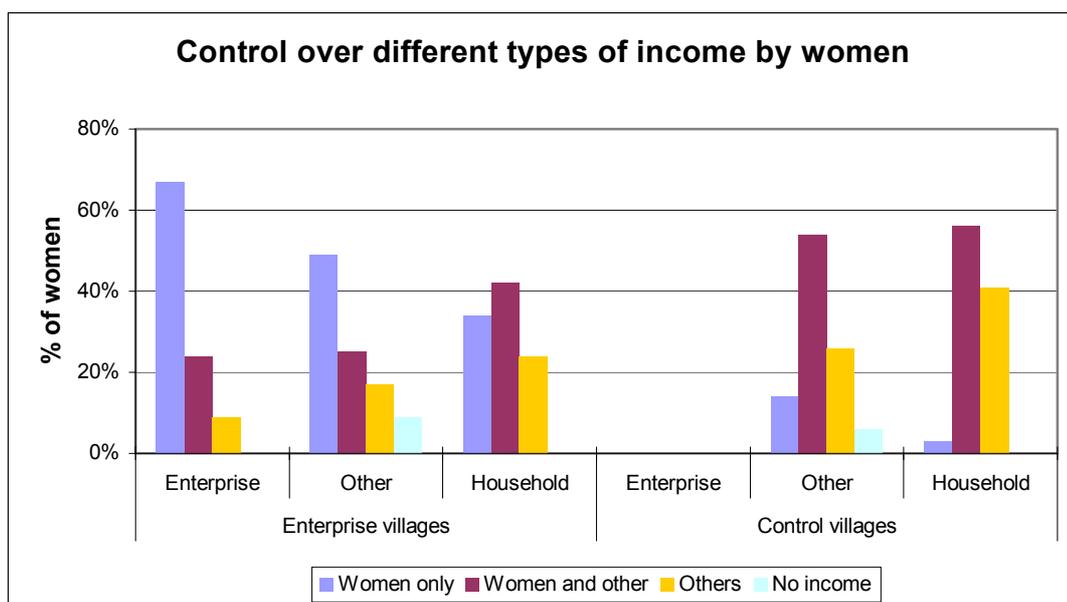


Figure 7 : Control of household members over different types of income

A comparison between enterprise households (11 villages, N=77) and households in control villages (5 villages, N=35)

Use of Income

As part of the gender exercises, the women were asked to indicate how they spent their income across various categories. The results of this inventory have been summarised in Table 12.

Table 12 : Women's spending of own income over a number of categories in %

(N = 11 enterprise villages and 5 control villages)

	Enterprise villages	Control villages
Personal items	5.4%*	14.2%*
Child care/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	100.1%	100.0%

Data marked with * are significantly different. (for more detailed information please see Appendix VI)

The findings can be summarised as follows:

- In all villages, women's most important expenditure was for domestic expenses;
- In all villages, women spent money on buying water;
- Women in enterprise households spent significantly less money on healthcare. This is possibly an outcome which reflects the access of these women to the health education and health care that are part of the enterprise programme;
- Women in enterprise households spent significantly more on child care and education than women in the control villages. (see note)
- Women in enterprise households spent significantly less money on personal items. This, and the debt repayments in the control villages, may relate to the field observation that the households in the control village were somewhat more affluent than those in the SEWA villages, but that women entrepreneurs in the enterprise households invested more into their enterprise and savings than the women in the control villages.

Changes in Gender Relations over Time

In enterprise villages and control villages, gender relations had changed over the previous ten years. For example, fewer women ate alone, more women went out alone and more children went to school (Table 13). The changes seem to be an outcome of ongoing changes in society as a whole as the trends were the same in all villages. However, several differences emerged:

- In the households of women entrepreneurs, the positions of the women were significantly better with regard to going out alone, having savings and owning assets (For the tests of significance, see Appendix VII);
- The enterprise villages had previously experienced significantly worse situations regarding children's school attendance and agricultural decision-making, but these differences had disappeared. Due to an error in the design of the tool, attending school was not split up for girls and boys. However, discussions made clear that both sexes now went to school for at least some years.
- The opposite development had occurred regarding women's decision-making on livestock purchases. Ten years earlier such participation had been significantly more common in the women's enterprise households than at the time of the research. The findings on agricultural and livestock decision-making should be interpreted with caution, however, because during a serious drought men often migrate in search of work and take livestock to other grazing areas.

Table 13 : Changing gender relations over the last ten years

(Data from 11 enterprise villages, N = 76 and five control villages, N = 35)

	Enterprise		Control	
	Past	Present	Past	Present
Harmony in family	90.8%	97.4%	75.8%	90.9%
Eating together	52.0%	84.2%	51.5%	87.9%
Going out alone	61.8%	89.5%	57.6%	75.8%
Children going to school	61.6%	90.5%	84.4%	90.9%
Women have savings	14.7%	77.3%	18.2%	24.2%
Women participate in agricultural decisions	8.3%	69.0%	28.1%	62.5%
Women participate in decisions on purchase of cattle	17.1%	72.0%	12.9%	61.3%
Women have own assets in their names	15.1%	41.9%	0.0%	15.2%

As most women entrepreneurs belonged to more traditional communities in the area, the progress made by these women stood out even more. However, no separate data were collected to substantiate this statement.

Apart from using time for domestic and productive purposes, the study also went into women’s time and freedom to play a role in community-level affairs (Figure 8).

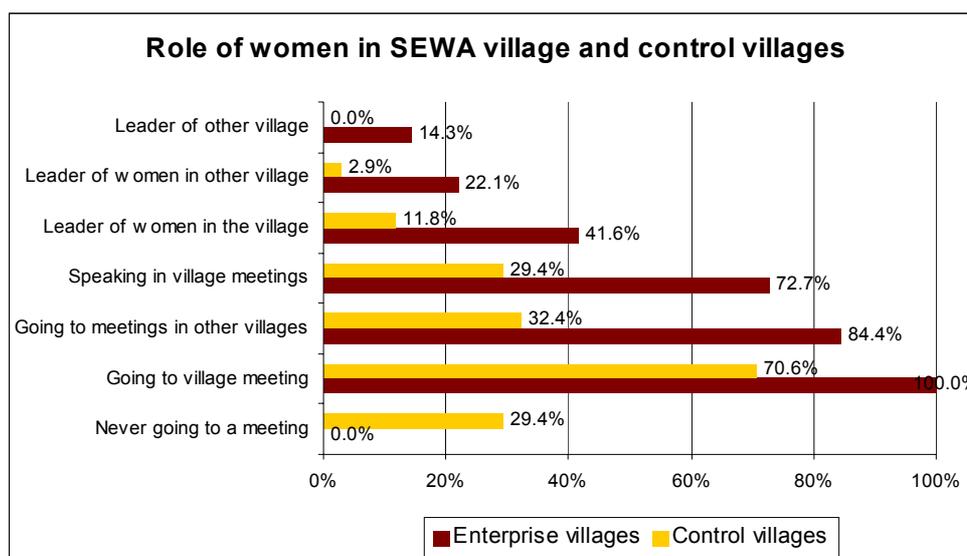


Figure 8 : Roles of women at community level in enterprise and control villages (11 enterprise villages, N = 77) and five control villages (N = 35)

The results show that by all criteria, participation by women from enterprise households was higher than by women in control villages. This applied to attendance at public meetings (whether women only or mixed), attendance at (mixed) village meetings in their own villages and at higher level meetings in an other community, speaking up at such meetings, and being a women’s leader either in one’s own village or in a cluster of villages.

The tool did, however, not differentiate between the nature and purpose of the meetings that the women attended. Some of the general village meetings (Gram Sabhas) had for

example been organised by BDMSA to discuss problems that concern the entire village and to initiate new, village-wide development programmes. Obviously it was easier for women entrepreneurs to attend meetings organised by their own umbrella organisation. Moreover, in such meetings, BDMSA ensured that women speak up and that their opinion counted. Further development of the tool is required to allow for these factors.

Gender Changes according to Men

Gender concerns the relationship between women and men. Semi-structured interviews were held with male focus groups to learn what changes they saw in these relationships, what their opinion was about these changes, and what in their experience explained these changes. Generally, men were surprised to be asked about gender relations and found them harder to discuss than women. However, they soon warmed to the issue and gave many and very specific reactions.

Subsequently, the team analysed the nature and frequencies of their reactions through content analysis of statements in Gujarati and, after translation into English, by comparing the two for consistency.

In all villages, the men saw changes in the position of women in the household and the community (Figure 9 and Table 14). Husbands and fathers/fathers-in-law of women entrepreneurs saw however a greater number of changes. Altogether, they gave 140 changes, an average of 13. Men in the other villages mentioned 32 changes, an average of six.

