

WORKING PAPER 11

# Gender in Lift Irrigation Schemes in East Gujarat, India

Harmeet Saini  
Barbara van Koppen



**Working Paper 11**

**Gender in Lift Irrigation Schemes in East  
Gujarat, India**

*Harmeet Saini  
and  
Barbara van Koppen*

N. M. Sadguru Water and Development Foundation, Gujarat, India  
and  
International Water Management Institute

IWMI receives its principal funding from 58 governments, private foundations, and international and regional organizations known as the Consultative Group on International Agricultural Research (CGIAR). Support is also given by the Governments of Pakistan, South Africa and Sri Lanka.

This case study was prepared as part of a long-term research program on Gender, Poverty, and Water in IWMI, carried out with the support of the Ford Foundation and the Governments of Sweden and the Netherlands.

*The authors:* Harmeet Saini is Program Executive, Irrigation Cooperative of Sadguru, Gujarat, India and Barbara van Koppen is Coordinator, Poverty, Gender and Water Project of IWMI, Colombo, Sri Lanka.

Harmeet Saini and Barbara van Koppen. 2001. *Gender in lift irrigation schemes in East Gujarat, India*. Working Paper 11. Colombo, Sri Lanka: International Water Management Institute.

*/irrigation management/ irrigated farming/ irrigation programs/ water lifting/ communal irrigation systems/ cooperatives/ legal aspects/ gender/ women's status/ decision making/ villages/ India/ Gujarat/ Tandi/ Chhasiya/*

ISBN 92-9090-433-X

Copyright © 2001, by IWMI. All rights reserved.

Please direct inquiries and comments to: [iwmi-research-news@cgiar.org](mailto:iwmi-research-news@cgiar.org)

## Contents

Acknowledgements.....	v
1. Introduction and Aim of the Study .....	1
2. The Irrigation Development Approach of N M Sadguru Water and Development Foundation .....	4
3. The Impact of Irrigation on Production and Well-Being .....	6
4. Gender in Irrigated Agriculture and Irrigation Management.....	8
5. Conclusions.....	13
Annex. Village Tandi, Jhalod Taluka and Village Chhasiya-1, Jhalod Taluka .....	14
Literature Cited .....	16



## **Acknowledgements**

We express our gratitude for the guidance and inspiration, throughout this study, of Mr. Harnath Jagawat, Director of N.M. Sadguru Water and Development Foundation. We also highly appreciate the support from the irrigation cooperative staff, especially Manhar Patel and Dalip Panchal and computer specialist Mazhar. Our friends Ravi Shankar and Purabi of Sadguru and Jacobijn van Etten of the International Water Management Institute are heartily recognized for their timely inputs and editing.

# 1. Introduction and Aim of the Study

## Sadguru: An overview

For the last 27 years, the Navinchandra Mafatlal Sadguru Water and Development Foundation (in short: NMSWDF or Sadguru) has been working on sustainable, participatory land and water management in the marginalized and poverty-stricken tribal areas in the Panchmahals of eastern Gujarat, along the Gujarat, Rajasthan and Madhya Pradesh borders. Annual rainfall in this semiarid region is 800 mm. The project area is part of the Mahi watershed, which extends throughout Madhya Pradesh, Rajasthan and Gujarat. The total operational area is over 11,200 sq. km and covers more than 350 villages with a population of around 80,000 families.

Sadguru has improved land and water management in multiple ways and also by constructing more than 190 lift-irrigation schemes that are all managed by the communities. In the past, this semiarid region was characterized by low productivity, rain-fed farming, severe soil erosion in the undulating topography and degradation of land and forests. Seasonal and permanent migration was widespread. Today, agricultural production, food consumption and incomes have considerably increased; the availability of water for domestic uses has strongly improved; and emigration is reduced.

Sadguru pays much attention to the equitable participation of women and men in the design and implementation of all its programs. Throughout its program, Sadguru seeks to reduce women's domestic burdens and to provide women with access and control over financial, capital, and natural resources that were previously the exclusively domain of males. Irrigation, social forestry and soil and water conservation programs considerably enhance women's access to fuel, fodder and water. Biogas plants contribute to women's health and reduce the need for collecting firewood and purchasing fertilizer. Income-generating off-farm activities give women money, over which they themselves decide, thus augmenting their purchasing power. When wage labor projects are undertaken, the organization pays equal wages to men and women.

