

TRANSFORMING WATER INTO MONEY

**An Assessment of Gender Specific Impacts from Improved Water Supply in
Banaskantha District, Gujarat, India**



Draft Research Report

Delft

May 2001

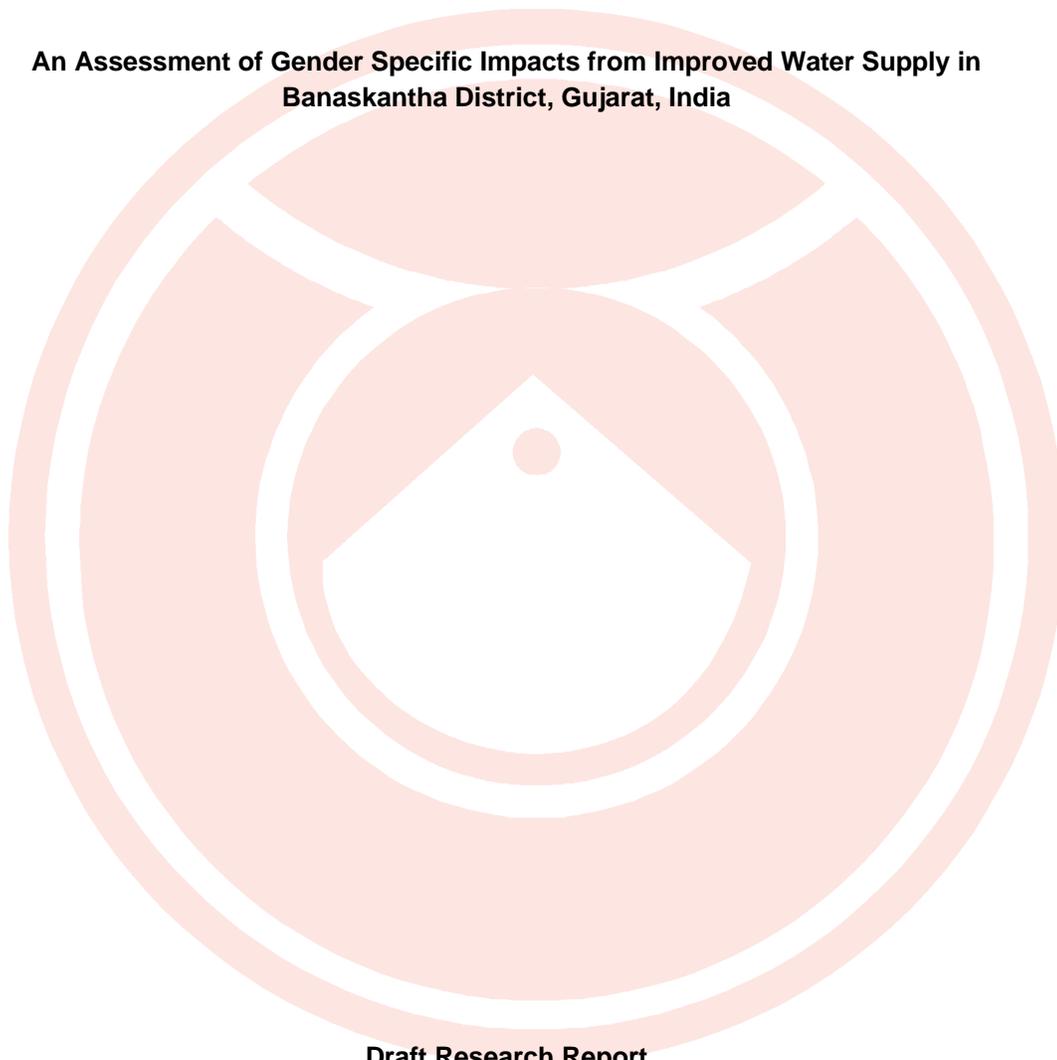
Ahmedabad

**IRC International Water and
Sanitation Centre & Partners**

**Foundation of Public Interest (FPI)
Self Employed Women's Association (SEWA)**

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Acknowledgements

This report has been made possible through the contribution of a large group of people and institutions; hence, it should be seen as the consolidation of a team effort.

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The study was the initiative of Ms. Reema Nanavaty (SEWA) and Ms. Christine van Wijk (IRC) and followed the addition of a women's income generation project to the establishment of the Santalpur Rural Water Supply Scheme, both financed by the Dutch bilateral development cooperation.

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Mr. Joep Verhagen (HabiCom International), together with Ms. Jennifer Francis, trained the field team. He was central in the organisation of the fieldwork, the analysis of the data and the writing of the report.

Dr. A.J. James, Environmental & Natural Resource Economist and Ms. van Wijk were instrumental in the data analysis and report writing, on the economic and gender data, respectively.

The team expresses its profound gratitude to the women and men of Banaskantha who gave their precious time and showed what can be achieved with hard work and perseverance. It is our hope that this report will make a contribution to the ongoing programmes in the district. We would like to use this opportunity to express our sympathy with the people who suffered during the recent earthquake and the ongoing drought and we hope that their courage helps them through this crisis.

Executive Summary

Introduction

The conventional aims of domestic water supply projects are improved welfare and public health. However, having more water close to the home also has the potential of significant *economic* benefits. This is particularly so in (semi)arid areas, where women spend long hours in collecting drinking water and lack other water sources for productive use, such as dairying, crafts, horticulture, etc. Women seldom have a chance to influence the design and operation of water projects for their productive use of water and time. This pilot research has assessed in the field, and with the women and men concerned, the relevance of these uses, their impact 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 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 apply participatory learning tools and strengthen the capacities of the implementing organisations, including the women's enterprises themselves, for participatory research.

The longer-term objective was to see if, 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.

Implementation

The study was carried out 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 from June 1999 to April 2001. 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 5 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 found 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 like improving health, hygiene, and sanitation, but can also yield *economic* returns. Conditions are:

- the water supply provides the timesavings and quantity and reliability of water required for economic use;
- the water project is linked with a micro-enterprise programme that provides the right enabling conditions, such as organisation and training of women, market research, marketing, quality control, and micro-credit facilities;

The research showed that breakdowns of the water supply make SEWA members lose an average of *Rs. 50 per person per month* in earnings. Extrapolated, inadequate operation and maintenance constitutes a loss of Rs. 2 million for 40,000 women. Actual losses are higher because the income data included a period of extreme drought during which especially income from dairying, plantations and agriculture has been virtually non-existent. In addition, in summer, each of them loses, on average, *seven hours per month*, time that they would spend otherwise on reproductive and/or personal activities.

An improvement of the water supply, to the extent that women spend one hour per day on collecting water, will result in an *improvement of their annual income* with upper boundaries of between *Rs. 750 and Rs. 5520*, depending on type of enterprise and local conditions. Alternatively, each woman may gain between 45 and 152 eight-hour days annually.

Women in Banaskantha already pay for water, but now only when they are short of this essential community. However, they have *no influence on its distribution*. 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 also pay for the water as a normal procedure.

Policy-wise, there is a strong need for an *integrated, holistic approach* to rural development, which is in contrast to the *sectoral approach* that is currently adopted by the Central and State Government. CBOs, NGOs, and other institutions with experience in improving water supply and supporting micro-enterprise development have to be involved in the reformulation of current policies. These institutions should also be used as *pathfinders in pilot exercises* before scaling up holistic rural development to a larger scale.

Gender Relations

Overall, and in all study villages, gender relations have changed in favour of women during 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, reflecting

the impact of the work of SEWA and BDMSA (the association of Banaskantha's women DWCRA groups).

During a breakdown of the water supply in summer, women, who are members of an enterprise, receive 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, decide for 10% of the SEWA women how they must spend their time and/or own income from enterprise work.

SEWA and BDMSA should therefore make the *gender relations between women* also a topic in gender discussions. The time spending tool proved to be a valuable aid for comparing activities and time spending of the various household members and its use should be continued in a wider sense than on water collection alone and be used with mothers and fathers to bring out gender differences in the division of work.

The research showed that a combination of an *anti-poverty* and *women's empowerment* strategy for rural development also 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);
- *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 men in the study villages 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 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.

Gender programmes should start addressing women's immediate gender needs and link these with the improvement of gender equality between, but also *among* the sexes i.e., for women of different *ages and positions* in the family.

Poverty Alleviation

From the findings, it became clear that women provide income to the family *in four 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 production is a valuable source of income for poor families and a means for women to meet their practical and strategic gender needs.

Conditions are:

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

Unfortunately, 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 semi-arid 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 further that women who earn income through the productive use of timesavings and 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 for and education of 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 may be the result of health education and health care as part of the micro-enterprise projects, but this has not been investigated.

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

As the total amount of water in semi-arid areas is limited, poverty alleviation policies should furthermore try to *unlink water and poverty* by providing income-generating opportunities that do not, or less, depend 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 found also that money spent on *drought relief work* in the form of craftwork can be economically viable. The policy implications are that SEWA, or other institutions, should provide craftwork *at times when other economic opportunities are at their lowest*.

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 and physically demanding and has lower returns. Part of the government drought relief funds should therefore be spent on providing *craftwork for poor women, provided* this can be done based on and adjusted to real market demands and with an efficient plan for managing and marketing their output. Institutions experienced in organising such relief work should be involved in the policy reformulation exercise.

Capacity Building

The research has built the capacity of all involved organisations, especially in the field of 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 spending related to 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 remained the co-owners of their own data and obtained a better insight in their conditions and 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 between SEWA and non-SEWA households. The design and implementation of a participatory action research study is therefore 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.

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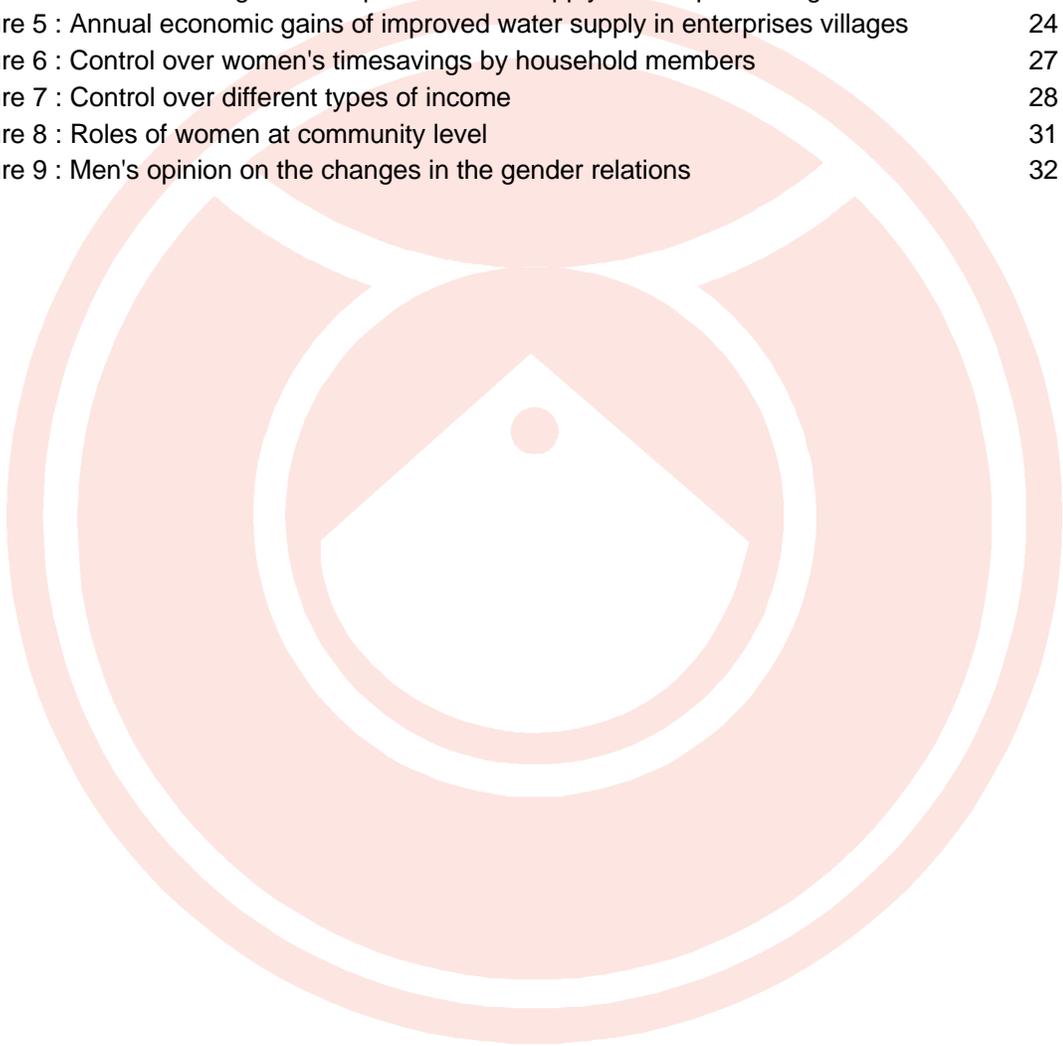
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Glossary	
BDMSA	Banaskantha DWCRA Mahila SEWA Association
CBO	Community Based Organisation
Cre	Ten million; Rupees 1 Cre is about US\$ 220,000
DMI	Disaster Mitigation Institute
DWCRA	Development for Women and Children in Rural Areas
FPI	Foundation 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