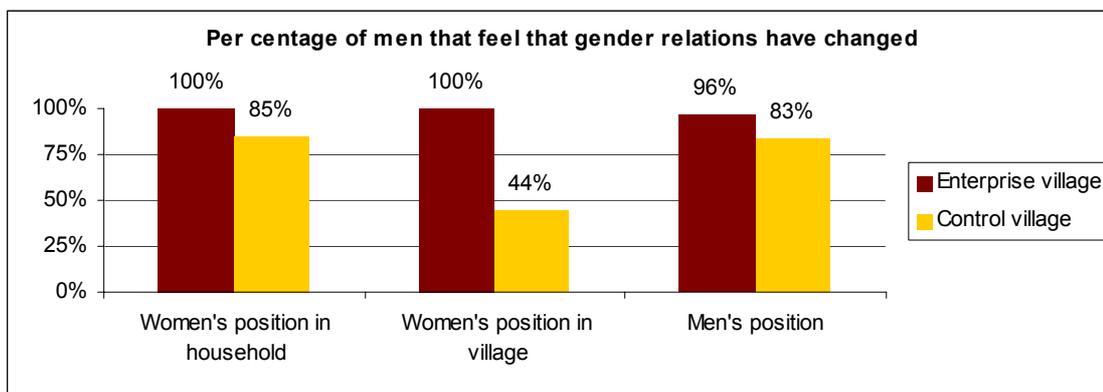


Figure 9 : Men's opinion on the changes in the gender relations (N = 11 male focus groups for entrepreneur households and N=5 for control villages)

For content analysis, the study team examined whether each described change related to one of the following:

- a women’s *welfare* strategy (women have become better mothers and housewives);
- an *anti-poverty* strategy (recognition and appreciation of women’s economic roles);
- an *equity* strategy (more equality in relations between husbands and wives, daughters-in-law and parents in law, girl children sent to school, etc.);
- an *empowerment* strategy (women have become more aware of their situation and potential, have gained strength from uniting and, like men, are now free to move, speak out, and make their voices heard and opinions count in public).

Kabeer has labelled the four changes from an empowerment strategy as having ‘power within’, ‘power with’, ‘power to’ and ‘power over’ (1994: 245).

The results of the analysis in the study and the control groups are given in Table 14. Some overlap occurred as statements sometimes fell in more than one category.

Table 14 : Changes in women’s position according to male focus groups

(N= 11 groups in 11 enterprise villages; N=5 groups in five 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

The data showed changes for all groups, but there were also differences:

- Both groups of men felt that the gender relations had changed. Men in the women’s enterprise villages saw a greater degree of change for women than men in the control villages.
- In the enterprise-related groups, only two out of the 140 changes that the men mentioned were negative. They were both to the effect that some women now had more opportunities to visit places that men did not an opportunity to visit. In the control villages, the men mentioned more changes which they felt were negative, e.g.

“Daughters-in-law don’t tolerate the elders’ dominance and answer back immediately. Families are separated. Nobody cares for elders”. “More conflicts and quarrel between husband and wife”.

The male relatives of the women entrepreneurs and the men’s groups in the control villages held quite different views of the same developments. Developments which

the first group perceived as positive tended to be viewed in a negative light by the second group. This is further illustrated in Box 1.

- Although the position of women had improved according to all the male groups, the male relatives of the women entrepreneurs felt that improvements went beyond women's roles within the home. This group saw changes not only in the roles of the women as housewives and mothers (a 'welfare' strategy), and in a more equal relationship between spouses and with daughters-in-law (an 'equity' strategy). They also stressed women's economic roles (the 'anti-poverty' strategy) and their roles in the community and society (women's 'empowerment').
- In the enterprise villages the empowerment of poor women also empowered poor men. According to the men in the focus groups, the enterprise programmes for their wives and daughters had also had a positive spin-off for them, e.g., because their wives passed their newly acquired knowledge on to them and because BDMSA's programmes had started a village-wide economic development process. The initiatives of their female relatives had further stimulated them to take an interest in village affairs and play a more active role. As husbands, they also got more respect in the village because of the improved status of their wives.
- In the women's enterprise villages, the men identified BDMSA's activities and an increased exposure to the outside world as the main reasons for change. In the other villages, the groups attributed the changes to general changes in society.

Box 1 Changes in gender and gender relations according to male focus groups in enterprise villages

Empowerment of women:

"Now they can go outside alone". "Earlier, the society did not allow women outside alone. They used to talk about that among themselves, but now the society is helping them to go ahead". "Women are making other women aware about saving, give them advice about work". "Now they aren't afraid of speaking with men or women or attending meetings". "Other women of the village are also getting information by going outside with the women of the association and learning new things". "Member women can go out alone, can speak in meetings and other village women have also started going with them so their confidence has been building up". "They could speak in front of the chief minister, too". "Their opinions are starting to be taken into consideration". "Women are invited and asked when important decisions are made about the village". "A meeting of men [for water harvesting] was held to help the women in their work".

Empowerment of men:

"That women have come forward and started taking up leadership has for men increased the respect for the men in the society". "Men's status in society has increased because we do not have to ask outsiders for money". "We can proudly say 'these women belong to our community'." "By women's information and their discussions in the household men's information has increased". "A man has learned a new grafting technique from a women's meeting and he has taught this technique to other village people. In this way the village people's knowledge has increased". "Because of the SEWA meetings, we also want to attend other meetings for more knowledge". But also: "We feel no change in our position from these [women's] changes, but we feel happy that women are learning something".

Equity:

"Understanding about educating children, especially about girl child education has come". "We have started educating the girls so that their future can be improved". "[Women] have started speaking more with the husband. Taking decisions together". "Better understanding between

men and women, especially in conflict resolution, has developed" "Feeling intimate with each other. Husband now started listening to the woman". "Women are being treated as equal in the family". "They give good response in the conversation". "Fewer fights. There is peace in the household". "If women go out, men handle housework". "They help women in the housework to send them for work early". "Men have started helping women in their housework for the easiness of the wife". "Women have started advising their husbands about cleanliness". "Because women have started supporting us economically, helping us in our work, we have to work less"). But also: "We [men] are not able to go outside [the village] that much, but the women can" and "When women go to meetings, husbands and children have to look after agriculture and the cattle. However, ultimately we are happy because from suffering in this way we have results".

Anti-Poverty:

"The increased income". "Can earn more from non-traditional occupation". "They know how to take better care of animals and have benefited from the knowledge on crop production". "Mortgaging the land and house for money has stopped due to women's income". "During crisis we can get financial help from the women" "Could build pucca (=stone) house". "Because of new occupation, they became more useful for society". "More concentration on work instead of moving here and there".

Welfare:

"Women can handle the house well". "Understanding about cleanliness, about house cleaning has come". "They are more concerned about their children's education and their cleanliness". "They have now started working faster at home". "Started spending with proper understanding and keeping accounts". "They are taking better care of their children and are giving them good culture". "They are welcoming guests better than before".**)

*) How women's and men's workloads compare has not been assessed with the men or the women.

***) This is also an equity issue as under the local culture only men would normally welcome guests.

Capacity Building

Building the capacity of FPI and SEWA in the design and use of participative research tools for the collection of quantitative data was one of the objectives of the research. This objective reflects one of IRC's working principles, namely to enhance a sense of being 'equal partners' with institutions and sector professionals from the South through valuing equally both academic and community knowledge, and operating on a partnership basis. Hence as part of the research, design and training workshops were organised. Hands-on training on lateral leadership and self-evaluation was part of the daily routine during the fieldwork.

During the mid-term review of the research project in July 2000, the capacity building activities were discussed with the entire team and all team members were asked to fill in a written questionnaire on the capacity that had been built so far and to give also critical comments. The findings from this inventory showed the following:

- Using the tools combined with day-to-day analysis and feedback contributed greatly to the capacity of the team. The efficiency of the data collection had increased and so had the understanding of the tools and their outcomes. Taking part in the design

of these tools and using them in the field increased the team's knowledge of how to retrieve information and quantify qualitative data from a group. The research team had also become more confident and participatory in their approach.

- The team had built up its capacity on the research subject. The gender perspective became more visible in new projects that the team and the groups had developed. The economics of water and its relationship with income generating activities were also better understood.
- The team felt that it had also strengthened its capacity for self-evaluation of its own performance, the identification of weaknesses and planning and implementing corrective actions. Organisational capacity, lateral leadership, and team spirit had also improved. Team building had helped the team to function as a whole so that the total was more than the sum of the individual members.
- There were also negative aspects that the team needed to deal with. Although computer knowledge had increased, some individuals were still unaware of how computer programmes could be used as tools to analyse data. The analysis by the team was also quite weak; not all individuals understood how to analyse the data.
- The research experience with SEWA and FPI had built IRC's capacity with respect to the institutional relationships with NGOs in the water sector. In addition, it had expanded the dimension of IRC research activities with a specific focus on gender. Finally, it strengthened IRC work on integrated water use and water resources and catchment management.

Conclusion and Recommendations

This study has shown that, given a reduced water collection time and gender relations and economic opportunities that make it worthwhile to use this time productively, women can make important, even critical, contributions to the household income in drought prone areas such as Banaskantha.

Their contribution is critical because this income comes at a time when other resources are at their lowest. Besides providing extra income for household expenses, education, and childcare, the money also acts as a buffer for crisis times. This reduces family dependency on unscrupulous moneylenders which often results in a long term debt.