Women are empowered economically and also socially. There is more awareness of their productive contribution to the household. Women also interact more with outsiders and, today, they even approach government officials and NGOs on behalf of their villages to negotiate assistance. Sadguru also stimulates women to take up unconventional jobs like site supervisors, nursery raisers, or village agricultural extension workers. More and more women are taking seats in the village councils as *Panchayati Raj* (elected members).

Women also organized themselves as a group and took up various activities, like milk dairy cooperatives, savings and credits, nursery raisers or horticulture groups. In those villages, they also became more vocal in community development processes in which, formerly, they hardly ever participated. Irrigation management at the committee level is an example of such a hitherto male domain.

## Gender in Tribal Society

The population in Sadguru's project area consists primarily of Bhils. As in most tribes in India, property, including land, is inherited in the male line and marriage is predominantly patrilocal. A daughter's right to the ancestral property of her father is recognized only when there are no male lineal descendents. Women can also inherit as a widow or mother of a deceased. For example, out of the households interviewed in the present study, women had own land rights in six cases (10% of the total sample). It was only in one case that this was registered as her own property. The other women derived *de facto*, but unregistered land rights either from their late husbands, as widows, or from their fathers.<sup>1</sup> Political institutions, such as the council of elders, village headman, village Panchayat and the tribal chiefs are also all-male. Only sons can succeed their fathers as the head of a clan or a lineage.

However, in the tribal economy, women's role is more articulate. Although ploughing is the domain of men as is elsewhere in India, women perform other agricultural tasks like soil preparation, planting, weeding, harvesting and storing food, and they participate in economic decisions within the family. Socially, women of the Bhil community enjoy more freedom of movement compared to their non-tribal counterparts. Divorce and remarriage of a divorcee or a widow are generally more accepted. The birth of a daughter is welcome. Also, Bhils have a bride price so that the bride's family receives the price from the bridegroom's family.

## This Study

This study aims to highlight the gender aspects of the Sadguru-supported community-based irrigation program, within the wider context of this program (section 2) and its general impact (section 3). It focuses on the intra-household organization of irrigated agriculture, the gender dimensions of scheme-level irrigation management, and Sadguru's efforts to strengthen women's participation in irrigation cooperatives (section 4).

The analysis presented here is based on interviews with farmers in two randomly selected irrigation schemes: Tandi and Chhasiya-I. Structured and open interviews were held with men in 38 households and with women in 22 households totaling 60 irrigating households, while group interviews were also held. Further, the report also reflects Sadguru's own insights gained in the long-standing interaction with the communities in the project area.

The selected villages differ in several respects. Tandi is near a town. Much of its land was submerged when the government constructed a reservoir for a new irrigation project. In 1994, when Sadguru's lift-irrigation scheme was constructed, many of those displaced persons became the beneficiaries of new irrigated land. Several other development programs have also started in the village during the last few years, for example, savings and credit groups and the successful women's milk dairy cooperative. Chhasiya is a remote village near the Rajasthan border and Sadguru's support for it has just started. However, the irrigation technologies and management

---

<sup>1</sup>One woman was married and her husband lived with her; another woman stayed with her father after separating from her husband; and two women inherited from their fathers, as they had no brothers.

structures are similar and reflect Sadguru's general irrigation intervention approach. In both villages, more than 90 percent of the respondents belong to the caste group of Hindu Bhils. Detailed profiles of the schemes are given in the annex.

## 2. The Irrigation Development Approach of Sadguru

### General Approach of Sadguru

Communities play an important role in determining the use and management of natural resources determine the state of the community. These two constituents, i.e., use and management of natural resources comprise the root of Sadguru's intervention approach. To rehabilitate and increase the natural resource, base and to empower the community to take charge of its growth and sustainability, natural resource management technologies and interventions are developed. Initiatives on community lift-irrigation systems, water-harvesting structures, masonry check dams, and recharging of community and private wells are carried out, along with various other activities like soil and moisture conservation, plantations, agroforestry, joint forest management, horticulture development and also saving and credit schemes. These development initiatives are carried out through various village institutions, mainly Irrigation Cooperatives, Women Milk-Producers-Cooperatives, Women's Savings and Credit Groups and Banking, Village Forest Institutions and Groups, Women Horticulture Cooperatives, Youth Groups, Watershed Associations, etc.