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1 Background

1.1 The Problem in its Context

Time Spent by Rural Women

Rural women all over the world spend a large part of their daily time on transporting water, fodder, and fuel wood, especially in semi-arid developing areas. In studies in Africa, it has been estimated that the time spent on transporting by a typical woman ranges from 1 to 4 hours per day (Barwell, 1993). In a study in Ghana and in comparison with men, men were found to spend only 35% of their time and 25% of their energy in load carrying. Reducing such transport loads can be an important condition for freeing women to use their time and energy for other existing productive activities as well as undertaking new enterprises. A World Bank Discussion Paper finds 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 reallocate time saved by improved transporting systems.

Using Timesavings from Water Collection for Productive Uses

One of the major transporting activities undertaken by women is carrying water. Reducing the time spent on water collection could mean more time for income generating activities, food production, childcare, nutrition, hygiene and health, a greater participation of women and girls in education and a better quality of labour. Improving water supply conditions to cut down the time women spend collecting water could, hence, unlock the productive potential of women’s time and energy.

The Self-Employed Women’s Association (SEWA), a labour union of poor self-employed women, which is based in Ahmedabad, India, adopted this approach, but realised it was insufficient on its own. 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 and reviving the existing water supply and also helped poor women organize, build their capacity and start and run micro-enterprises. Its aims were not only to help its 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 the share of water in the value of the output produced by water. 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, or 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 timesaving that result from an improved domestic water supply, provided the opportunities for additional income generation exist.

1.2 The Present Study

Objectives

The present study has three equally important 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 in the data collection as well as the analysis and build capacity within all implementing organisations, including the women's enterprises themselves, for participatory research on water, production, economic development, and gender relations.

The longer-term objective was to see if, 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 that seeks to quantify the economic impacts of improved water supply based on field-level data on women's enterprises in India. The only other study 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 difference between this earlier research and the present study is the latter's focus on women's micro-enterprises, the use of participatory tools in data collection and the linkage of economic uses of water and time with gender relations.

Study Questions

The specific questions addressed by the pilot research are:

- 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 Centre² and the Self-Employed Women's Association (SEWA)³. It was funded by the Swedish International Development Authority (Sida). Its implementation was a joint project of SEWA, the Foundation of Public Interest (FPI)⁴ 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. FPI and SEWA, with extensive hands-on experience in the research area, were able to channel IRC's expertise in the required local context. IRC further involved two consultants based in India, Joep Verhagen (MSc.) of HabiCom International⁵ and Dr. A. J. James⁶ to co-ordinate the fieldwork and data collection and analysis, and to work on the economic aspects of the research, respectively.

² 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.

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.

⁴ 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.

⁵ HabiCom International is an India-based consultant for water and enterprise-related research and development projects. It is located in New Delhi, India.

⁶ Dr. James is an environmental and natural resource economist who works as an independent consultant. He is based in New Delhi.

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 from July 1999 to February 2000 and a detailed data collection and analysis phase from February 2000 to April 2001 (Please refer to Appendix I for the detailed research itinerary).

1.3 The Study Region: Banaskantha in Gujarat, India

Although a high achiever in terms of overall per capita income⁷, the economic future of the state of Gujarat in western India is threatened by an ever-growing water shortage. In 1999, a large part of Gujarat suffered from the worst drought in 50 years. Droughts, however, occur every three years on average. The poorer parts of the population are usually the hardest hit, with frequent droughts eroding any interim livelihood gains and keeping them in a poverty trap.

Banaskantha district⁸ (see Figure 1) is one of the hardest hit districts in this respect and continues to be one of the most backward districts of Gujarat. For further information on Banaskantha, reference is made to Appendix II.



Figure 1 : Banaskantha District in Gujarat

⁷ 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).

⁸ Although a new district of Patan has recently been carved out of Banaskantha 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 (2,162,578 persons in 1991) live in villages. Many of them 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 population of Banaskantha is literate. This is especially 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 breakdown for women and men could be found).

Agriculture and dairy production are the economic backbone 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, livelihoods of the poor 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 groundwater table. The over-extraction makes the water become saline in a growing number of tubewells and is causing a rise in nitrate and fluoride levels.

The drought of last year has illustrated how dependent semi-arid 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 severest impact was 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 had failed. The indirect link between the shortage of water and income is the time that women spend to collect water (DMI and Verhagen, 2000).

1.4 SEWA and BDMSA in Banaskantha

Banaskantha DWCRA Mahila SEWA Association (BDMSA)

SEWA's activities in Banaskantha got a major thrust in 1987, after they were invited by the Royal Netherlands Embassy (RNE) to initiate a programme that would more directly target the needs of the rural poor than the original piped water scheme. The scheme was being implemented by the Gujarat government as part of the Dutch bilateral development programme in India. It was to provide a piped water supply to more than 100 villages.

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. It 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.

The programme uses 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:
 - entails the sharing and rotation of responsibilities;
 - encourages participatory and democratic functioning;
 - develops trust, sharing and openness;
 - stimulates development of each *aagewan* (organiser) and their group/team; and
 - encourages the development of a new generations of leaders, especially from within the self employed women workers themselves.

Organising women is carried out at several levels for mainstreaming and visibility of the self-employed women through organised networks like WIEGO, HOMENET, STREETNET, IUF, etc.

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

At the higher level, SEWA facilitates policy-level interventions through women's representation in committees and boards at district, state, national and international levels for drawing attention on micro-level needs of the poor women.

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. BDMSA's programmes are a combination of four elements: organising women for collective strength, capacity building, asset building, and social security.

Coverage

BDMSA works extensively in Santalpur and Radhanpur blocks of Banaskantha district. In Santalpur, where 100% of the population (of 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. To give some idea of the scarcity of water in the district, note that less than 0.5% of the cultivable land in Santalpur is irrigated. In Radhanpur block, irrigation covers 5% of the arable land available.

DWCRA Groups and Income-Generating Activities

BDMSA organises the implementation of a large portfolio of activities, of which the Development of Women And Children in Rural Areas (DWCRA) programme has been an important instrument to target poor rural women. The DWCRA scheme gave loans to groups of rural women to start their own income generating activities. Till 1999, 62 DWCRA groups and 160 savings-and-credit groups have 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.

For further information regarding SEWA and its work in Banaskantha, please refer to Appendix III.

www.sewa.org
www.sewaresearch.org

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.

2 Conceptual Framework and Research Methodology

2.1 The Impacts of Improved Domestic Water Supply

Conventional Water Supply Projects: General Social Welfare

Conventional water supply projects, both private and government provided, aim at simply providing drinking water in water scarce areas. These projects are expected to increase only general social welfare, not generate specific benefits. Project design is therefore concerned almost exclusively with the technical feasibility for an investment with no economic returns or benefits.

Modern Water Supply Projects: Impacts on Women's Social Welfare

In a newer generation of water supply projects, such as the Santalpur scheme in Banaskantha, it has been recognised that as domestic managers, women are centrally involved in water collection and use. Instead of being just general 'social investments', water supply projects were therefore justified by their potential impact on 'women's welfare issues', such as relieving women's drudgery and giving them more time and water for domestic uses.

It was expected that women would use these gains to improve personal and domestic hygiene and spend more time on cooking, childcare, and other domestic work. The benefits from this work would benefit the welfare and health status of the whole family.

These benefits were, however, expected to occur somehow once the basic technical infrastructure (i.e., pipes, taps and pumps) has been provided. No explicit and simultaneous provision was made to give women a say in the planning and design of the system and the operation of the scheme to ensure that the supply would actually meet their requirements. Inputs to improve health and hygiene have remained limited to the provision of health education for women only. How men, and gender relations between women and men, affect the realisation of these welfare benefits is not questioned in the welfare approach

Economic Benefits of Water Supply

As women are seen as mainly domestic managers, the economic use of water and time gains by women and the benefits of such uses – to individuals or to society as a whole – have played no role in these social investments. Yet research by Rogers (1980), Kabber (1994), Young (1993) and many others has shown that women have triple roles: domestic managers, economic producers and social service managers. An easier access to water for basic domestic needs might therefore provide women with more time and water for all three gender roles: domestic, economic and managerial.

2.2 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 given in Figure 2. The upper half of the model depicts the usual benefits expected from an improved water supply: women's relief from drudgery and more time for their reproductive (domestic) tasks and for their own personal uses.