The women used the benefits of shorter collection times and easier access to water, supplemented by a programme for women's economic and social empowerment, in three complementary ways:

- for their reproductive roles, such as for domestic work, childcare and hygiene/health;
- for their economic roles, in the households' farms, as wage labour, and in women's enterprises;
- for community development work in women's organisation and through participation in general decision-making.

The study found that the women made reasoned choices on the use of water, which made for complex, and sometimes contradictory, relationships between the quality of the water supply and the time spent on water collection. For instance, they often spent more time collecting water in the monsoon than in summer, and similarly, women in villages with 'better' quality of water supply sometimes spent more time collecting water than did women in villages with 'worse' supply. Basically, this was because they reduced household water collection during periods of shortages and expanded them when water was more abundant.

In particular, the study found that the use of water changed when the available quantity of water improved or deteriorated. The economic status of the households prioritised the way time was being used, with poor households giving priority to the use of time for income generating purposes. Also economic opportunities determined whether time savings would be used for income generating activities, domestic work such as water collection, or other activities. A reliable and sufficient supply of domestic water combined with uses of water and time gains for small-scale domestic production was found to be economically most important for the poorest households.

The study has further shown that because the water supply was not reliable, the drudgery of water collection for women and girls continued despite the establishment of a large

piped water supply in the area. These findings have several important research and policy implications as set out in the next sections.

Water Supply Projects

The study has shown that domestic water supply projects are not just welfare projects to be undertaken to reduce women's drudgery in water collection. Neither should they be undertaken exclusively for 'soft' concerns such as improving health, hygiene, and sanitation. Especially in drought prone areas and given the right enabling conditions, rural domestic water projects may also be economic development projects, especially for women. Women especially benefit from domestic water projects and within an enabling environment they use both water and time gains not only domestically but also for economic purposes within the household.

Providing an additional water supply alone does, however, not translate automatically into economic returns. Women need a reliable and predictable service delivering sufficient amounts of water to meet basic household needs, an enabling environment for productive uses of time and water, gender relations that allow such productive uses, and economic opportunities to turn these uses into income.

A poorly functioning domestic water service has not only serious negative impacts for domestic work, hygiene and childcare in these harsh and poor areas, but also denies women, and their families, a valuable income.

There are several policy implications from these conclusions:

- There is a strong need for an integrated, holistic approach to rural development in drought prone areas, which is in contrast to the sectoral approach that is currently adopted by the Indian national government and the government of the state of Gujarat.
- Domestic water supplies should include the productive uses of water and time gains at the domestic level in their planning and design.
- As users, producers, and stakeholders who already spend part of their earnings on water, women should have an influence on the maintenance and scheduling of the service and the distribution of the available water. Follow-up research is needed to test the effects of such an influence on the reliability and predictability of local water delivery, the adequacy and equality of the distribution of the available water, and the impact of meeting the domestic and economic needs of the user groups. The research could also assess whether in such circumstances there will be a greater willingness to pay for water routinely.
- CBOs, NGOs, and other institutions with experience in improving water supply and supporting micro-enterprise development need to be involved in the reformulation of

current policies. These institutions should also be used as pathfinders in exercises to test the operationalisation of the policies for their applicability and results.

Gender

The study has found that the combination of an anti-poverty and a women's empowerment approach have significantly improved women's economic and social positions in households and communities. These changes surpassed the improvement in women's position and in gender relations that have taken place as part of general developments in society. Women in villages with a similarly improved water situation, but without the benefit of an economic and social empowerment programme, showed significantly less advanced improvements than did members of the women's enterprises.

The improvements related more to the mothers than to the daughters, however. The latter still provided the bulk of domestic help within the households and did not seem to have the same say over the use of their own time and income as had their mothers and mothers-in-law.

All 11 male focus groups were of the opinion that the positions of women in the households and the community had changed. Almost invariably, they saw these changes as positive. The groups in the women's enterprise villages saw more changes than those in the other villages. Asked about the kind of changes, all groups described specific improvements in women's domestic roles and gave a number of instances of greater equality between women and men within households. In addition, the male groups in the women's enterprise villages also always gave examples of poverty reduction from women's work and more often gave instances of women's empowerment as a group.

Empowerment of mostly poor women in women's enterprise households had also changed the gender situation of poor men. They said that they were more respected because of the achievements of the women in their households. They had also taken inspiration and obtained new knowledge from the women which had improved their positions as poor men.

The present study did not investigate the overall division of work within households. It is therefore not possible to say whether, in comparison with men and boys, the total workload of women and girls has changed over time and between the two study groups. The design and implementation of a participatory action research study in this subject field are recommended.

In its tools and focus discussions and interviews on children, the current research failed to make a distinction between girl and boy children.

The policy implications that have been drawn from these conclusions are the following:

- Gender equality should be part of any rural development programme as a right and an end in itself, because women and men are open for change, and both are equally able to have positive impacts on the development of their families and the entire community.
- Gender programmes should start addressing the immediate needs felt by women and should gradually address more long-term problems.
- Income-generation programmes for women cannot be limited to a few inputs, such as women's organisation and skills training, but must address all social, economic and infrastructural pre-conditions for making a real difference economically as well as for gender relations.
- Within SEWA's enterprise programme, gender relations within the household between women (mothers/mothers in law and daughters/daughters in law) and the roles of husbands and sons deserve more attention.

Poverty Alleviation and Watershed Development Programmes

In a situation where existing strategies for poverty alleviation have, by and large, failed to uplift the poorest of the poor, the study has demonstrated that rural micro-enterprises facilitated by an enabling gender as well as economic environment may have positive impacts on poverty alleviation.

Because women provide critical income to poor households, rural poverty alleviation programmes should not be limited to improvements in the resource base, e.g., soils, irrigation water, crops and forests. The development of women's enterprises combined with the improvement of domestic water supply should become one of the major entry points for these programmes

As the total amount of water in drought prone areas is limited, poverty alleviation policies should furthermore try to unlink water and poverty by providing income-generating opportunities that do not require, or are less dependent on, water and are based on market demand.

This study has demonstrated that a more holistic approach to watershed programmes, which includes a reliably improved domestic water supply and women's micro-enterprises in a gender context, deserves to be researched as a strategy to bring rural households above the poverty line.

For policy-making, these conclusions imply the following:

- The development of rural micro-enterprises and the improvement of drinking water supply should become a major thrust in rural poverty alleviation strategies and programmes - rather than just focusing on improvements in the resource base (e.g., soils, irrigation water, crops and forests).
- Micro enterprise development has to be embedded in a holistic approach that focuses simultaneously on creating an enabling environment and favourable gender relations, and must contain linkages back to e.g. the natural resource base and forward to skills and services such as marketing.
- NGOs and other institutions with experience in effective poverty alleviation for poor women and men should be involved in reformulating current policies to bring these changes in focus. These institutions should also be used as pathfinders in pilot exercises before scaling up operations to a larger scale.
- As the total amount of water in drought prone areas is limited, policies should try to unlink water and poverty by providing income-generating opportunities that are less dependent on water, e.g. gum and crafts. Policies should facilitate the marketing of such goods and facilitate the identification of new products. Greater diversification of products and enhanced economic viability is needed to accommodate any growth in number and scope of women's micro-enterprises.

Drought Management

This project found that under the current conditions money spent on drought relief work - in the form of craftwork - can be economically viable for the women concerned¹⁸.

The policy implications are that

- SEWA, or other institutions, should provide craftwork at times when other economic opportunities are at their lowest.
- Part of the money spent on government relief programmes providing physical labour (e.g., digging) opportunities during summer months should be spent on providing craftwork for poor women under an efficient plan for managing and marketing this output.
- NGOs and other institutions experienced in organising such relief work should be involved in reformulating policy.

¹⁸ Economic viability above community level was not within the scope of this study.

Community Infrastructure Projects

Women who are empowered and who earn income can improve the effectiveness of decentralised community infrastructure projects.

The policy implications are that

- Communities where women are empowered and earn money should be the focus of government community infrastructure projects, which should involve these women in decentralised and participatory planning and implementation.
- NGOs and other institutions who are already working with these women's groups should be involved in planning and implementing such government projects.

Organisational Capacity Building

The research has built up the capacity of all involved organisations, especially in the development and use of participatory research tools for the collection of quantitative data. The use of these tools, instead of the commonly used questionnaires, made it possible immediately to review and discuss findings with groups of women and men in the villages. This contributed to their empowerment as they remained the co-owners of their own data and may have gained new insights into their own situation. In addition, capacity has been built both for teamwork and the subject areas of the research. Capacities for the design, management and analysis of research can, however, be further improved.

Participatory methods and tools have been valuable entry points for discussions on gender and gender equality with the women enterprise groups, their male relatives, and the control groups. They also encouraged discussions within the team and brought out additional aspects, especially on gender relations between mothers and daughters. One of the women entrepreneurs summarised this new insight quite concisely: "We are all women". Integrating the tools in the training and linking their use with gender analysis and action planning are further ways to enhance gender equality as part of the enterprise work.