Complementary to these are the various support activities such as women's nonfarm income generation, rural energy promotion, for example biogas, agriculture extension, and research and documentation. The training and human resources development are integral parts of all activities and processes.

### Community Lift Irrigation Systems

Irrigation is one of the most important means for food and fodder in this semiarid area. Earlier, when dry farming was the only means of food production and sustenance, the tribal communities depended on the vagaries of nature for their survival. In this undulating landscape, Sadguru introduced lift irrigation by installing electric pumps that lift water from various water sources like rivers, tanks, bunded rivers, natural ponds, and canals or reservoirs to main distribution chambers at the highest point in a command area. *Kundis* (masonry outlets) are constructed at convenient locations in the command area, all connected to the main distribution chamber through underground pipes. The outlets have two to four openings, each feeding open channels that ultimately bring water to the fields. Currently, 177 irrigation systems are functioning in the project area in the tribal belt of Dahod, Banswada and Jhabua.

The capital costs for construction of the schemes are usually funded by the government under the funds for Tribal Development and, partly, by international donors. Both male and female farmers contribute labor in the construction, or they deposit money, generally based on acreage of land. This money is put in the bank in the name of the cooperative as an initial fund. Once the system is constructed all further costs are entirely borne by the members of the cooperative.

Most plots are around 1.5 to 2 acres; it is rare to find plots larger than 3 acres. Besides irrigated plots, households usually also have some wasteland for plantations or land around their

houses. The tenorial arrangements that prevail in rain-fed agriculture hold in irrigated agriculture as well.

### **Irrigation Cooperatives**

Sadguru supports farmers in creating cooperatives to operate and maintain the lift-irrigation schemes. These irrigation cooperatives are based on values of self-help, mutual responsibility, equality and equity amongst all members. According to the State Cooperative Law, to become a member of an irrigation cooperative, one should own land in the command area. The landowners constitute the general body of the irrigation cooperative. This body meets at least once before each irrigation season, i.e., in July/August every year. The members elect the Managing Committee or Executive Committee, or approve proposed candidates. This is usually done by consensus for a term of 3 years. Committee membership is renewable and changes take place. In cases where the population lives in dispersed small, lineage-based hamlets, called *falias*, each *falia* is usually represented in the cooperative committee.

The Managing Committee is responsible for the management and operation of the irrigation system. It decides on the water prices, collects the fees, and keeps accounts. Electricity bills, maintenance charges, wages of the staff, and all other costs are included in the water charges. In the studied schemes, Chhasiya-1 and Tandi, the water rates are Rs 160<sup>2</sup> and Rs 180 per watering per acre, respectively (see annex). Wheat, for example, requires four to five waterings while pulses require only one to two waterings. The committee also monitors water distribution and mediates in conflicts if problems cannot be solved at the lower levels.

The Managing Committee consists of seven to eleven members. The committee chooses the chairman and vice-chairman and three other members who are paid employees: the secretary, operator and distributor. The secretary is responsible for the accounts, water management, collection of money, and for setting and monitoring the rotation patterns for water distribution. The operator operates the pump, while the distributor distributes water over the various outlets. The committee can also select three women committee members, as co-opted members.