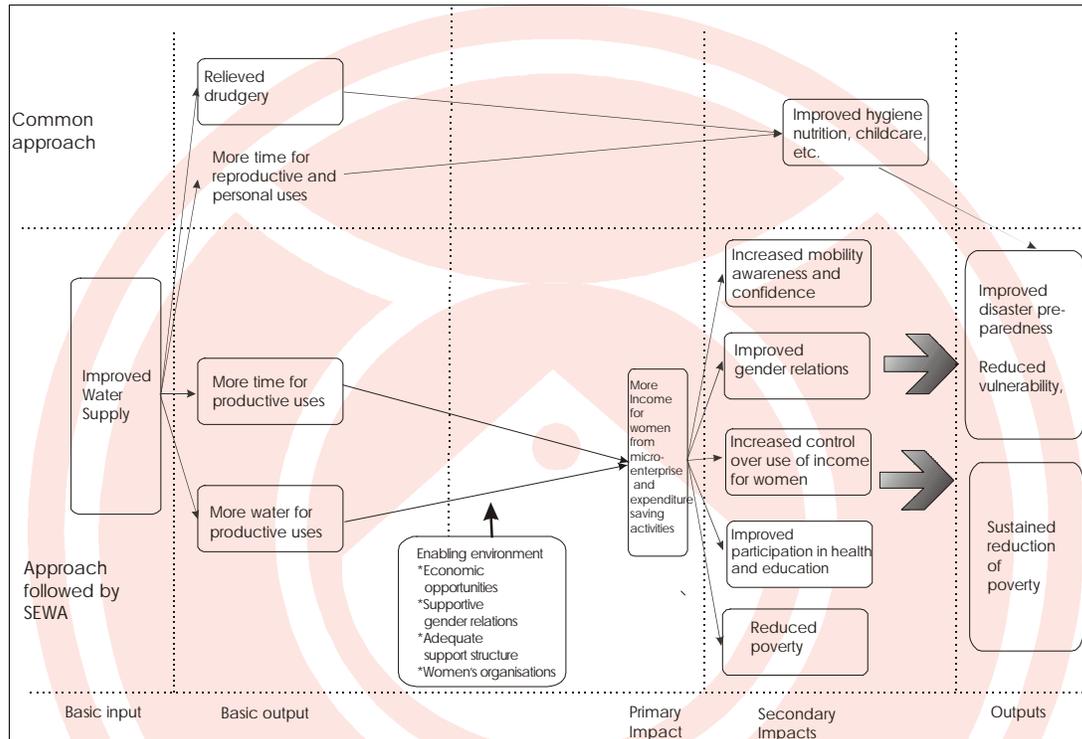


Figure 2 : Conceptual model of the study

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

The resulting primary impact, more income, is the conversion of part of the timesavings and access to water into earnings. This economic independence may in turn bring secondary benefits. Investigated here is what impacts women's income and their organisation have on women's position and gender relations, within the household and community in the context of the overall reduction of poverty. Areas of specific attention are women's 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 and water and for security against risks.

In assessing the effectiveness of BDMSA's gender strategy, a comparison is made between the situation in the enterprise households and of women in other, comparable households. In addition, a comparison is made between the present gender relations and the gender relations prevalent 10 years ago.

The conceptual framework of the study further adds the, what is here called 'enabling environment that SEWA provides to its women members as described in section 1.4.

In assessing gender, 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 themselves, their husbands, and children. The approach assumes that when women's economic position changes, gender relations will improve automatically.
3. **The gender equity approach:** stresses that 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 any form of inequity amongst 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:

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

The third and fourth pre-requisite mean that, unless women are able to use their timesavings in 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 get training and engage in economic activities, freeing time alone will not yield economic benefits. In addition, an enabling economic environment needs to be created 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 is created by SEWA through product development, quality control, marketing, capacity building, and so on.

A complication is that, also 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 a concern at the moment.

2.3 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, the above is especially true. Given the limited time and resources, a complete survey with appropriate sample sizes and with in-depth discussions in selected villages was not possible. Instead, detailed case studies were made, using both outside assessments (for the economic data) and participatory methods (for the water and gender and part of the enterprise data).

Design of the Study

The pilot research had originally been planned as comparative case studies of five pairs of women’s micro-enterprises: crafts, milk production, salt production, gum collection, and tree plantations. The cases would be comparable in general socio-economic conditions as based on their 1991 census data (Appendix IV) and each group would have comparable levels of training, commitment, leadership, access to markets, etc. However, one enterprise would operate in a better and the other a worse water situation. 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.

Table 1 gives an overview of the original study design. The study would compare the economic performance of each pair of enterprises with a ‘better’ and a ‘worse’ water supply situation, and in two time periods - summer (when water supply worsens) and the monsoon (when water situation improves). The number of enterprises was later raised to eleven in each group for several reasons:

- One of the craft enterprises, Par was a special case because it is 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 enterprises, in contrast to earlier assessment, was functioning poorly. Hence, this enterprise was added to the selected list of poorly functioning enterprises and a new, well functioning enterprise was selected.

Assumptions were that productivity would be higher under a better water situation, but that even in a worse water situation, the women might make an extra income from enterprise work that other women would not. It was further assumed that gender relations in women’s enterprise households would show significant differences from those in the households in the control villages. Interviews with women leaders in ten other, weaker enterprises would be held to assess which role, in their experience, the water supply played in the under par performance of their enterprises.

Table 1 : Initial list of selected villages

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

Because no systematic data were available at the beginning of the research, the water supply situation and the nature of the enterprise had to be defined and then used to make a preliminary selection of the cases that would be studied.

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 performs relatively well according to the BDSMA staff with respect to productivity, quality of the products, income, and leadership.

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 22 enterprise villages. They also chose five control villages.

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 concerned and the village selection was changed where necessary.

The exploratory phase revealed that it would be hard to control for the many factors influencing the performance of the enterprises. Moreover, the most serious drought in 50 years and external interventions from emergency water projects and relief work had changed the conditions of the study.

The research therefore became a series of sixteen independent case studies, eleven micro-enterprises in nine villages and five with women in control villages (Table 2). In the remaining villages, interviews with women enterprise leaders took place as planned.

Within each village, participatory tools were used with a group of seven women members. Because of the relatively small size of the enterprises, 10 to 15 women on average, and the need to repeat the same activities with the same groups, focus groups were not formed through random sampling, but through discussions with the group leaders.

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 Kamalpura Sherpura Manpura
Gum:	Parsund Patanka	Gum	Dhokawada Varanosari	
Plantation:	Zanzarsar Zandala	Plantation:	Sarkarpura Gadha	
Dairy:	Moti Pipli Garamdi	Dairy:	Kolapur Vaghpura	
Salt:	Madhutra Ranmalpura	Salt:	Garamdi Piprala	

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 differences in economic performance and gender relations might not be explained by these factors (refer Appendix IV). Secondary data (the records of the enterprises) were further used to determine the locally specific value of timegains.

Wherever possible, the research was carried out with the active involvement of the women. Representatives of women enterprise members 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 for the collection of data from the census and the enterprise accounts. There were a number of reasons to design and use participatory tools:

- The design and use enhanced the 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 the tools made it possible for all to contribute their knowledge with regard to content issues as well as feasibility of use;
- The tools make all participants learners and owners of the knowledge, not just the external researchers;

- Participatory tools and methods recognize local women and men as actors and modellers of their own environment and not just respondents in an extractive study that serves only the purpose of organisations and individuals outside the community;
- The tools and methods can be used with literate as well as non- and semi-literate women and men, so even the most marginal can participate. At the same time, they offer women who have acquired numerical literacy the opportunity to practice and demonstrate their new skills. This applies also to younger women in a culture where they are usually expected to remain in the background when older women are present;
- They stimulated everyone's creativity and pleasure in and commitment to the study;
- Local workers, women, and men can continue using the methods and tools for other purposes. The efficiency and effectiveness of the tools therefore go beyond a one-time survey.

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

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 timegains 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	Participative tools were developed for individual types of enterprises to discuss enterprise-related issues such as: costs of fodder, number of cows (both dairy), distance to 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.

The participatory 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.

Table 3 gives an overview of the methods and tools that have been used in the study.

Planning and Organisation of the Fieldwork

Two mixed teams would visit one village a day, at a time that was most suitable for the women. Since they did not have any work in agriculture because of the ongoing drought, women could spend up to 3 hours a day with the team. Table 4 shows the schedule of information collection in summer (April-June) and during the monsoon (August-September). In all cases, women were asked to refer to the present situation. A mid-term review checked whether there were any gaps in the data collected so far, and whether it was necessary to develop new tools to fill these gaps.

Table 4 : Schedule of information collection

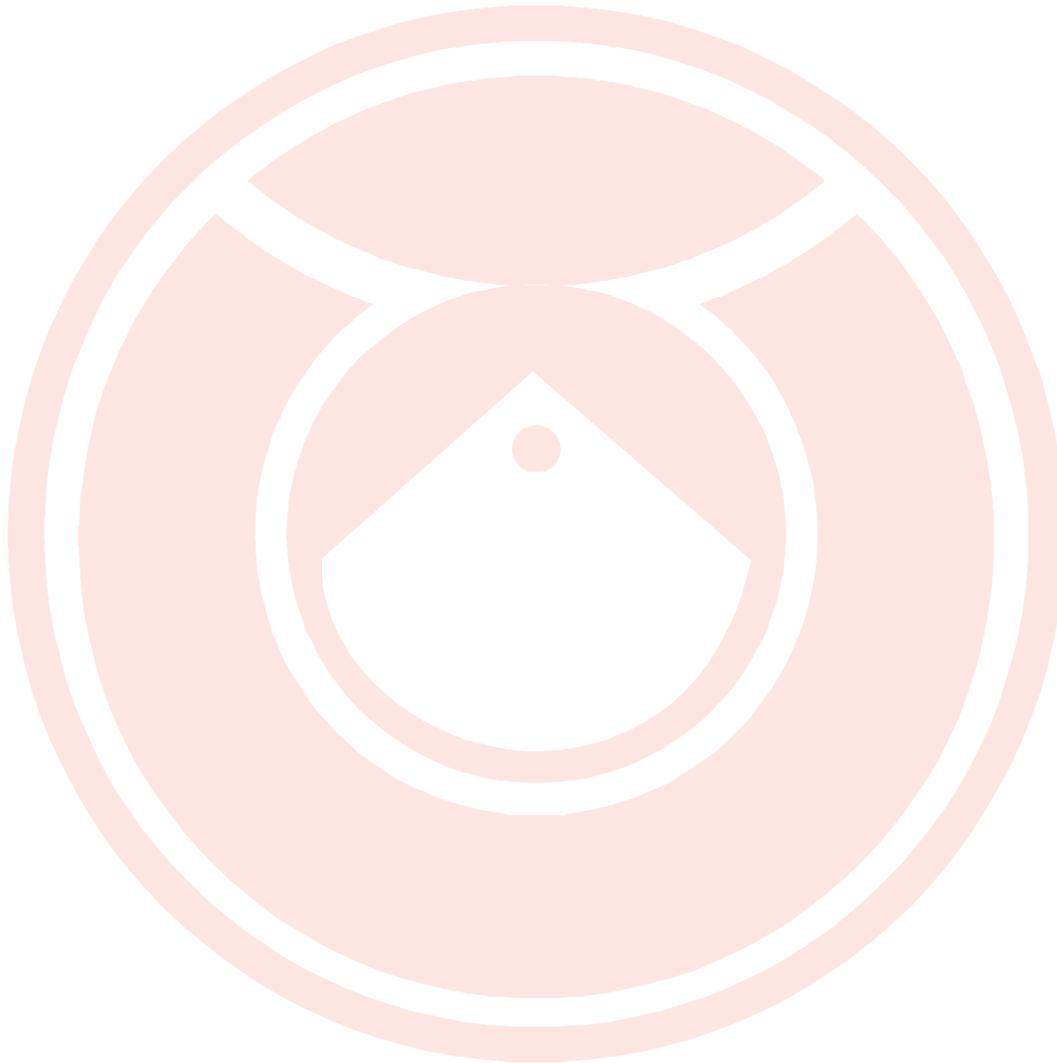
Period	Phase	Type of activities
Preparation	Design workshop	Design of research tools
April – June	Data collection	Gender tools Time/activity profile summer Typical household profile Enterprise tools Accounts analysis
July	Mid-term review	Review of research tools
August – September	Data collection	Time/activity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

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 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 has not been considered as less than 5% of the cultivatable land is irrigated and 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 introduce a bias, this information is basic to the study.
- Information was collected during consecutive drought years, when especially plantations, dairying, and agriculture suffered. The reduced income from these water-related enterprises will be reflected in the loss of income during the time of

breakdown, which would have been higher when the women had had enough water to sustain their enterprises.

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



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3 Findings

3.1 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 households of SEWA members 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 have been distinguished.