As a follow-up to this study, partners will undertake activities to disseminate the results, exchange knowledge and plan future action. They will look for opportunities to prepare documents and video records of the study results and will seek contacts with policy makers and fellow programme/project organisations to continue the development of this important subject area.

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IRC International Water and Sanitation Centre

IRC facilitates the creation, sharing, and use of knowledge so that sector staff and organisations can better support poor men, women and children in developing countries to obtain water and sanitation services they will use and can sustain. It does this by improving the information and knowledge base of the sector and by strengthening sector resource centres in the South.

As a gateway to quality information, the IRC maintains a Documentation Unit and a web site with a weekly news service, and produces publications in English, French, Spanish and Portuguese both in print and electronically. It also offers training and experience-based learning activities, advisory and evaluation services, applied research and learning projects in Asia, Africa and Latin America; and conducts advocacy activities for the sector as a whole. Topics include community management, gender and equity, institutional development, integrated water resources management, school sanitation, and hygiene promotion.

IRC staff work as facilitators in helping people make their own decisions; are equal partners with sector professionals from the South; stimulate dialogue among all parties to create trust and promote change; and create a learning environment to develop better alternatives.

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Appendices

Appendix I Research Activities

Exploratory phase

July 1999	Preparation of research framework
October 1999	Design workshop. Design of research tools for explorative phase
	Training workshop for field research team
November – December 1999	Data collection in 25 villages in Banaskantha
December 1999	Data entry
	Data analysis
January 2000	Preparation of report on the exploratory phase

Main research

February 2000	Second design workshop. Design and testing of additional research tools
April – June 2000	Data collection using Time/activity profile summer Typical household profile Gender tools Enterprise tools Accounts analysis
July 2000	Mid-term review
August – September 2000	Data collection. Time/activity profile monsoon Typical household profile monsoon Enterprise tools monsoon Accounts analysis
November 2000	Analysis workshop. Analysis of collected data
December 2000 – April 2001	Preparation of final research report.

Appendix II Banaskantha

In 1999, Gujarat was hit by the severest drought of the last 50 years. Because of an uneven distribution of resources and an inadequate long-term political response, some districts, especially the least developed, were hit hardest. Banaskantha, one of the most backward districts of Gujarat, was hit particularly hard by the drought. The district has a total population of 2,162,578 (census 1991), 90% of whom live in rural areas.

Table 15 : Basic statistics of Santalpur and Radhanpur block

	Population	% Rural	No. of villages	Villages covered by SEWA	% Cultivable land that is irrigated
Santalpur	86,396	100%	73	68	0.48%
Radhanpur	94,669	75%	55	47	5.30%
Total	181,065		128	115	

Most of these villages lack basic infrastructure such as safe drinking water, electricity and schools. Literacy rates are below par as compared to other parts of Gujarat, 39% against a state average of 61%. In the Radhanpur and Santalpur blocks, classified as desert area, the literacy rates are as low as 16% and 17%, respectively.

Box 2 Water policy in Gujarat

Lack of water policy haunts Gujarat

Gujarat hasn't learnt any lessons from last year's drought. The State Government is gearing up to tackle the state's second drought in succession. Concerns have been expressed over the lack of comprehensive water policy. Gujarat is heading for an ecological disaster, thanks to an ad-hoc handling of the problem every year.

It's not uncommon for a tropical country like India to experience droughts related to monsoon failure. What is alarming about the recent droughts in Gujarat is that they are related to hydrological factors, where even drinking water becomes unavailable for a vast section of the people not directly dependent on agriculture.

Surface and ground water resources had been exploited to provide water for consumption and for other household chores. No attempts were made to control the unrestricted use of water by rich farmers and the industrial sector. Monsoon failure over the last two years has led to a hydrological drought, throwing a big chunk of the State's population into a drinking water crisis all year round...

The Government does not seem to have a long-term solution for the crisis. Their approach has been to manage drinking water supply from other areas and provide subsistence wages to the rural poor by way of relief work. NGOs said that such an approach did not take into account the reality that such droughts would recur every year if water resources were not managed judiciously...

(Source : Rathina Das (2000), Hindustan Times 10th of January, 2001)

Agriculture and dairy production are the economic backbone of Banaskantha: 52% and 23% of the population earn their living as cultivators and as agricultural labourers, respectively. This forms an unstable basis for further development, considering the geographic as well as the climatic conditions in this district.

The Water Situation in Banaskantha

Most of the small and marginal farmers depend completely on the rain. In the event that monsoon rains fail, which happens every third year on average, entire communities are forced to migrate in search for work and fodder. Excessive groundwater harvesting by rich farmers has resulted in rapidly dropping groundwater tables and an increase in salinity of bore wells.

The findings of the first phase revealed the complexity of the water supply in the study villages. Although most villages have multiple water sources, the standposts are the most favoured source and, consequently, traditional sources are neglected. Because of the unreliable and inadequate supply of these standposts, however, women often have to rely on traditional sources resulting in loss of time and unsafe drinking water (FPI et al: 2000).

Appendix III SEWA and BDMSA

SEWA's Approach to Development

The Self-Employed Women's Association (SEWA) is a trade union with more than 210,000 poor women members¹⁹. Approximately, 67% of these members live in rural areas (SEWA 2000). Most of these women are working in the informal sector of the economy and earn their living through their own labour or through small businesses. "SEWA's objectives are to organise women workers for full employment. Full employment means employment whereby workers obtain work security, income security, and social security (at least health care, child care, and shelter). By self-reliance, we mean that women should be autonomous and self-reliant, individually and collectively, both economically and in terms of their decision making power" (SEWA 2000: 9).

SEWA was founded in 1972 as a trade union to mobilise women in the unorganised sector of the Indian economy. It evolved from the Textile Labour Association (TLA), which was inspired by a workers' movement led by Mahatma Gandhi and was founded in 1920 by a woman, Anasyaben. Twenty-five years later, SEWA is now both a member-based organisation and a movement, working towards the full employment, self-reliance, and empowerment of women.

The guiding force behind the SEWA movement, Mahatma Gandhi's message of liberation through economic independence, is especially suited to SEWA's members. SEWA's approach to realise economic self-reliance for its members at the ground level consists of the following four elements (SEWA 2000):

1. Organise for collective strength, the create bargaining power, and secure representation on committees and boards from district to international level.
2. Create capital at household level to create and build up assets by women in their own names.
3. Build capacity to stand firm in the competitive market and to enable women to run their own organisations.
4. Provide social security to enhance health care, childcare, provide shelter, and basic insurance.

SEWA's Water Activities

For SEWA members in rural areas, water is often one of their main problems. Water is related to most aspects of women's life: drinking, domestic use, livestock, washing, agriculture, and so on. Consequently, many SEWA activities in rural areas evolve around water.

In 1994, SEWA launched its first water campaign, which has gained momentum ever since. The main objectives are to provide clean drinking water and to prevent migration

¹⁹ According to SEWA's annual report 1999, SEWA had 215,234 members all over India of which 147,618 were in Gujarat.

due to water scarcity. Currently, SEWA, or its local associations, are involved in a wide range of water related activities such as watershed development programmes, training handpump technicians, improving existing water services by pressurising relevant government agencies, and so on.

Banaskantha DWCRA Mahila SEWA Association (BDMSA)

In 1987, SEWA was invited by the Netherlands Embassy to start a participatory, rural development programme that would meet the needs of the rural poor. The invitation was extended after an evaluation of the Gujarat Rural Water Supply Scheme (GRWSS) pointed out that it had not managed to start up economic development for the poor as intended in the original project.

SEWA, supported by FPI, started an action planning cycle to assess bottlenecks in the project and to design a holistic rural development project. Initially, the activities in Banaskantha were run by SEWA itself. From 1995 onwards, however, SEWA started withdrawing in a phased manner, which finally resulted in a complete take over in 1997 by BDMSA.

BDMSA is instrumental in the implementation of a large portfolio of activities (see Table 16). Within BDMSA's activities, the Development of Women And Children in Rural Areas (DWCRA) programme has been an important instrument to target poor, rural women. The DWCRA scheme gives loans to groups of rural women to start their own income generating activities. Till date, 62 DWCRA groups and 160 savings-and-credit groups have been established (SEWA 2000). The DWCRA groups undertake, amongst others things, income-generating activities such as crafts, nurseries and plantations, salt farming, gum collection and dairying.