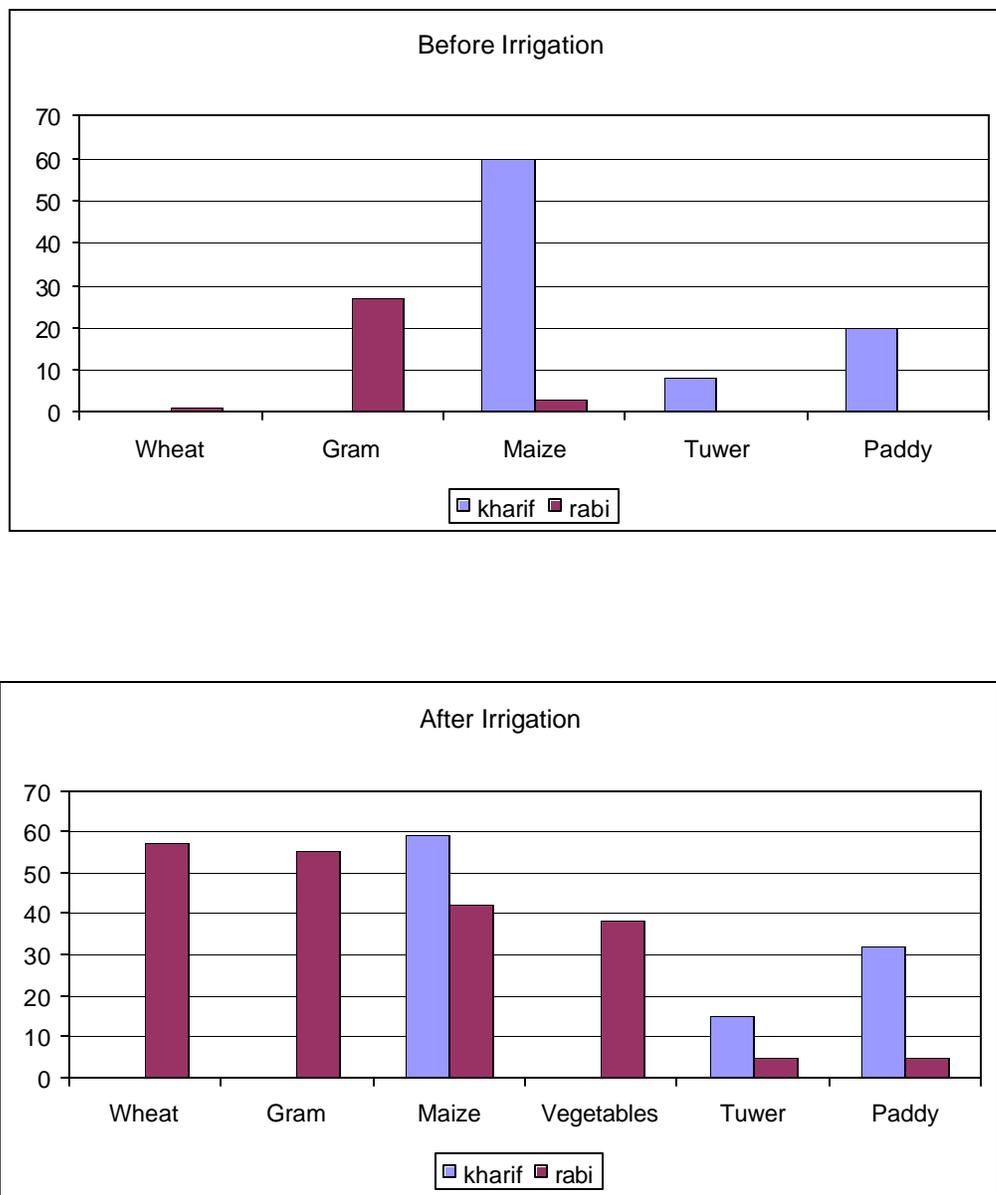
---

<sup>2</sup>US\$1.00 = Indian Rs 40.00.

### 3. The Impact of Irrigation on Production and Well-Being

Sustainable lift irrigation schemes have enabled households to increase food production significantly. In many cases, crop yield has doubled and sometimes even quadrupled, and production is now year-round. As figure 1 shows, in the past, the large majority of the 60 respondents in the studied schemes did not cultivate their fields in *rabi* (the winter season). After introducing irrigation, however, they not only undertake irrigated cropping during both *kharif* (summer) and *rabi* seasons, but cultivate a much wider range of crops. Previously maize was the main crop grown, but now farmers grow crops like wheat, paddy, gram, pulses and vegetables along with maize cultivation.

Figure 1. Crops grown before and after the introduction of irrigation (n = 60).



All respondents confirmed that their incomes had increased. Previously, it was a hand-to-mouth existence, but many have a surplus now. Food consumption has improved and farmers have started investing in better housing, cattle, or jewelry and in income-generating activities. The sale of agricultural produce is the major source of income for all. One-third of them also earned incomes from selling milk, or from jobs.

Emigration has reduced drastically as well. Before the introduction of the lift-irrigation schemes, a quarter of the respondents used to emigrate or, to a lesser extent, other family members did so. Although men were the majority, women emigrated as well. While emigration has been reduced the pattern of migration has changed as well. Earlier, people emigrated due to distress and for periods of 4 to 8 months. Now only the 'extra hands' emigrate and that only during the summer, to places like Ahmedabad, Surat, and Baroda. Emigration by women and children is rare by now. As a result, children attend school more regularly and women are increasingly enrolling in literacy and other skill-building courses.