1. **Reproductive activities** include childcare, cooking, cleaning, household work, etc. It should be noted that though livestock is seen as part of the household, livestock related activities are 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.
2. **Productive activities** include 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 is a separate sub-category.
3. **Personal activities** such as social activities, sleeping, and so on.
4. **Management activities** in the communities; this category also includes SEWA related activities such as training, meetings, accounting, etc.⁹

On the first three types of activities, data have been collected as a part of a day of 24 hours. Data on management activities have been collected on the basis of a three-month period.

The data was compared for the two types of households for summer and monsoon and for a better and worse water situation.

Main findings are:

- Women in both enterprise households and households in control villages have a working day of 15 to 16 hours throughout the year. On average, women spend **3 hours a day** on fetching water only.
- To this should be added the average time contributed to water collection by other household members: daughters 83, sons 12, and husbands 15 minutes. This brings the total average time spent on water collection by the households in the study to almost 5 hours a day. The still high time in water collection occurs in a situation where, **on paper**, all households have year round access to a piped domestic water

⁹ For more detailed information please refer Appendix VIII

supply meant to reduce the drudgery of water collection and improve health and hygiene.

- Contrary to the normally observed patterns, women 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 differ significantly with respect to time the women spent on income generating activities. During the monsoon as well as 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.

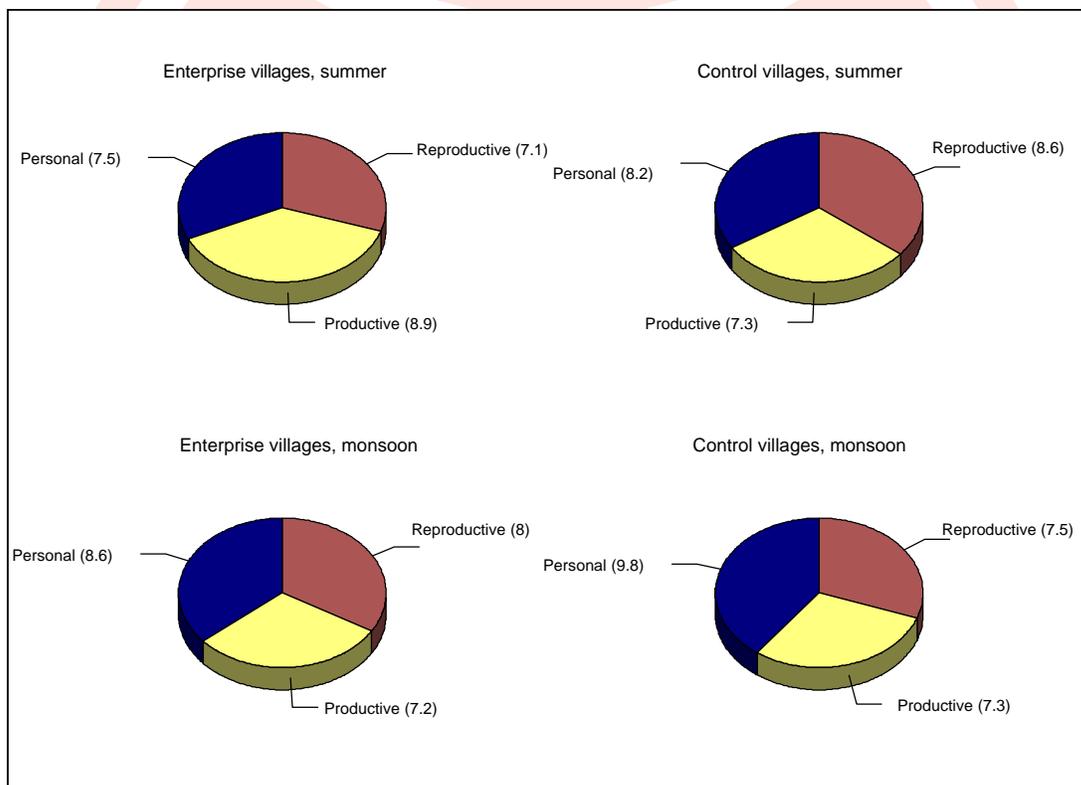


Figure 3 : Women's activities during summer and monsoon in enterprise households and households in control villages (11 enterprise villages, N = 77 women and 5 control villages, N = 35 women)

- Women in the control villages spent significantly more time on **expenditure saving** activities during the monsoon. (For more detailed tables on the time/activity profiles, including tests on significance of differences please refer to Appendix VI) In addition, they spent significantly more time on reproductive activities during summer.

Table 5 : Women's detailed activity profile during summer and monsoon in enterprise villages and control villages

		Summer		Monsoon	
Type of Activity		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 on fetching water than women in villages with a worse water supply. (Table 6, For more detailed tables on the time/activity profiles, including tests on significance of differences please refer to Appendix VI)

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

			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

The differences in water situations may, however, not have been large enough to significantly influence water collection time. The present study used qualitative ratings so the scope of the actual differences is not known. It is further possible that the particular economic status of the household results in different time allocation to domestic tasks, including water collection, and personal activities. Other factors, such as the decision to use the better water situation to collect more water rather than reduce collection time, may also play a role. This would be a point for further study.

3.2 Assistance from other 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 the time/activity profiles for these other members (Table 7).

The main **findings** on the help women get are:

- 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 difference has not extended to their **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 in enterprise villages and control villages to complete the women's task (enterprise villages, N = 77 women and 5 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 Appendix VI, Table 28

This study did not go 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 use. Used with women's groups as well as their husbands, it will give them insight into how workload and tasks are divided within the household as a basis for discussions and action.

3.3 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) have been calculated as described in section 1.1. Furthermore, the importance of a good water supply for the quality of the enterprise was looked at in qualitative terms.



The cost of a worsened water supply is the forgone income when, due to breakdowns of the piped water supply, women have to suspend income-generating activities in order to collect water.

This definition was used to value water supplied in summer, which is taken to last for the three months of March, April, and May (91 days). Basically, the number of hours lost for income generating activities was valued at the average prevailing wage rate

(Rs. 40 per hour). 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, money women spent on buying water to save time for income generating activities has been added to the costs of a worsened water supply.¹⁰

¹⁰ For some cases an alternative method could be followed, the results are presented in Appendix IX.

In Ranmalpura, for instance, the 2.5 extra hours spent to collect water during supply breakdowns came partly from 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 Rs. 5 per day for the 46 days of no supply – or Rs. 227.50.¹¹ In addition, each woman reportedly spent Rs. 4 to buy water, which adds up to Rs. 231 per woman for the whole summer. In addition, there was a social cost of about losing nine 8-hour days of personal and reproductive time – or 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 doing SEWA craftwork spent Rs. 186 on average to buy water during the 13 days when there was no water supply.

The main **findings** of Table 8 are that

- **Women in Banaskantha villages lost an average of Rs. 50 per month** in earnings or costs merely due to breakdowns in regular water supply in summer. In other words, because of poor operation and maintenance (O&M) of the water supply, the 40,000 SEWA members in Banaskantha forgo a total income of Rs. 20 lakh¹² a month.
- In addition, they also lose, on average, a **total of 7 hours of time** for personal and reproductive time.

3.4 Economic Value of Water: Benefits of Improved Water Supply

The benefits of an improved supply of domestic water were operationalized 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 can be improved to the point where women would have to spend only one hour every day to collect water. The subsequent timegains, calculated on the basis of the time-activity profile, can be allocated either to *productive activities* or a combination of *reproductive and personal* activities.

Consequently, two alternatives upper bounds have been calculated: (1) the maximum additional income a woman can earn assuming all this time is devoted to *economic activities*; and (2) the maximum time that is freed for *personal and reproductive activities*.

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¹¹ 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’.

¹² Approximately US\$ 44,000

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

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 Potential income lost due to breakdowns in summer (@ Rs. 40 per 8-hr day)	Water Purchase Cost Average spent by each woman in SEWA group to buy water in order to continue micro enterprise (Rs.)	Cost per woman of water supply breakdowns over summer season		
			Productive Activity	Personal/reproductive activity			Economic Cost	Social Costs	
							Water purchase cost + Value of forgone income	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

The **time spent on productive activities** was valued as follows:

It was assumed that women would allocate their time on purely economic motives and, therefore, allocate time to that particular activity with the highest net rate of return. Note that the type of activities possible and the returns to these activities varied across villages and within villages, across the year.

In case of crafts, dairying, and gum collection, rate of returns have been calculated from data collected for summer and monsoon. The hourly rates of return in the period September till March are 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) – is taken to be Rs. 5 per hour (Rs. 40 for an 8 hour day).

It should be noted that the estimation of the value of water is thus based on these three main **assumptions**:

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

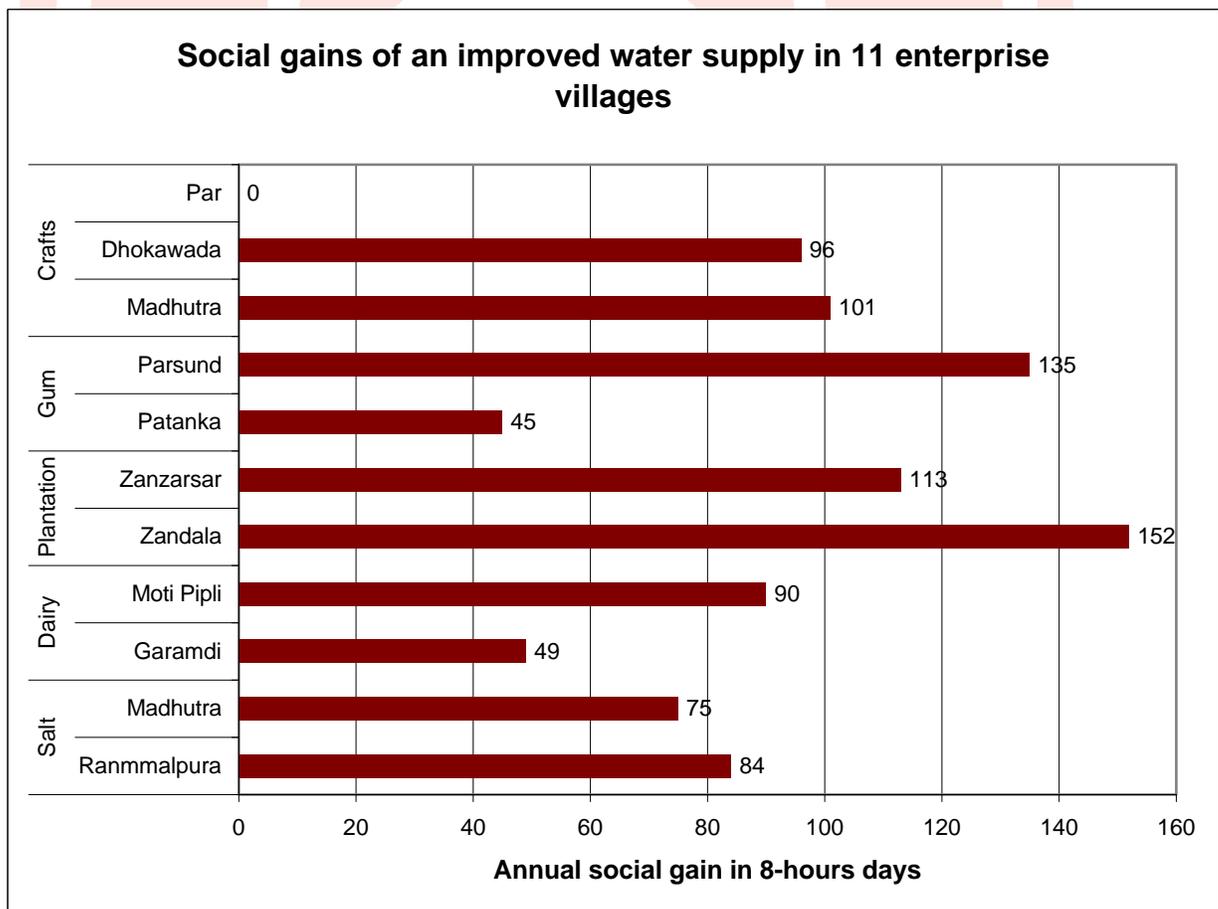


Figure 4 : Annual social gains of improved water supply in enterprise villages

As a caveat it should be noted that if women were asked how they would have allocated these timesavings, these calculations might have been more precise and realistic. Currently, they are hypothetical and consequently range broadly across all possible options.