Table 16 : BDMSA's most important activities in 1999

	Number of women	Amount (Rs.)	Note
Employment & income	22,000	90,000,000	Handicraft, dairy, forestry, farming, salt work, gum work
Assets ownership		10,000,000	375 got food security
Food security	375 children		
Organising	26,800		
Health care	2,000		Eye-camps, women-diseases camps, child-health camps
Child care			10 child care centres
Housing	116	384,000	House repairing
	17	255,000	House construction
	70	700,000	Roof Rain Water Harvesting tanks

Source : SEWA 2000,3

Appendix IV Census Data of the Selected Villages

	Village area in Hectares	Land use					Distance to nearest town (in km.)	Population				% Male literates	% Female literates	Composition labour force					
		Forest %	Irrigated %	Not irrigated %	Wasteland %	Not available for cultivation %		House holds	M	F	Total			% Male main workers	% Female main workers*	% Male cultivators	% Female cultivators	% Male agricultural labour	% Female agricultural labour
Kolapur	699.6	0.0%	8.6 %	84.4%	8.6%	2.8%	8	172	527	504	1031	22%	6%	28%	5%	14%	1%	10%	4%
Moti Pipli	1408.8	0.0%	0.0%	74.5%	12.9%	12.6%	8	310	900	850	1750	36%	16%	18%	8%	6%	0%	10%	8%
Sarkarpura	1106.2	0.0%	0.0%	83.4%	1.0%	15.6%	9	164	497	485	982	45%	15%	27%	5%	14%	3%	8%	1%
Bavarda	1355.2	2.5%	0.0%	68.9%	6.1%	22.4%	49	142	369	343	712	38%	12%	28%	0%	24%	0%	1%	0%
Par	1786.3	0.0%	0.0%	76.7%	7.3%	16.0%	44	213	594	531	1125	36%	15%	26%	2%	15%	0%	3%	0%
Parsund	1381.6	3.3%	0.0%	64.8%	14.8%	17.0%	32	129	424	361	785	31%	5%	28%	4%	12%	0%	14%	3%
Patanka	3735.7	37.9%	0.0%	31.7%	9.2%	21.2%	48	114	341	302	643	41%	12%	30%	24%	11%	1%	18%	23%
Dhokawada	3642.6	26.2%	0.0%	56.2%	4.4%	13.2%	48	286	805	720	1525	25%	3%	30%	6%	18%	0%	4%	2%
Babra	2953.1	16.3%	0.0%	49.0%	9.9%	24.7%	31	171	551	467	1018	35%	7%	29%	5%	19%	0%	4%	4%
Barara	1254.7	0.0%	0.0%	87.5%	0.0%	12.4%	50	109	325	336	661	25%	5%	32%	0%	29%	0%	1%	0%
Garamdi	2689.5	38.8%	0.0%	34.5%	6.6%	20.0%	71	201	553	505	1058	27%	5%	30%	10%	14%	3%	9%	4%
Vaghpura	309.2	0.0%	0.0%	68.0%	1.1%	30.9%	26	133	354	315	669	34%	6%	29%	0%	12%	0%	11%	0%
Zandala	2217.6	23.9%	0.5%	61.2 %	7.2%	7.4%	20	282	828	749	1577	34%	10%	29%	5%	19%	3%	8%	2%
Zanzarsar	434.7	0.0%	0.0%	74.6 %	14.0%	11.4%	18	116	380	310	690	41%	9%	30%	13%	12%	8%	14%	5%
Gadha	1118.0	0.2%	4.7%	65.7%	29.2%	2.5%	36	218	671	636	1307	39%	6%	29%	1%	16%	0%	7%	1%
Varanosari	1158.5	19.2%	0.0%	52.7%	0.8%	27.3%	47	139	423	396	819	40%	8%	24%	1%	10%	0%	8%	1%
Madhutra	4375.0	12.5%	0.0%	74.9%	2.9%	9.6%	59	524	1346	1119	2465	20%	8%	31%	1%	20%	0%	7%	1%
Ranmalpura	721.0	0.0%	0.0%	83.5%	16.5%		48	120	332	323	655	30%	4%	27%	3%	13%	0%	7%	3%
Piprala	7742.5	54.5%	0.0%	34.1%	3.1%	8.2%	78	356	987	992	1979	14%	3%	18%	2%	10%	0%	7%	2%
Kamalpura	373.9	0.0%	0.0%	92.3%	7.4%	0.2%	23	104	315	292	607	29%	7%	27%	5%	15%	1%	10%	3%
Dhrandva	412.0	0.0%	0.0%	84.1%	12.0%	3.9%	22	78	260	243	503	27%	9%	29%	1%	29%	1%	0%	0%
Abiyana	1265.5	0.0%	0.0%	80.5%	0.2%	19.3%	33	353	948	853	1801	40%	14%	28%	0%	12%	0%	10%	0%

Appendix V Description of Enterprises

SEWA's Approach to Micro-Enterprise Development

Income-generating activities form an important part of SEWA's rural development programmes²⁰. SEWA's approach to micro-scale enterprises development is holistic and market-driven as it is recognised that this is the only basis for sustainability in the long run.

The manner in which the micro-enterprise are set up and supported bears some resemblance to a franchise system. It combines the advantages of local micro-scale production with the advantages of the economics of scale. Problems of micro-scale enterprises are often related to their scale, for example, weak bargaining position, no access to information, no access to training, no access to marketing channels, no quality control, lack of innovation, little or no product development, and so on. SEWA combines and organises the resources of individual women to strengthen their position and to make marketing, quality control, training available.

Organising women and building their capacity are central to each enterprise. SEWA seeks to organise enterprises in such a way that women manage them themselves.

The Studied Enterprises

The five types of enterprises that are subject of this study differ with respect to the complexity of the production process, the required skill levels, and initial investments. They also differ with regard to their dependency on a good water supply. In some cases, there is an indirect relationship between the quality of the water supply and the performance of the enterprise. Gum and crafts do not need water in their production process; a bad water supply, however, means that women lose production time due to the time they have to spend on fetching water. Dairying and plantations, however, need water as an input in their production process.

The Crafts Enterprises

Banaskantha has a rich tradition in craftwork such as embroidery, mirror work, and patchwork. Benefits, however, mostly ended up with middlemen who traded craft products for plastic and steel vessels. SEWA's intervention changed this; currently, women get paid for their efforts and the crafts production has become a self-sustaining business.

SEWA supports local crafts groups through capacity building, quality control, product development, centralised purchase of raw materials, and the marketing of the finished craft products. Partly, this support is canalised through experienced craft workers themselves, who are organised in a 'spearhead team'. This team takes care of the centralised purchase of raw material and the quality control of the finished products.

²⁰ This section is based on the findings of the first phase of the research, unless mentioned differently.

In Banaskantha, women are doing three different types of craftwork: patchwork; Aahir embroidery; and regular embroidery work. Depending on skill requirements, the net rates of return vary between Rs. 1.91 per hour for simple embroidery work, Rs. 5.71 for patchwork and Rs. 8.71 for *Aahir* embroidery (mirror work). The more advanced crafts provide a viable and competitive alternative to regular income generating activities such as agricultural labour, which gives a rate of return of around Rs. 5.00 per hour.²¹

During the drought in 1999, SEWA and BDMSA, supported with a loan from the State Government, provided the women with craftwork as an alternative for the ongoing relief work. In total, relief work was provided to 10,000 women who did not therefore have to travel to the regular government relief sites, which are often located far from the main village. In this manner, women could combine their daily routines, such as fetching water, with income generating activities.

Table 17 : Characteristics of crafts production

Production factors	
Land	Not required
Capital	Simple equipment such as needle and scissors, little investment required, no working capital required.
Labour	Labour intensive, skilled labour with high quality awareness, women spend 4 – 5 hours per day on craftwork
Management	Four layers (group members, group leaders, spearhead team, Banas craft), good co-ordination essential for sustainability
Technology	Traditional technology, not complex
Water	No direct need for water in production but needed for cleanliness in production
Production cycle	Not bound to a particular season, women spend 3.9 hours per day during the monsoon, this goes up to 4.9 and 5.2 hours per day during winter and summer respectively.
Products	Three different types of products: Embroidery, patchwork, or mirror work. Piece rates depend on the required skill level
Support	Spearhead teams play an important role.
Quality control	Done by spearhead teams, high quality absolute must to maintain required volume of sales
Raw materials	Raw materials are purchased centrally to ensure quality and price
Training	Individual members: technical training, quality awareness. Group leaders:; technical training, management and accounting
Sales	Centralised sales via Radhanpur centre and Banascraft, ensured market for group members
Marketing	Marketing by Banascraft with input from spearhead team
Product development	Product development by Banascraft.
Credit	Raw materials on credit by Radhanpur centre
Finances	
Accounting	Individual records on:; received raw material, number of finished pieces, quality of finished pieces, and revenues from sales. Group records on total raw material received, total number of finished products & quality, total revenues.

²¹ Women who do *simple* embroidery work belong the Darbar community. This community does not allow the women to venture outside the house; hence, craftwork is the only option available to them to generate cash income.

The Dairy Co-operatives

Almost all households in Banaskantha own some livestock. A number of households are members of a dairy co-operative and sell their milk to the Banasdairy co-operation. At the time when BDMSA started organising women in separate co-operatives, most existing co-operatives were defunct because of three successive droughts which led Banasdairy virtually to stop collecting milk. Because of BDMSA's efforts, Banasdairy re-started the procurement of milk and reopened a chilling centre in Radhanpur. Recently, a milk powder factory has been opened in Palanpur. The women's dairy co-operatives are currently viable enterprises that have won several awards for best organisation and products. Dairy production strongly depends on the quality of monsoon rains. If the rains fail, fodder has to be purchased and sometimes drinking water becomes scarce. As a result, milk production falls, livestock is sold off or dies, and households leave their village in search of pastures for their cattle.