The income generated from irrigated agriculture has also led to a range of other activities like savings and credit, milk production, floriculture, or vegetable cultivation. Villages are developed through the installation of hand pumps, building schools and primary health centers, road construction, etc. In addition, the value of land has considerably improved, which has further enhanced the creditworthiness of the farmers.

### **Specific Impacts for Women**

The fact that water, fuel and fodder are now easily available near the house has a direct impact on women. They no longer need to walk long distances to obtain water, fuel and fodder for washing vessels, cooking, bathing purposes, and feeding livestock. Women have now more time to devote to other activities including literacy, health care, women's groups, and income-generation projects.

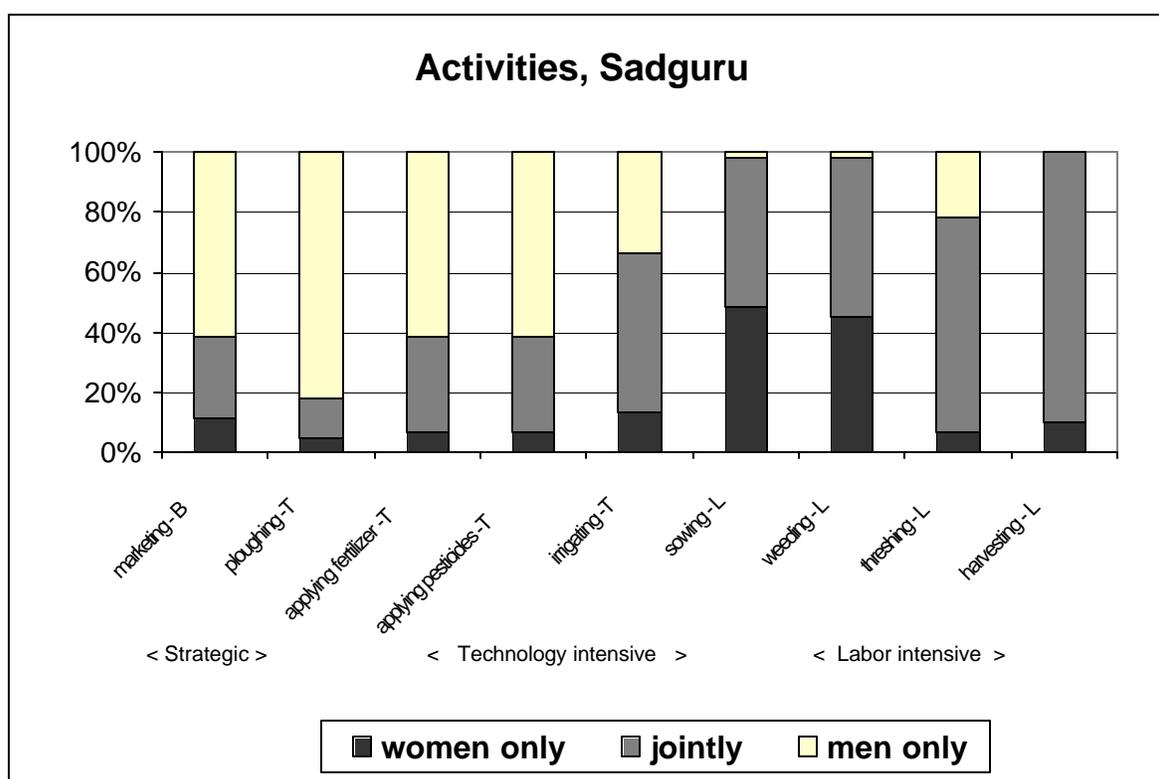
Four years after the start of the irrigation scheme in Tandi, the women organized and formed a milk producers' cooperative. This strong, vocal women's group convinced their men about the profitability of the enterprise. Now, men grow fodder for the cattle in a special part of the irrigation scheme and both women and men take care of the cattle. Water for crops and the cattle is made available when needed.

## 4. Gender in Irrigated Agriculture and Irrigation Management

### Participation in Agricultural Activities and Field Irrigation

Our analysis of the gender dimensions of irrigation seeks to understand, in the first place, how irrigated production, including field watering, is organized within the household, both in terms of labor input and decision making. An analysis of the participation of both genders in each of the components of the various agricultural operations and of the various decisions with regard to the irrigated plots is given in figures 2 and 3.