The results of these calculations are in Figures Figure 4 and **Figure 5**.

The main **findings** are that:

- with an improved water supply that reduces water collection time to 1 hour a day, women in the 11 selected enterprise villages can;
- 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 this additional time was used entirely for income generating and/or expenditure saving activities;

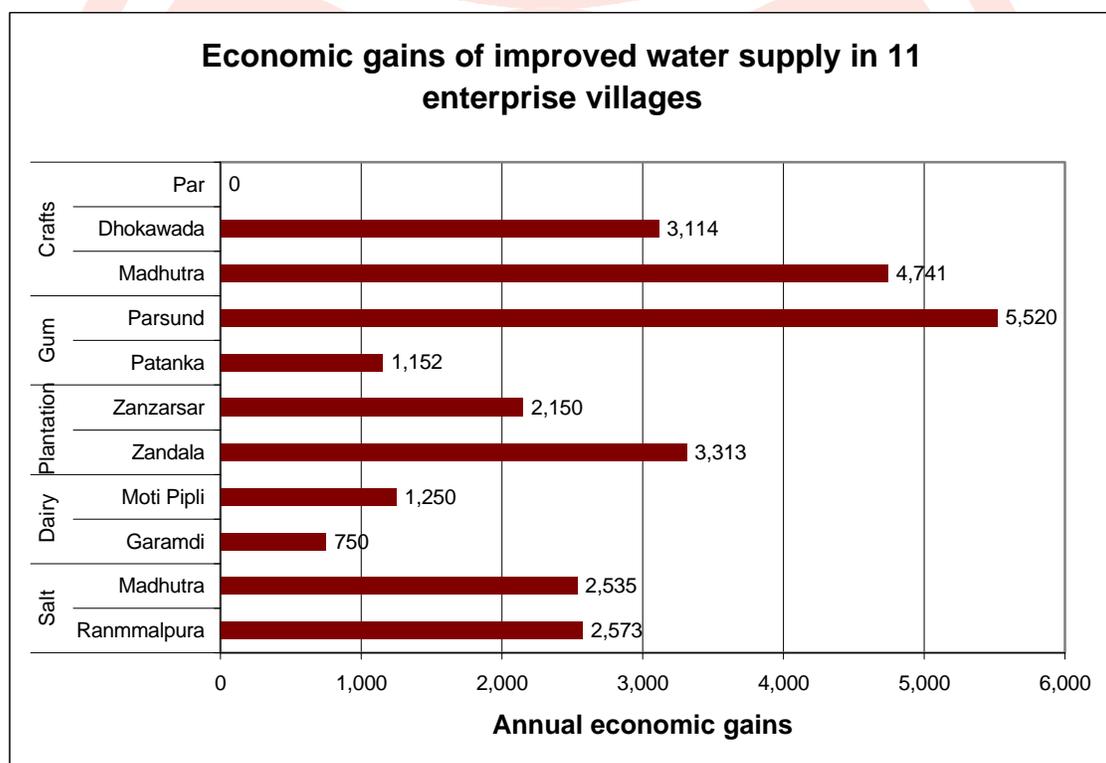


Figure 5 : Annual economic gains of improved water supply in enterprises villages

- they gain between **45 and 153 additional 8-hour days annually**, if this time saved is not used for economic activities. For the 40,000 SEWA women in Banaskantha, this translates to around Rs. 1 Crore annually, if the time saved is invested in available economic activities;
- a detailed season-wise analysis shows that the **maximum economic impact** of an improved water supply can be achieved by providing income-generating activities

during the summer period when no economic opportunities are available in semi-arid areas¹³.

The Importance of the Quality of the Water Supply for under performing Enterprises

The semi-structured interviews with the leaders of the bad enterprises were used to determine which of the four factors (gender relations, water, economic opportunities, and enabling environment) resulted in a sub-standard performance of their enterprises (Table 9).

Table 9 : Factors negatively influencing the performance of 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
		Gender related problems	Water	Facilitating environment	Economic Opportunities	
Better	6	5 of 6	5 of 6	6 of 6	5 of 6	3.5
Worse	5	3 of 6	5 of 6	4 of 6	2 of 6	2.8
Total	11	8	10	10	7	3.2

The main findings are:

- In all cases, there is a combination of factors that cause the enterprise to under perform, on the average, 3 factors hamper the functioning of the enterprise;
- Comparatively, the problems related to the water supply are more outspoken in the enterprise villages with a worse water supply.

3.5 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** do women, as compared to men, have on the **delivery of water**?
2. Do women have sufficient **control** over their **timesavings** to use them for income generation?
3. Who has the **control** over the resulting **income**?
4. For what **purposes** is resulting income used?
5. How do the **gender relations** in villages where BDMSA is active compare to the gender relations in the control villages?

¹³ Appendix X studies one of the possible alternative sources of income in a case study on the production of Micro Concrete Roofing tiles.

Influence on Water Delivery

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

The main findings are that:

- Women in enterprise households are more involved in the management of community water resources than women in the control villages, with an exception of the use of water, which is a women's issue only 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 in enterprise village (11 villages, N = 77) and control villages (5 villages, N = 35)

	Enterprise village			Control village		
	Men	Women	Both	Men	Women	Both
Decisions on the investment in traditional water sources ¹⁴	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%

However, and as shown in Table 11, the preferred source of domestic water of women are the standpipes of the Santalpur piped water supply. This is a comprehensive piped water supply solely managed by the Gujarat Water Supply and Sewerage Board (GWSSB).

The **main findings** are:

- in the control villages, the usual situation is that, apart from water use, in all community water issues it is the men who predominantly decide (65%-88%);
- in women's enterprise households, such decisions are now 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 men, but also women may now take the lead;
- village women in all study villages, have **currently no say in the scheduling** of the water delivery and **the distribution of the available water** over the villages although they are the primary users of the supply for reproductive (domestic) and productive uses and the intended beneficiaries of the service.

¹⁴: Traditional water sources include sources such as well, ponds, etc.

Table 11 : Sources for drinking water during different seasons in the 25 villages

	Monsoon ¹⁵	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 women have over their timesavings, three categories of diminishing control have been distinguished. Women have most control over their timesavings if they alone decide on how they spend this time. They have less control if women together with someone in the household decide on how timesavings are spent. Women have the least control, if someone else decides about how women spend their timesavings. Figure 6 presents the results of the assessments of the women's groups.

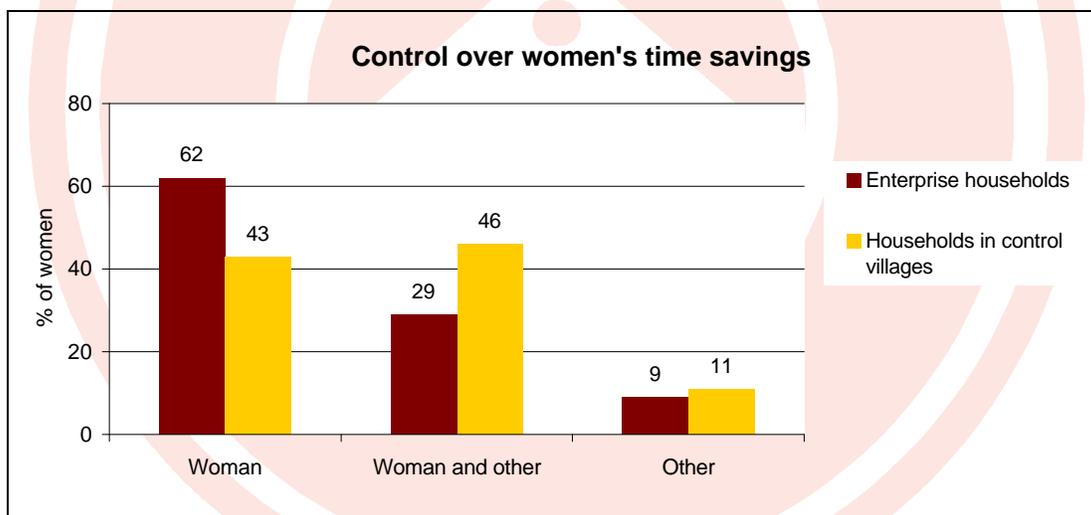


Figure 6 : Control over women's timesavings by household members in enterprise villages and control villages (11 enterprise villages N = 77, 5 control villages N = 35)

The **main findings** regarding the women's control over their timesavings are:

- In women's enterprise households and in households in the control villages, 91% and 89% of the women, respectively, have a degree of control over their timesavings. Hence, in all cases women appear to have **sufficient control over their time use** to decide to spend timesavings on income generating activities. There are no significant differences between the two groups.
- In both types of villages, a similar percentage – approximately 10% – of women have **no say in how they spend time saved**. This group might consist of unmarried

¹⁵ Figures do not add up to 100% because only the most important sources are shown in the table.

and/or recently married women, who still have – according to local customs – a subordinated position in their households.

Control over Income

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

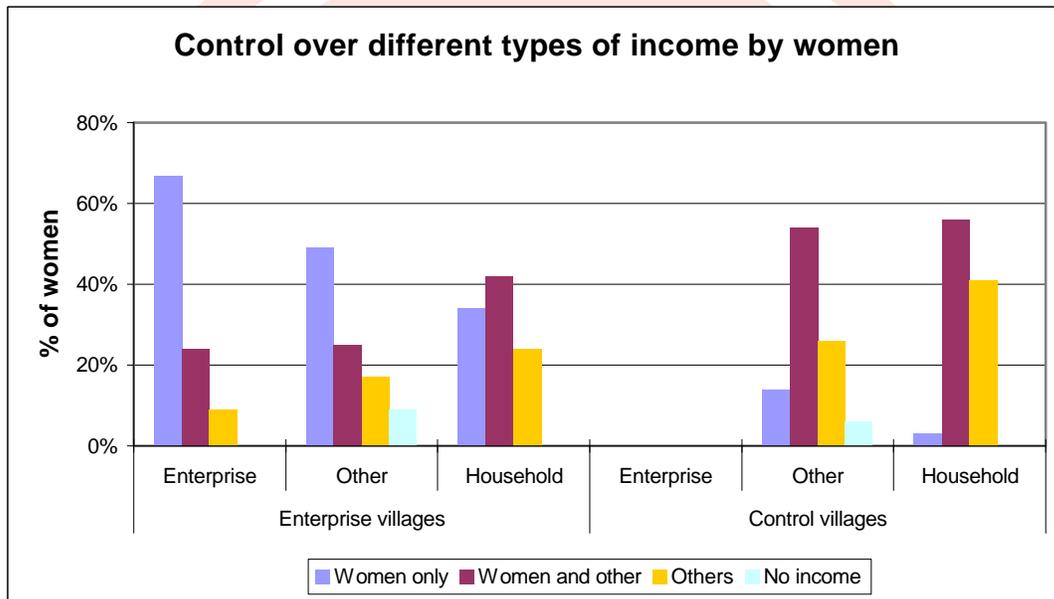


Figure 7 : Control over different types of income in enterprise households (11 villages, N=77) and women in control villages (5 villages, N=35)

The main findings are:

- Women in **control villages** have **not started any independent, entrepreneurial activities**;
- Women in enterprise households have **most control** over the income from the **SEWA related economic activities** and **least** over the **household income**;
- Women in the control villages have **less control** over their income as well as the household income **as compared to women's enterprise members**;
- In enterprise villages, **9% of the women** do **not** have any say in the spending of the income generated through their enterprise activities. Probably, this is the same group that does not have any control over their time.