To mitigate the effects of droughts, fodder farms and fodder banks (stores) have been set up and subsidised fodder is provided. Despite this support, households were spending Rs. 20/- and Rs. 30/- daily on water and fodder in Moti Pipli and Garamdi respectively.

In addition, the drought has a long-term impact on milk production as livestock is lost and the number of lactating cows decrease as a result of a decline in the number of calves born during the drought.

Table 18 : Characteristics of dairy production

Production factors	
Land	For fodder farms and grazing
Capital	Livestock, testing equipment for milk, sometimes computer for administration
Labour	Medium skill level and labour intensity, women spend 4 – 5 hours depending on the season and water situation.
Management	Simple management structure
Technology	Equipment for testing milk quality, measure instrument for milk quantity. Simple technology
Seasonal fluctuations	Milk production decreases towards end of summer due to worsening of water situation.
Water	Dependent on rain for fodder, bathing water and drinking water for animals. Good water needed for cleaning milk vessels. Bad water decreases milk production. In case of drought, drinking water for animals from stand post or bore well. A long-term impact of the drought is that fewer calves are born during drought period consequently fewer cows are lactating in the next year.
Products	
	Milk and young livestock
Support	
Production	Spearhead teams play important role.
Negotiations	Subsidised fodder during droughts
	Revival of procuring routes, reopening chilling centre Radhanpur, opening milk powder factory.
Training	Individual members: technical training, awareness on quality. Group leaders: technical training, management, and accounting
Finances	
Accounting	Records on income and costs of co-operative. Individual records on volume and quality of milk, total revenues, individual income, and purchase subsidised fodder. No accounts on: sales (young) livestock, value fixed assets, purchase of water, and purchase of fodder in open market.

The Plantations and Nurseries

SEWA established a number of DWCRA groups which run nurseries and fruit plantations. Generally, the tree saplings are sold to the Gujarat State Women's Development Corporation (GSWDC) or other government agencies. The yields from the plantation are sold in the open market. Furthermore, women grow fodder and/or vegetables in between the trees. The women are paid Rs. 15/- from a revolving fund for each day they work on the plantation. This fund is maintained with the revenues from the plantation or nursery.

Table 19 : Characteristics of the plantations and nurseries

Production factors	
Land	Often on lease from government, has to be yearly renewed.
Capital	Trees & saplings
Labour	Labour intensive, unskilled, women spend 4 to 5 hours a day fetching water
Management	Simple, little involvement of spearhead team
Technology	N.a.
Season	Harvest period depends on product, no fluctuations in time spent on enterprise.
Water	Reliable supply of large quantities of good water required. Sources: rain, ponds, well, and bore wells. Women have to pay for water from the bore well.
Products	Tree saplings and fruit
Support	Spearhead teams play minor role.
Training	Individual members: technical training Group leaders: technical training, management and accounting
Sales	Centralised sales for nurseries.
Finances	
Accounting	Accounts on individual and group income. No accounts kept on expenditure on water.

The plantation and nurseries need a constant supply of fresh water throughout the year. As a result, women spend sometimes up to 5 hours a day on fetching water, carrying the water over long distances. In some cases, women have to pay for this water as well.

Gum Enterprises

Gum collection is one of the few alternative sources of income after the end of the agricultural season. The women collect the sap from the gum trees and sell the produce. The best gum is collected from October till November, after that, the quality as well as the prices of the gum decrease.

However, to sell gum to the Gujarat State Forest Department Corporation (GSFDC) requires a licence, which can only be obtained with the right influence. Women have been exploited by local middlemen who buy the gum at very low prices and sell it to the GSFDC with a big margin.

BDMSA organised the women and obtained licences for the DWACRA groups to sell the gum directly to the GSFDC. As only the GSFDC can sell the gum in the open market, the women still depend on GSFDC. This organisation sells the gum far below the market price to private traders. The income that the women earn is therefore lower than if they could sell the product in an open market.

Table 20 : Characteristics of the gum enterprises

Production factors	
Land	No land needed
Capital	No investment needed
Labour	Labour intensive, unskilled labour, women spend around 5 hours per day on gum collection during season
Management	Simple structure, three layers (members, leaders, BDSMA/Gram Mahila Haat), spearhead team not very active
Technology	Not applicable
Season	Winter and summer, quality (and price) of gum is best in early winter and goes steadily down during the summer.
Water	Good monsoon increases gum production, water has to be taken into desert, time spent on water collection cannot be spent on gum collection
Products	Gum, 1 kg of gum fetches around Rs. 11/-
Support	
Training	Management and accounting training for group leaders
Sales	Centralised sales by Gram Mahila Haat
Marketing	Marketing by Gram Mahila Haat
Other	Crucial negotiations with GSFDC by BDSMA for license
Finances	
Accounting	Volume and quality of collected gum (group & individual), group and individual revenues, individual income

The net rate of return in the two studied gum enterprises was Rs. 6.10 and Rs. 1.09 per hour in Parsund and Patanka respectively. This difference in the rate of return is caused by the different quality of the natural resource base, which had been more affected by the drought in Patanka. As the net rate of return in Patanka was less than that of other income generating activities, the women opted to do other work, such as government relief work. If SEWA could obtain a license to sell gum on the open market, the hourly rate of return in Parsund would go up to Rs. 13.87.

The Salt Enterprises

Salt farming is a traditional source of income in the Little Ran of Kutch. In this desert area, salty water (known as brine) is extracted from the ground through bore wells or wells and is evaporated in a complex system of salt pans. This process is technically complex and requires a great deal of technical knowledge that is traditionally passed on by and to men.

Working conditions are hard. People live in simple huts in the desert, sometimes for months at a stretch. Basic facilities such as medical care and education are not available and sweet water has to be bought from private water vendors.

As revenue only comes in at the end of the season, a considerable amount of capital is required for the initial investment and working capital. At the beginning of the season, a bore well needs to be drilled, and sometimes a diesel pump has to be purchased. In addition, working capital is needed to operate the diesel pump, pay labourers, and transport the salt. These high capital requirements often push the salt farmers into the hands of large salt traders who provide the necessary capital at high interest rates.

Table 21 : Characteristics of salt production

Production factors	Long production cycle
Land	Land needed, currently much of land is under dispute
Capital	Investment needed for bore well, working capital needed, diesel pump
Labour	Labour intensive, skilled labour, women spend 7 hours a day on their enterprise
Management	Production process requires complex technical management
Technology	Traditional technology, complex production process
Seasonal fluctuations	From November till June, impossible during monsoon, in some cases women migrate seasonally to the desert.
Water	Salt water needed, sweet water for domestic use and bathing has to be brought in from the outside. Not washing leads to (fungal) infections and bleeding wounds.
Products	Salt
Support	Role of spearhead team limited
Training	Technical training for group members, management and accounting training for group members
Sales	Centralised sales by Gram Mahila Haat
Marketing	Marketing by Gram Mahila Haat
Other	Negotiating with government agencies by BDSMA
Credit	Credit provided by DWACRA programme and BDSMA for initial investment and working capital

Appendix VI T-test Tables

Table 22 : Independent sample test for spending of women's own income

(Equal variance assumed)

Independent Samples Test, equal variance assumed									
	Levene's Test for Equality of Variances		test for Equality of Means t-						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Child care/education	0.257	0.620	1.974	14.000	0.068	3.473	1.759	-0.301	7.246
Health care	2.772	0.118	-3.153	14.000	0.007	-5.400	1.713	-9.074	-1.726
Domestic expenses	2.153	0.164	-0.150	14.000	0.883	-0.927	6.168	-14.157	12.302
Social events	0.872	0.366	-0.306	14.000	0.764	-0.764	2.496	-6.116	4.589
Working capital	0.262	0.617	0.307	14.000	0.763	1.200	3.908	-7.181	9.581
Assets	0.002	0.968	1.217	14.000	0.244	3.273	2.690	-2.496	9.042
Water	3.588	0.079	0.846	14.000	0.412	2.764	3.267	-4.244	9.771
Savings	0.041	0.842	1.450	14.000	0.169	1.509	1.041	-0.723	3.741
Debt repayment	0.059	0.811	1.758	14.000	0.101	3.800	2.161	-0.836	8.436
Personal items	8.294	0.012	-2.227	14.000	0.043	-8.836	3.967	-17.345	-0.328

A negative value for *t* means that women in enterprise households spend less money on this category as compared to women in the control villages.

Main findings:

- women in the enterprise households spend significantly less on health care as compared to women in the control villages;
- women in the enterprise households spend significantly less on personal items as compared to women in the control villages.

Table 23 : Independent sample test for women's activities during monsoon

(Equal variance in enterprise villages and control villages assumed)

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
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 activities	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	2.160	0.164	0.661	14.000	0.519	0.273	0.412	-0.612	1.157
Total Personal activities	0.458	0.509	-1.627	14.000	0.126	-1.182	0.726	-2.740	0.376

A positive value for t means that women in enterprise households spend more time on this particular activity as compared to women in the control villages.

The main findings are:

- women in enterprise households spend significantly more time on income generating activities as compared to women in the control villages;
- women in enterprise households spend significantly less time on expenditure saving activities as compared to women in the control villages.