Figure 2. Percentage of households, by gender of the member, carrying out agricultural activities (n = 60).

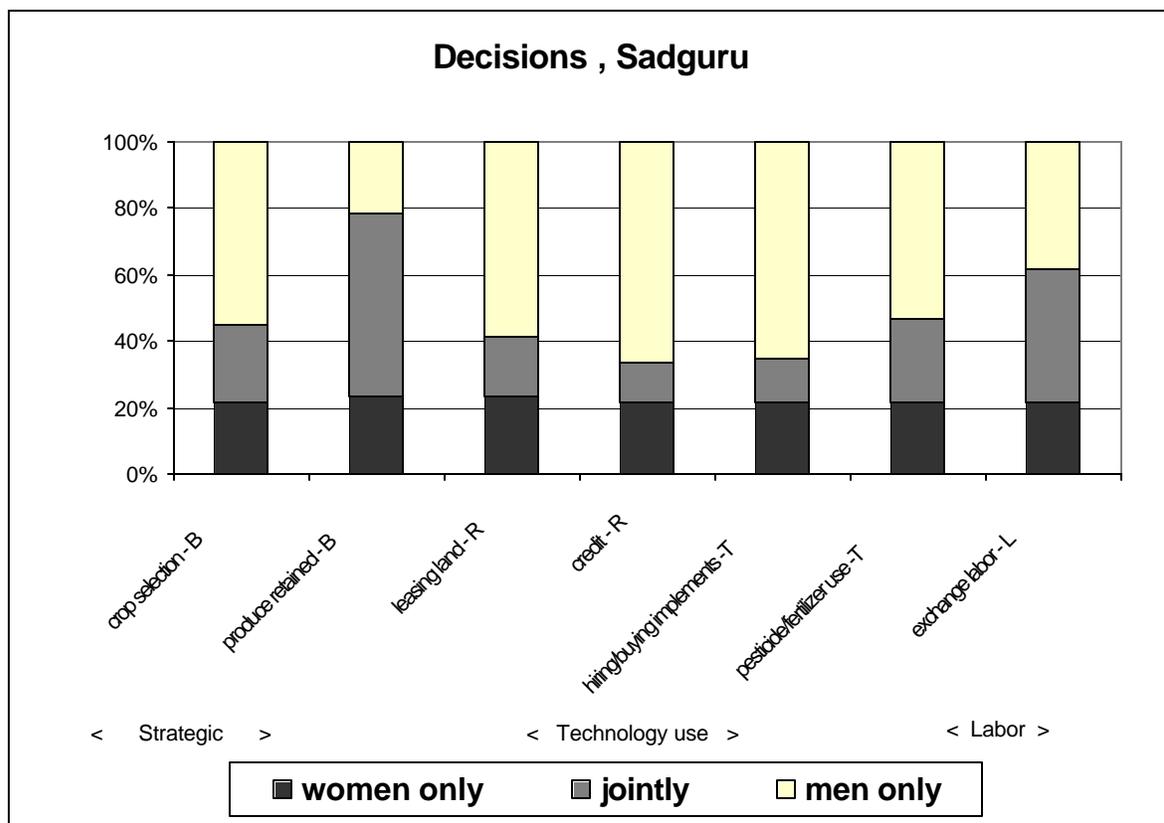


This shows that with regard to agricultural operations, men tend to carry out the technological and highly production-augmenting tasks (T), like ploughing (in 82% of the cases, done exclusively by men), and fertilizer and pesticide application (in 62% of the cases, done exclusively by men). Men are also exclusively performing the task of marketing in 62 percent of the cases. Marketing is usually related to a strong say over the use and benefits (B) of the income gained. Women, on the other hand, tend to be most involved in the unskilled and labor-intensive (L) tasks of weeding, harvesting, and threshing, either alone or jointly with men.

Interestingly, it is only in one-third of the cases that irrigation is performed exclusively by men. In 13 percent of the cases, this task is performed exclusively by women; in half the cases, 53 percent, men and women jointly perform this task.