Use of Income

As part of the gender exercises, women were asked to indicate how they spend their income across various categories.

Table 12 : Women's spending of their 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 refer Appendix VI)

The **main findings** are (Table 12):

- Across all villages, women's most important expenditure is on domestic expenses;
- Across all villages, women are spending money on buying water;
- Women in enterprise villages spend significantly less money on healthcare, possibly this is an outcome of SEWA health programme;
- Women in enterprise village spend significantly less money on personal items supporting the field observation that the control village are more affluent than the SEWA villages.

Changes in Gender Relations over Time

Both in women's enterprise villages and control villages, gender relations have changed over the last ten years. For example, fewer women eat alone, more women go out alone, more children go to school, and so on (Table 13). These changes seem to be an outcome of the ongoing changes in society as a whole that are taking place.

Table 13 : Changing gender relations in enterprise villages (11 villages, N = 76) and control villages (5 villages, N = 35)

	Enterprise		Control	
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 agricultural decisions	8.3%	69.0%	28.1%	62.5%
Women participate decisions 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%

The main **findings** are:

- In the households of women entrepreneurs, the position of women was significantly better with regard to going out alone, having savings and owning assets (For the tests of significance, see Appendix VII);
- Significantly worse situations regarding children's school attendance and agricultural decision-making had disappeared. Due to an error in the design of the tool, attending school was not split up for girls and boys.
- The opposite was the case for women's decision-making on livestock, which had earlier been significantly more common in the women's enterprise households. 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 to find fodder for livestock.

As most women in the women's enterprise villages belong to more traditional communities, the progress made by these women stands out even more. However, no data have been 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. The results are given in Figure 8.

They show that:

- on all accounts, **participation by women from enterprise** households is **higher** than by women in control villages.

This applied to attendance of public meetings (whether with women only or mixed), attendance of (mixed) village meetings in one's own village and in higher level meetings in an other community, speaking up at such meetings, and being a women's leader in one's own village and in a cluster of villages. The tool did, however, not take into account whether in all villages meetings had taken place during the previous three months. It did also not differentiate between the nature and purpose of the meetings that the women attended. Some of the general village meetings (Gram Sabhas) are organized by BDMSA to discuss

problems that concern the entire village and to initiate new, village-wide development programmes. In such meetings, BDMSA ensures that women speak up and that their opinion counts. Further development of the tool is thus required.

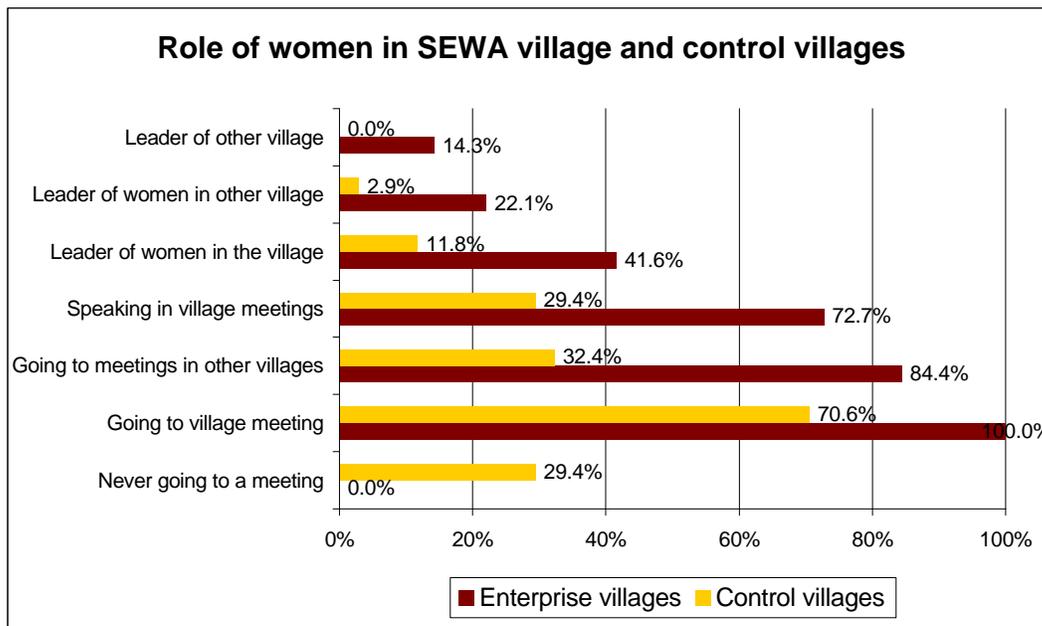


Figure 8 : Roles of women at community level (11 village, N = 77) and control villages (5 villages, N = 35)

Gender Changes according to the Men

Because 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 relations, what their opinion was about these changes, and what, in their views, explained these changes. Generally, the men were surprised to be asked about gender relations and found them harder to discuss than the 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 the statements in Gujarati and after translation into English, comparing the two for consistency.

In all villages, the men saw changes in the position of women in the household and the community (Table 9 and Table 14). They also saw a greater number of changes, giving overall 140 changes, an average of 13 per enterprise. Men in the other villages mentioned 32 changes, an average of six.

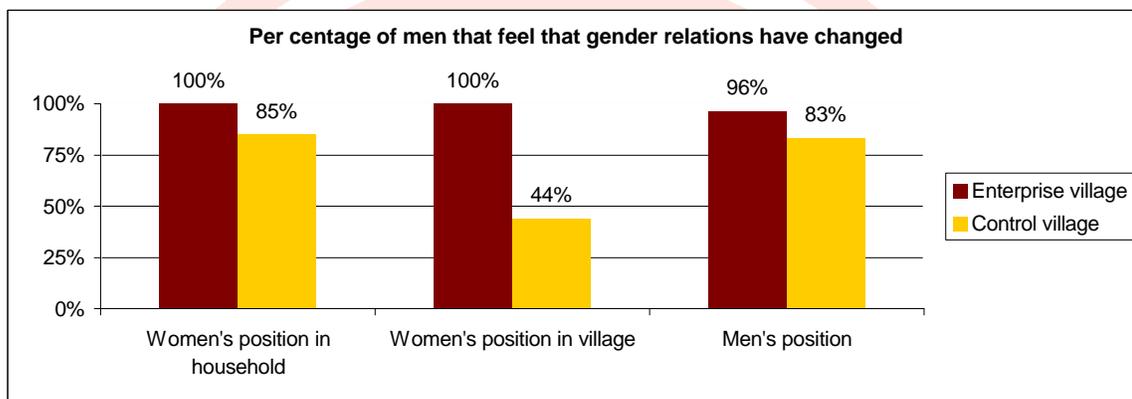


Figure 9 : Men's opinion on the changes in the gender relations (N = 11 focus groups for entrepreneur households and N=5 for control villages)

For the content analysis, the team looked whether each described change related to:

- 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 called this to have 'power within', 'power with', 'power to' and 'power over' (1994: 245). The results of the analysis are given in Table 14.

Table 14 : Changes in women's position according to male focus groups (N= 11 in enterprise villages; N=5 in control villages)

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

Findings from these and the other data are that:

- Both groups of men feel that the gender relations have changed. Men in the women's enterprise villages see a **greater degree of change for women** than men in the control villages.
- In the enterprise villages, only two out of the 140 changes mentioned were negative. They related to some of the women getting chances to move to places that men did not have. In the control villages, the men mentioned more changes which they saw as 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".
- When asked about changes in households, reactions on the same developments from the men in the enterprise villages to the team (who were men not associated with SEWA) were quite different (Box 2 overleaf).
- Although the position of women has improved according to all, for the groups in the enterprise villages the improvements expand beyond women's roles within the home as housewives and mothers ('welfare') and spouses and daughters-in-law ('equity') to their **economic roles** ('anti-poverty') and their roles in the **community and society** ('empowerment').
- The empowerment of poor women has also **empowered poor men**. The enterprise programmes for the women have had a positive spin-off for men, e.g., because their wives pass on their newly acquired knowledge to them and BDMSA's programmes have started a village-wide economic development process. The initiatives of the women have further stimulated these poor men to take an interest in village affairs and play a more active role. As husbands, they now get 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, they attributed changes to changes in society as a whole.

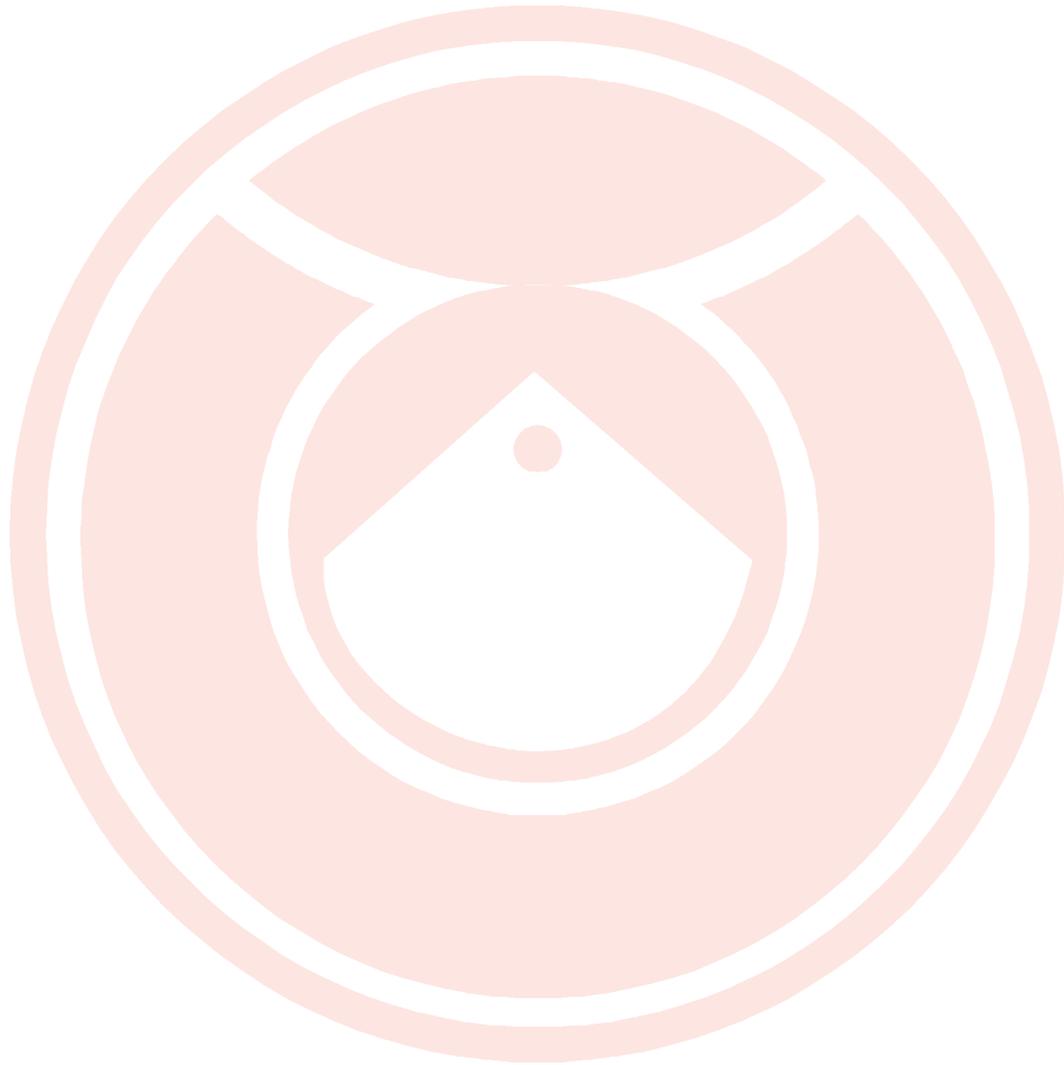
Capacity Building

Building FPI's and SEWA's capacity in the design and use of participative research tools for the collection of quantitative data was one of the objectives of the research. This reflects one of IRC's working principles, namely to enhance 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, also design and training workshops have been organised. Furthermore, hands-on training on lateral leadership, self-evaluation, etc. was part of the daily routine during the fieldwork.