Table 24 : Independent sample test for women's activities during summer

(Equal variance in enterprise villages and control villages assumed)

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Reproductive other	0.424	0.526	-2.027	14.000	0.062	-1.486	0.733	-3.059	0.086
Reproductive water	2.827	0.115	-1.096	14.000	0.292	-0.682	0.622	-2.017	0.653
Total Productive activities	0.025	0.876	1.472	14.000	0.163	1.341	0.911	-0.612	3.294
Income generating	10.337	0.006	2.378	14.000	0.032	2.150	0.904	0.211	4.089
Expenditure saving	1.251	0.282	-1.382	14.000	0.188	-0.809	0.585	-2.064	0.446
Productive water	2.160	0.164	0.661	14.000	0.519	0.318	0.481	-0.714	1.350
Total Personal activities	0.000	0.999	-0.827	14.000	0.422	-0.695	0.841	-2.500	1.109

A negative value for *t* means that women in enterprise households spend less time on this particular activity as compared to women in the control villages.

The main findings are:

- women in enterprise households spend significantly more time on income generating activities as compared to women in control villages.

Table 25 : Independent sample test for women's time-activity profile during summer

(In better and worse water situations, equal variance assumed)

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Reproductive other	1.268	0.279	1.500	14.000	0.156	0.577	0.385	-0.248	1.403
Reproductive water	0.025	0.876	0.070	14.000	0.945	0.045	0.648	-1.345	1.436
Total Productive activities	2.099	0.169	-0.116	14.000	0.909	-0.114	0.978	-2.212	1.984
Income generating	6.362	0.024	-0.941	14.000	0.363	-0.977	1.039	-3.205	1.251
Expenditure saving	1.518	0.238	1.490	14.000	0.158	0.864	0.580	-0.380	2.107
Productive water	2.160	0.164	0.661	14.000	0.519	0.318	0.481	-0.714	1.350
Total Personal activities	0.446	0.515	-0.132	14.000	0.897	-0.114	0.861	-1.960	1.733

A negative value for t means that women in a good water situation spend less time on this particular activity.

The main findings are:

- no significant differences were found between women's time activity profile in better and worse water situations in summer.

Table 26 : Independent sample test for women's time-activity profile during monsoon

(In better and worse water situations, equal variance assumed)

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Reproductive other	525.000	0.000	-1.909	14.000	0.077	-0.455	0.238	-0.965	0.056
Reproductive water	0.592	0.454	0.847	14.000	0.411	0.791	0.934	-1.212	2.794
Total Productive activities	0.670	0.427	1.068	14.000	0.304	0.709	0.664	-0.715	2.133
Income generating	0.765	0.397	0.132	14.000	0.897	0.082	0.621	-1.251	1.415
Expenditure saving	0.432	0.522	-0.671	14.000	0.513	-0.732	1.091	-3.072	1.609
Productive water	0.006	0.940	-1.376	14.000	0.190	-1.950	1.417	-4.990	1.090
Total Personal activities	0.022	0.884	0.934	14.000	0.366	1.218	1.304	-1.579	4.015

A negative value for t means that women in a good water situation spend less time on this particular activity.

The main findings are:

- no significant differences were found between women's time activity profile in better and worse water situations in monsoon.

Table 27 : Independent sample test for the help women get across the seasons

(in enterprise households and control villages under conditions of normal water supply and breakdown of water supply).

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Husband normal summer	0.020	0.891	-0.507	14.000	0.620	-0.459	0.905	-2.401	1.483
Girls normal summer	0.022	0.884	0.432	14.000	0.672	0.714	1.651	-2.828	4.256
Boys normal summer	20.467	0.000	1.458	14.000	0.167	0.950	0.651	-0.447	2.347
Total summer normal	0.031	0.862	0.589	14.000	0.566	1.205	2.047	-3.185	5.594
Husband breakdown summer	2.337	0.149	0.690	14.000	0.501	0.805	1.166	-1.696	3.305
Girls breakdown summer	1.764	0.205	1.694	14.000	0.112	2.486	1.467	-0.661	5.634
Boys breakdown summer	2.448	0.140	0.894	14.000	0.386	0.427	0.478	-0.597	1.452
Total summer breakdown	0.584	0.457	2.513	14.000	0.025	3.718	1.479	0.545	6.891
Husband normal monsoon	0.071	0.794	-0.349	14.000	0.732	-0.173	0.494	-1.233	0.887
Girls normal monsoon	6.489	0.023	1.124	14.000	0.280	1.482	1.319	-1.346	4.310
Boys normal monsoon	4.281	0.058	0.709	14.000	0.490	0.168	0.237	-0.341	0.677
Total monsoon normal	2.587	0.130	0.861	14.000	0.404	1.477	1.717	-2.204	5.159
Husband breakdown monsoon	1.349	0.265	0.519	14.000	0.612	0.323	0.622	-1.011	1.656
Girls breakdown monsoon	6.058	0.027	1.761	14.000	0.100	2.168	1.231	-0.472	4.809
Boys breakdown monsoon	1.053	0.322	0.553	14.000	0.589	0.191	0.345	-0.549	0.931
Total monsoon breakdown	3.934	0.067	1.580	14.000	0.136	2.682	1.697	-0.958	6.321

A negative value for t means that women in enterprise households receive less support than the women in control villages.

The main findings are:

during a breakdown of the water supply in summer, women in enterprise households receive significantly more help from their husbands, daughters and sons together as compared to the women in the control villages.

Appendix VII Chi-square Tests

Table 28 : Chi-square test for the significance of difference in gender relations

(A comparison between women in women's enterprise households and in control villages)

	H	df	Asymp. Sig. (2-sided)
Harmony in family, before	4.3809	1.0000	0.0363
Harmony in family, after	6.0015	1.0000	0.0143
Eating together, before	0.4404	2.0000	0.8024
Eating together, after	0.2148	1.0000	0.6430
Going out alone, before	0.1753	1.0000	0.6754
Going out alone, after	3.4563	1.0000	0.0630
Children going to school, before	5.4087	2.0000	0.0669
Children going to school, after	0.8884	2.0000	0.6414
Women have savings, before	0.6528	2.0000	0.7215
Women have savings, after	27.7594	2.0000	0.0000
Women participate in agricultural decisions, before	7.3569	2.0000	0.0253
Women participate in agricultural decisions, after	0.9865	2.0000	0.6106
Women participate in decisions regarding purchase of cattle, before	4.9758	2.0000	0.0831
Women participate in decisions regarding purchase of cattle, after	3.0856	2.0000	0.2138
Women have own assets in their names, before	6.9748	2.0000	0.0306
Women have own assets in their names, after	8.2706	2.0000	0.0160

The main findings are:

- Harmony in households was in the past significantly better in women's enterprise households than in households in control villages.
- Currently, harmony is significantly better in women's enterprise households than in households in control villages.
- No significant differences for eating with the household, after and before.
- Going out alone before was not significantly different. Currently, it is significantly better in women's enterprise households.
- Children going to school was significantly worse in women's enterprise households before. This difference has currently disappeared. Due to an oversight in the development of the tool, going to school was not differentiated for girls and boys!
- In the past, there was no significant difference in women's savings in the two groups. Currently, significantly more women save in women's enterprise households than in households in control villages.

- In the past, women in women’s enterprise households participated significantly less in agricultural decision making in the household. This difference has now disappeared.
- For decisions about cattle, this situation was the opposite (women had previously participated more in enterprise villages) and this difference has also disappeared. In interpreting this finding, caution is required, however, as before the women started to make an income, the men used to migrate in a period of serious drought, which affected the decision making in the household.
- Both in the past and currently, it is significantly more common for women in enterprise households to have assets than for women in the control villages.

Table 29 : Chi-square test for women’s roles in community water management

(A comparison between women in women’s enterprise households and in control villages)

	Value	df	Asymp. Sig. (2-sided)
Decisions on the investment in traditional water sources	9.221	2.000	0.010
Use of water	0.739	2.000	0.691
Follow after piped water supply breakdown	16.051	2.000	0.000
Decision about construction of traditional water sources	23.599	2.000	0.000
Decision about upgrading of traditional water sources	13.731	2.000	0.001

The main findings are:

Women in women’s enterprise households are significantly more involved in:

- decisions on investment in traditional water sources than women in the control villages;
- the follow up after breakdowns of the piped water supply than women in the control villages;
- decisions on the construction of traditional water sources than women in the control villages;
- decisions on the upgrading of traditional water sources than women in the control villages;
- No significant difference between women in women’s enterprise households and women in control villages was found regarding the use of water.

Table 30 : Chi-square test for the men's opinion on the changes in gender relations

(A comparison between men in women's enterprise households and in control villages)

	Value	df	Asymp. Sig. (2-sided)
Has the position of women in the household changed	6.984	1	0.008
Has the position of women in the society changed	21.788	1	0.000
Has the position of men changed	4.231	1	0.040

The main findings are:

- according to significantly more men in the enterprise villages (as compared to control villages) the position of the women in the household has changed.
- according to significantly more men in the enterprise villages (as compared to control villages) the position of the women in society has changed.
- according to significantly more men in the enterprise villages (as compared to control villages) their own position of in the household and society has changed.