During the mid-term review in July, the capacity building has been 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** that emerged from the answers are as follows:

- 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 has increased and so has the understanding. Taking part in the design of the tools as well as using them in the field has increased the knowledge of how to retrieve information and quantify qualitative data from a group and the research team has become more confident and participatory in their approach.



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

Empowerment of women:

"Now they can go outside alone". "Earlier, the society did not allow them to move for 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 was held to help the women in their work "[for water harvesting].

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". "Could 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 earlier men would welcome guests.

- The team's capacity has been built with respect to the research subject as such. The gender perspective, for example, is becoming more visible in the new projects that have been developed. The economics of water and its relationship with income generating activities are better understood as well.
- The team's capacity has also been built with respect to self-evaluating their own performance, identifying weaknesses and improving the latter. Organisational capacity, lateral leadership, and team spirit had also improved. The team building has helped the team function as a team whole in which the total was more than the sum of the individual members together.
- There are also negative aspects that the team should deal with. Although computer knowledge has increased overall, individuals are still unaware of how programmes can be used as a tool to analyse data. The analysis by the team is also quite weak; not all individuals are aware of how to analyse data.
- The research experience with SEWA and FPI has built IRC's capacity with respect to the institutional relationships with NGOs in the water sector. In addition, it has expanded the dimension of IRC's research activities with a specific focus on gender. Finally, it has strengthened IRC's work in integrated water use and water resources and catchment management.

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4 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 an important, and even critical, contribution to the household income in semi-arid areas such as Banaskantha.

The contribution is critical because this income comes at a time when other resources are at the lowest and, besides providing income for household expenses, education, and childcare, constitutes a buffer for crisis times.

Women use benefits of more time and an easier access to water from a closer by and working water supply (supplemented by a programme for women's economic and social empowerment) in three supplementary ways:

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

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

In particular, the study found that (1) the use of water changes when the quantity of the water available improves or deteriorates, (2) the economic status of the households prioritises the way time is being used, and (3) economic opportunities determine whether time savings will be used for income generating activities, water collection or other activities. A reliable and sufficient supply of domestic water combined with uses of water and time for small-scale domestic production is therefore economically most important for the poorest households.

The study has further shown that because the water supply is not reliable, drudgery of water collection for women and girls continues despite the establishment of a large piped water supply in the area.

These findings have several important research and policy implications.

4.1 Water Supply Projects

Domestic water supply projects are not just *welfare projects* 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 (semi)-arid areas and given the right enabling conditions, rural domestic water projects may also be *economic development projects, especially for women*. The reason is that it is especially women who

benefit from domestic water projects and who use these benefits (water and time) also economically.

Providing an additional water supply alone does, however, *not translate automatically into economic returns*. They 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, favourable gender relations that allow such productive uses, and economic opportunities to turn them 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.

The **policy implications** of these conclusions are that:

- There is a strong need for an integrated, holistic approach to rural development in semi-arid areas, which is in contrast to the sectoral approach that is currently adopted by the national and state Government.
- 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.
- A follow-up research could test the effect of some form of cooperation with a user association in the operation of the comprehensive piped water supply. It would evaluate the impact on the degree to which the service meets the domestic and economic needs of women and assess whether in such circumstances they would be ready to pay for the water as a normal procedure.
- CBOs, NGOs, and other institutions with experience in improving water supply and supporting micro-enterprise development have to be involved in the reformulation of current policies. These institutions should also be used as pathfinders in pilot exercises before scaling up the operation to a larger scale.

4.2 Gender

The combination of an anti-poverty and a women's empowerment approach has significantly improved women's economic and social positions in the households and the communities.

These changes have surpassed the improvement of women's position and of 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, have not organised and, although their situation has also improved, improvements have been significantly less than for the members of women's enterprises.

The improvements related more to the mothers than to the daughters, who within the household still provide the bulk of domestic help and did not seem to have the same say over the use of their own time and income as their mothers/mothers-in-law.

All 11 male focus groups were of the opinion that the positions of women in the household 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 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 has also changed the gender situation of poor men. They are more respected because of the achievements of the women in their households and have taken inspiration and obtained new knowledge from them.

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 field is 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** are

- Gender and 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 because women and men are equally able to have a positive impact 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 minor 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.

4.3 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 demonstrated that rural micro-enterprises facilitated by an enabling gender as well as economic environment may have positive impacts on poverty alleviation.

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

As the total amount of water in semi-arid areas is limited, poverty alleviation policies should furthermore try to *unlink water and poverty* by providing income-generating opportunities that do not, or less, depend 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.

For **policy**, this implies the following:

- The development of rural micro-enterprises and improving drinking water supply have to become the main planks of rural poverty alleviation strategies and programmes - and not just 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, favourable gender relations, and backward (e.g. natural resource base) and forward linkages (e.g. marketing).
- NGOs and other institutions with experience in such effective poverty alleviation for poor women and men have to be involved in the reformulation of current policies to put these changes in focus. Again, 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 is limited in semi-arid areas, policies should try to unlink water and poverty by providing income-generating opportunities that do not, or less, depend 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.

4.4 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 concerned¹⁶.

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 could 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 the policy reformulation exercise.

4.5 Community Infrastructure Projects

Empowered and earning women can improve the effectiveness of decentralised community infrastructure projects.

The **policy implications** are that

- Communities with empowered and earning women should be the focus of government community infrastructure projects and should involve these women in decentralised and participatory planning and implementation.
- NGOs and other institutions working with such women's groups should be involved in planning and implementing such projects.

Organizational Capacity Building

The research has built the capacity of all involved organisations, especially in the field of 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 to immediately review and discuss the findings with the groups of women and men in the villages. This has contributed to their empowerment as they have remained the co-owners of their own data and may have added new insights on their own situation. In addition, capacity has been built for teamwork and in the subject areas of the research. Capacities for the design, management and analysis of research can, however, be further improved.

Implications for **policy** are:

¹⁶ Economic viability at above-community levels was not within the scope of this study.

- To seek opportunities to prepare separate documents, in print and as a video, on the PRA tools and process used for the study
- To link the use of the tools with training to SEWA facilitators in gender analysis and action planning.
- To follow up this report with activities for dissemination, knowledge exchange and action planning, seeking contacts with both policy makers and fellow programme/project organisations and continue the development of this so important overall subject area.



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Appendix I Research Itinerary

Table 15 : Research planning

Phase	Period	Phase	Type of activities
Explorative phase	July 1999	Research framework	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 explorative phase	Data collection in 25 villages in Banaskantha
	December 1999	Data analysis	Data entry Data analysis
	January 2000	Report	Preparation of research report explorative phase
Second phase	February 2000	Design workshop	Design of research tools
	April – June 2000	Data collection	Gender tools Time/activity profile summer Typical household profile Enterprise tools Accounts analysis
	July 2000	Mid-term review	Review of research tools
	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	Final research report	Preparation of report.

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Appendix II Banaskantha¹⁷

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 even harder. 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 this population lives in rural areas.

Table 16 : Basic statistics 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 for around the year...

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.

¹⁷ Recently, the district of Banaskantha has been split up into two parts; Patan and Banaskantha.

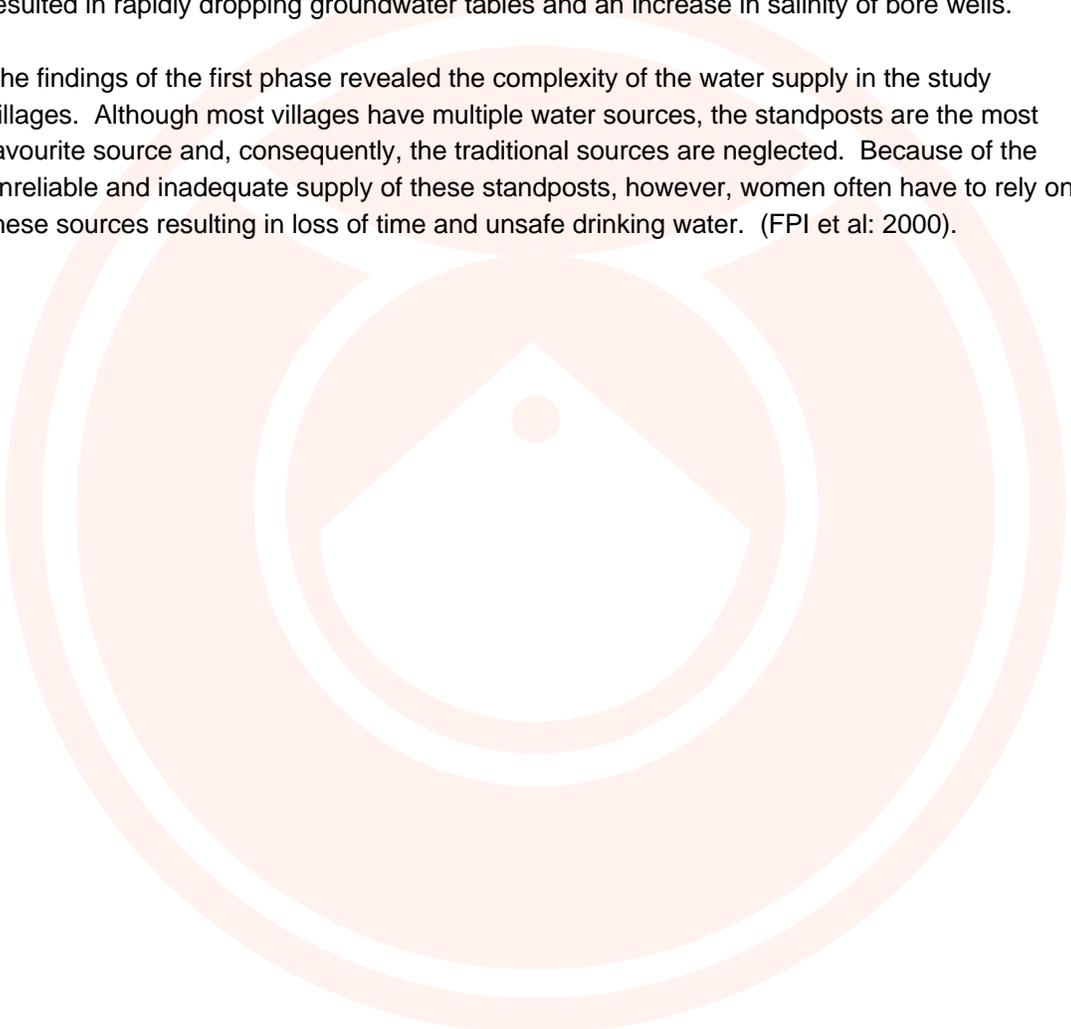
Though the study area is located in Patan, this section refers to the entire district before the split, as no separate data are available on the Patan district yet.

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 case the 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 favourite source and, consequently, the traditional sources are neglected. Because of the unreliable and inadequate supply of these standposts, however, women often have to rely on these sources resulting in loss of time and unsafe drinking water. (FPI et al: 2000).



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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 members¹⁸. 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, creation bargaining power, and representation in committees and boards from district up to international levels.
2. Capital formation at the household level to build up and create assets by the women in their own names.
3. Capacity building to stand firm in the competitive market and to enable women to run their own organisations.
4. Providing social security to enhance health care, childcare, provide shelter, and basic insurance.

SEWA's Water Activities

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

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

¹⁸ According to SEWA's annual report 1999, SEWA had 215,234 members all over India of which 147,618 in Gujarat.

technicians, improving of existing water services by pressurising the concerned 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) had pointed out that this scheme did not manage to start economic development for the poor as was intended in the original project set-up.

SEWA, supported by FPI, started an action planning cycle to assess the 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 to the implementation of a large portfolio of activities (see Table 17). 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 17 : 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 2000,39

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 %		Households	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%
Varnosari	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%

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Appendix V Description of Enterprises¹⁹

SEWA's Approach to Micro-Enterprise Development

Income-generating activities form an important part of SEWA's rural development programmes. 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 enterprise are often related to their scale, for example, a 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 organizes the resources of individual women to strengthen their position and to make marketing, quality control, training available to them.

Organising of women and building their capacity are central to each enterprise. SEWA seeks to organise the enterprises in such a way that they are managed by the women 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 the initial investments that have to be made. 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 the plantations, however, need water as an input in their production process.

The Crafts Enterprises

Banaskantha has a rich tradition in crafts work such as embroidery, mirror work, and patchwork. Benefits, however, mostly ended up with the middlemen who used to trade crafts 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 the 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 the so-called spearhead team. This team takes care of the centralised purchase of raw material and the quality control of the finished products.

¹⁹ 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 the 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 work provides thus a viable and competitive alternative to the regular income generating activities such as agricultural labour, which gives a rate of return of around Rs. 5.00.²⁰

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

Table 18 : 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 crafts work
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.

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 BDMSA started organising women in separate co-operatives, most of the existing co-operatives were defunct because of three successive droughts and Banasdairy virtually

²⁰ Women who do *simple* embroidery work belong the Darbar community. This community does not allow the women to venture outside the house; hence, crafts work is the only option available to them to generate cash income.

stopped collecting milk. Because of BDMSA's efforts, Banasdairy has re-started the procurement of milk and its chilling centre in Radhanpur. Recently, a milk powder factory has been opened in Palanpur. Currently, the women's dairy co-operatives are viable enterprises that have won several awards for best organisation and products.

The dairy production strongly depends on the quality of the 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 have been set up and subsidised fodder is provided. Despite the support, however, household were spending Rs. 20/- and Rs. 30/- daily on water and fodder in Moti Pipli and Garamdi respectively.

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

Table 19 : Characteristics 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	
Spearhead teams play important role.	
Production	Subsidized fodder during droughts
Negotiations	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, purchase of fodder in open market.

The Plantations and Nurseries

SEWA established a number of DWACRA 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.

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.

Table 20 : 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 on fetching water
Management	Simple, little involvement of spearhead team
Technology	N.a.
Season	Reap 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 Gum Enterprises

Gum collection is one of the few alternative sources of income after the end of the agricultural season. 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) a license is needed, which can be obtained only with the right influences. Consequently, 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 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 has been more affected by the drought in Patanka. As the net rate of return in Patanka is less than that of other income generating activities, the women have opted to do other work, such as government relief work. If SEWA would manage to obtain a license to sell the gum in the open market, the hourly rate of return in Parsund would go up to Rs. 13.87.

Table 21 : 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 dessert, time spent for water can't 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 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 to the 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 the revenues only come 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 for the operation of the diesel pump, payment of labourers, and the transport of the salt. These high capital requirements often push the salt farmers into the hands of large salt traders who provide the necessary capital against high interest rates.

Table 22 : Characteristics 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

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Appendix VI T-test Tables

Table 23 : 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 24 : Independent sample test for women's activities during monsoon in enterprise villages and control villages, assuming equal variance

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.

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Table 25 : Independent sample test for women's activities during summer in enterprise villages and control villages, assuming equal variance

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 26 : Independent sample test for women's time-activity profile during summer in better and worse water situations assuming equal variance.

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 27 : Independent sample test for women's time-activity profile during monsoon in better and worse water situations assuming equal variance.

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 28 : Independent sample test for the help women get in SEWA - control villages during summer and monsoon (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 29 : Chi-square for the significance of difference in gender relations between women in women's enterprise households and women 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 agricultural decisions, before	7.3569	2.0000	0.0253
Women participate agricultural decisions, after	0.9865	2.0000	0.6106
Women participate decisions purchase of cattle, before	4.9758	2.0000	0.0831
Women participate decisions 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.
- Currently, harmony is significantly better in women's enterprise households.
- 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. 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, women savings occur significantly more in women's enterprise households.
- 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 and this difference has also disappeared. In interpreting this finding, caution is required, however, as in a period of serious drought the men often migrate, which affects 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 30 : Chi-square test for women's role in management of community water resources in women's enterprise households and 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:

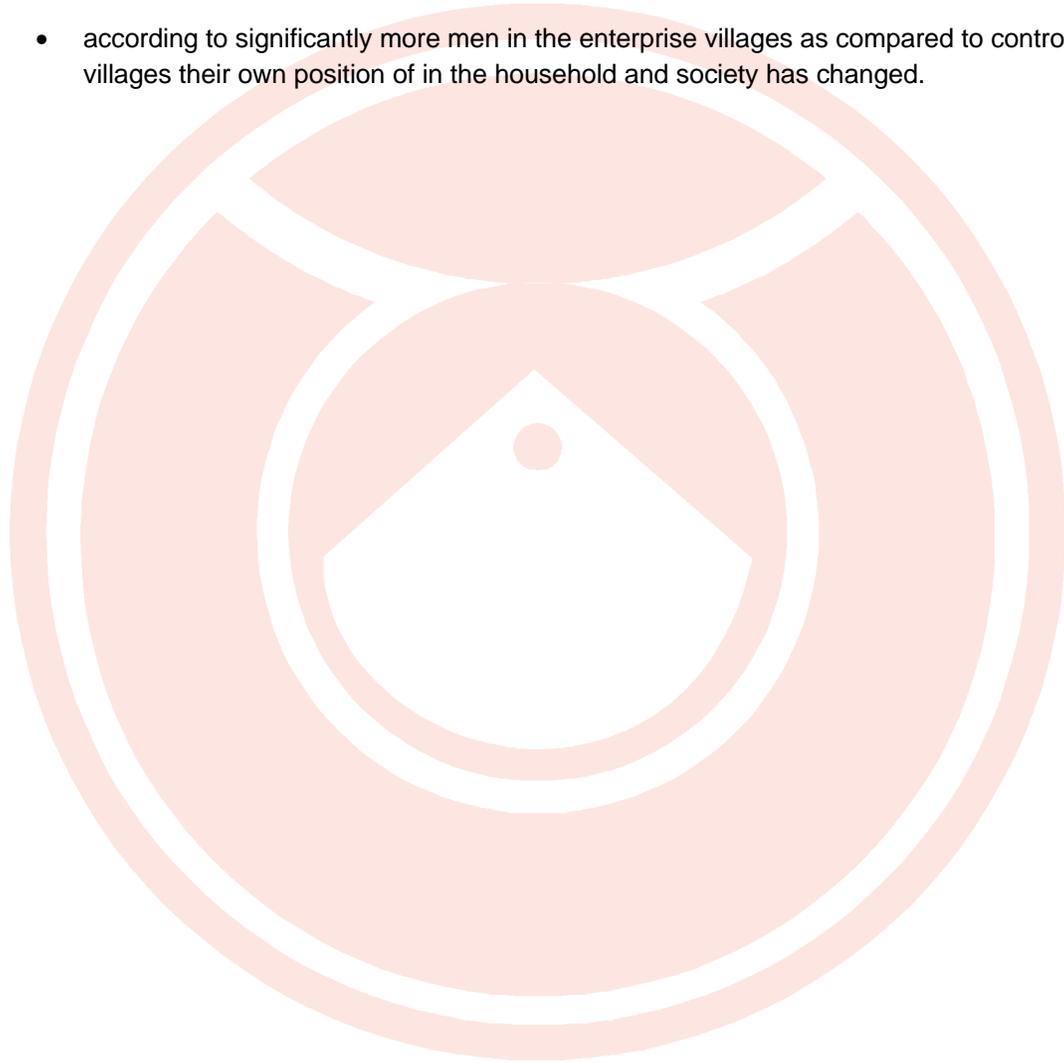
- women in women's enterprise households are significantly more involved in the decisions on the investment in traditional water sources than women in the control villages;
- women in women's enterprise households are significantly more involved in the follow up after breakdowns of the piped water supply than women in the control villages;
- women in women's enterprise households are significantly more involved in the decisions on the construction of traditional water sources than women in the control villages;
- women in women's enterprise households are significantly more involved in the 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 31 : Chi-square test for the men's opinion on the changes in gender relations 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 the control villages the position of the women in the household has changed.
- according to significantly more men in the enterprise villages as compared to the control villages the position of the women in the 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.



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Appendix VIII Management Activities by SEWA Members

Women 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 difference has been 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 is lower than the aforementioned time-activity profile.

The main **findings** are:

- 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 crafts relief work and the fodder banks that were organised by BDMSA during the summer.

Table 32 : Number of days SEWA group leaders and SEWA members spent on management activities and training per month in summer and monsoon (N = 11 villages).

	Summer	Monsoon
SEWA leaders	7.8	4.8
SEWA members	2.0	0.9

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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 the production takes place in the desert far away from the villages. Sometimes, women migrate temporarily to the desert, in other cases women commute daily to their enterprise.

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

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

The main **findings** are that a single woman forgoes, 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.

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 relief work, 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 earthwork 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 period.

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 give 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

The 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. Currently, the 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 the 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 on 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, whilst MCR tiles are strong enough to bear a load of 80 kilograms (for more technical details 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.

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 well strategized marketing approach is needed. Furthermore, the production and sales system should ensure timely delivery and continuous, high quality.

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.

Required Inputs

To start the production of MCR-tiles by poor women in Banaskantha;

- a continuous supply of sweet water and electricity is required. 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 get 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 will provide:

- employment to 4 women per production unit, In addition 5 more women will be able to generate income through the construction of roofs. These women will generate a daily income of Rs. 50/-. In addition, they will share in the net-profit, which is estimated to be Rs. 109,000;
- the production of MCR-tiles is not bound to a particular season; hence, an alternative source of income will become available when other income sources fail;

- the women's contribution to the household income will have a positive influence on the 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					