Appendix VIII Management Activities by SEWA Members

Women may spend a considerable amount of time on management activities. In the time-activity profile, SEWA members were asked how much time they spend on SEWA activities such as training, accounting, meetings, and so on. A distinction was made between group members and group leaders.

As the time spent on SEWA management was collected as number of days over a period of three months, the accuracy of the data was lower than the aforementioned time-activity profile.

The main findings were:

- These management roles take a considerable amount of time from the women, thereby further increasing their workload. SEWA leaders spent 7.8 days and 4.8 days per month on these activities during the summer and the monsoon respectively. SEWA members spent considerable less time on these activities.
- The difference between summer and monsoon can be explained by the craft relief work and the fodder banks that were organised by BDMSA during the summer.

Table 31 : Number of days spent on management activities and training

(by SEWA group leaders and SEWA members per month in summer and monsoon

N = 11 villages

	Summer	Monsoon
SEWA leaders	7.8	4.8
SEWA members	2.0	0.9

Appendix IX Loss of Income because of a bad water situation: Additional Findings

Salt Enterprises

The salt enterprises take a special place amongst the studied enterprises as production takes place in the desert far from the villages. Sometimes, women migrate temporarily to the desert, in other cases women commute daily.

The initial layout for the Santalpur Rural Water Supply Scheme (SRWSS) included pipes to supply safe drinking water to the salt enterprises in the desert. These plans were altered at a later stage and, women who stay in the desert have to buy water for drinking and washing from private tankers. Furthermore, women who commute daily lose an entire day's income if they have to spend so much time fetching water for domestic needs that they cannot go to the saltpan that day.

To assess the economic impacts of the inadequate water supply, data were collected on how much money women spent on buying water and on how many days they could not go to work because of a breakdown in the water supply.

The main findings were that a single woman forfeit, on average, an income of Rs. 500/- in the period February till May because of a sub-standard water supply. For the entire salt-season, October till May, this equals to about Rs. 1,000/- or approximately 10% of the women's annual income from salt activities.

Table 32 Amount of income from a bad water situation lost by salt enterprises

Ranmalpura		February	March	April	May	Total season
	Forgone income due bad water situation	274	229	0	0	504
	Costs of buying water	0	0	0	0	0
	Total	274	229	0	0	504
Madhutra	Forgone income due bad water situation	129	160	0	0	289
	Costs of buying water	129	71	4	0	204
	Total	257	231	4	0	492

Relief Work

During droughts, such as during the summer of 2000, the government provides drought relief work in the affected areas. Through this, households generate a supplementary income of Rs. 40/- a day per person which mitigates part of the impacts of the drought. This wage, however, will be paid only if someone is present at the relief site for the entire day. Mostly, the relief work consists of doing earthworks at sites at considerable distances from the villages.

As a result of a breakdown in the water supply, women are sometimes not able to go to the relief site, and subsequently lose their entire daily earnings. Data show that 56 women lost, on average, Rs. 192 as a result of a breakdown of the water supply during the last drought.

Appendix X Case Study : Production of Micro Concrete Roofing Tiles

This research argues that given an improved water supply, economic opportunities, and an enabling environment, women are able to make a substantial, sometimes even critical contribution, to the household income. This case study on the production of micro concrete (MCR) tiles gives an illustration of this.

Micro Concrete Roofing (MCR) tiles

Micro Concrete Roofing technology was developed in the 1970s to provide an environment friendly and cost-effective alternative for existing roofing materials that could be produced on a micro-scale. MCR-technology is in a mature stage, and experience has shown that it offers a reliable roofing material that can compete with the conventional roofing materials. The competitive advantages of MCR technology are becoming increasingly important since conventional materials like thatch, wood, and fired clay tiles are becoming more expensive and scarcer.

Raw materials for MCR-tiles (sand, aggregate, cement, and water) are widely available. After vibrating this mix on a vibrating table for approximately one minute, the cement slab is placed in a specially designed mould. After 24 hours air tight curing, the tile is placed in a curing tank for 7 days and 21 more days in the open air. This curing process and the specially designed mould make any kind of reinforcement unnecessary. MCR tiles are strong enough to bear a load of 80 kilograms (for technical detail refer to Table 33).

MCR-tiles can be produced almost everywhere by a micro-scale production unit that employs 4 to 5 people. One unit can produce up to 60,000 tiles annually. In addition, 4 to 5 people can be employed for the construction of the roofs and the laying of the tiles.

Table 33 : Technical details and quality standards of MCR-tiles

Technical details and quality standards	
Clear length	488 mm
Length after overlap	400 mm
Clear width	240 mm
With after overlap	200 mm
Thickness	8 mm or 10 mm
Weight (8 mm)	2,25 kg
Traverse bending strength	More than 50 kg for 8 mm, 80 kg for 10 mm
Understructure	Steel or wood
Expected life span	Approximately 50 years
Permeability	Undersize of tile free from water drip. Signs of dampness not more than 50% of total area exposed to water.
Water absorption	Average percentage of water absorption after soaking tiles for 24 hours should be less than 10%
Surface finish	The tiles shall be smooth in finish and be free from visible defects or pores greater than 2 mm in diameter.

The Market Potential for MCR-tiles in Banaskantha

In 1997, a market assessment was carried out in Ahmedabad and Kheda district to assess the market potential of MCR-tiles. The assessment showed that MCR-tiles would offer a viable and acceptable alternative to existing roofing materials such as Mangalore tiles, country tiles, and asbestos sheets.

As the prices in the Banaskantha district of traditional roofing materials, mostly Mangalore tiles, are higher as compared to Ahmedabad and Kheda district, it is likely that there will be a market for MCR-tiles in Banaskantha. However, MCR-technology needs to overcome the conservatism that is prevalent in the building sector. Therefore, a strategic marketing approach is needed. Furthermore, the production and sales system should ensure timely delivery and continuous, high quality.

Required Inputs

To start the production of MCR-tiles by poor women in Banaskantha, the following requirements are needed:

- A continuous supply of sweet water and electricity. Water is required for the production and curing of MCR-tiles. Electricity is needed for the vibrating table;
- Women should have control over time and income to be able to spend time on the production of MCR-tiles and to have an incentive to generate income;
- For each production unit, 4 to 5 women need to be trained for the production of the tiles. In addition, 4 to 5 women should be trained in the construction of roofs and the laying of the tiles;
- The women need to be given access to credit to meet the initial investments and working capital requirements. The estimated capital requirements are Rs. 170,000;
- To overcome the disadvantages of the micro-scale of the production units, a centralised quality control system, marketing, and sales structure need to be established.

Expected Outputs

Micro-scale production of MCR-tiles by poor women in Banaskantha has several potential benefits:

- Employment is created for four women per production unit. In addition, five more women are able to generate income of Rs. 50/- each through the construction of roofs. They will also share in the net-profit, which is estimated to be Rs. 109,000 a year;

- The production of MCR-tiles is not bound to a particular season; hence, an alternative source of income will become available whenever other income sources fail;
- The women's contribution to the household income can be expected to have a positive influence on gender relations;
- As MCR-tiles do not need to be baked, fuel will be saved. This will have a positive impact on the natural environment, especially with respect to the reduction of CO₂-emission;
- As MCR-tiles do not need clay, the fertile topsoil will be saved. This will have a positive impact on the natural resource base.

Table 34 : Profit and loss statements for the micro-scale production of MCR-tiles

Profit and Loss Statement							
	Expected inflation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income							
Gross Sales of tiles		247,500	294,525	363,825	382,016	401,117	421,173
Breakage/Spoilage	5%	12,375	14,726	18,191	19,101	20,056	21,059
Net Sales of tiles		235,125	279,799	345,634	362,915	381,061	400,114
Expenditure							
Raw materials	5%	87,120	103,673	128,066	134,470	141,193	148,253
Labour costs	5%	60,000	63,000	66,150	69,458	72,930	76,577
Variable costs (marketing etc.)	5%	20,814	23,588	27,496	28,870	30,314	31,830
Fixed assets (rent of buildings)	5%	5,000	5,250	5,513	5,788	6,078	6,381
Growth working capital			5,184	7,776			
Depreciation		8,329	8,329	8,329	8,329	8,329	8,329
Financial costs		47,361	47,361	47,361	47,361	47,361	
Total expenditure		228,624	256,384	290,690	294,275	306,205	271,370
Profit before Tax		6,501	23,415	54,944	68,640	74,856	128,745
Tax		975	3,512	8,242	10,296	11,228	19,312
Net profit		5,526	19,903	46,702	58,344	63,628	109,433
Pre-Tax profit Ratio							
		3%	8%	16%	19%	20%	32%
Return on investment							
		3%	12%	27%	34%	37%	64%
Break Even Analysis							
		69%	64%	59%	57%	55%	27%
Contribution per tile							
		1.96	2.22	2.52	2.65	2.78	2.92
Assumptions							
Tax rate		15 %					
Price of tiles		Rs. 5.50					