In agricultural decision making (see figure 3), men’s role is strongest. In around 60 percent of the cases, only men decide over issues like crop selection (which is related to the end benefits–B), application of pesticides and fertilizers, and hiring and buying of implements (technology-related-T), and leasing land and taking credit (resource-related decisions-R). For the exchange of labor (L), men consult women slightly more often, which reflects women’s responsibility to carry out labor-intensive tasks. However, the decision on the use of the harvest either for self-consumption or for sale (benefit-related-B) is, in most cases, a joint decision. Men decide alone on this in only 22 percent of the households. Women do so in 23 percent of the households.

Figure 3. Percentage of households, by gender of the member, taking agricultural decisions.



It can be concluded that in most households men are the main farm decision makers and marketers of the produce, and responsible for the technology-intensive tasks. In these households, women are unpaid family laborers carrying out laborious tasks. They gain in kind through food kept for family consumption or they gain if their husbands spend money from the sale of the produce to satisfy household needs. Irrigation is a task that women perform either alone or with their husbands in two-thirds of the cases. Thus, the task of irrigating fields seems neither a typical female, labor-intensive task nor a male, skilled, and technology-intensive task, but a task in

between. Irrigation is certainly no typical ‘male task’ in these lift-irrigation schemes of the Bhil communities.

### **Participation of Women Farmers in the Irrigation Cooperative**

In the present study, irrigation management issues were mainly discussed in focus groups and a qualitative picture has emerged. The issues discussed encompassed the general tasks that each farmer and each member of the irrigation cooperative carry out besides applying water to the field itself, such as following-up on requests for water, depositing water charges, filling forms to request water, participating in general body meetings, being informed about decisions of these meetings like water rates and rotation schedules, etc. It also concerned maintenance obligations, with regard to both the field channels around one’s plot and the main distribution system.

Apparently, women do participate in these tasks but to a lesser extent than applying water in the field. There is no taboo against women carrying out such tasks. The women were generally satisfied with water delivery, as the men were, except in one case out of the 60 households interviewed. The unreliability of electricity supply by the Gujarat State Electricity Board during the day forced many schemes to irrigate most of the time during the night. In the two studied schemes, and elsewhere as well (Ahmed 1999), extra effort was reported to ensure that widows benefited from the water supplies during the day.

Before the irrigation season, the earthen field channels are cleaned and repaired. Women generally do this work as well. Maintenance of the main distribution system, however, is done by (male) technicians and some men of the cooperative.

In case of scheme-level conflicts, women may participate in scheme-level irrigation management and conflict resolution as well.<sup>3</sup>

### **Formal Membership Criteria**

Before 1995, the formal government regulations on Cooperative Irrigation Societies stated that only persons who own land could be members of the Irrigation Cooperative. In 1995, however, NGOs in Gujarat challenged this rule. Then, the option was added in the law that “one female household member of the Co-operative member will be considered a nominal member, and she will have to pay Rs10 as a fee” (Registrar of Co-operative Societies, 1996). This membership is annually renewable. Nominal female members are entitled for appointment or election to the executive committee of the irrigation cooperative. However, nominal members who take part in general body meetings have no right to elect the management committee and do not share in the

---

<sup>3</sup>For example, in Bambela-II, Jhalod Taluka, three plates from the outlets were stolen from the irrigation cooperative. The women’s savings group, about 40 to 50 women who attend the irrigation meetings, proposed to close the scheme until the lost plates were returned. This strategy worked, the plates were returned, and the scheme started operating again.

property of the society. However, Sadguru is currently changing the bylaws regarding these clauses to extend women members' rights to vote.

The six women who were the *de facto* landowners had shares in their names, even though only one was the registered landowner. In fact, quite a few men have no land in their names, and no water shares in their names. Generally, with the Bhils the land remains in the name of the father or is shared between the sons. Sons are given specific plots to cultivate. It is often only after the father's death that the ownership is formally transferred along the male line. Nevertheless, sons who are the main farm manager and irrigator are *de facto* members of the cooperative.

### **Participation of Women in Committees**

The changes in the bylaws of the State Irrigation Co-operative Laws with regard to women since 1995 also concerned women as committee members. It has been made compulsory that

“There will be three female members in the committee. In case there are no sufficient female members in the society, appointment from among the nominal female members' quorum will be counted with more than half of the members.”

So if no women are elected among the seven to eleven members of the Executive Committee by the general body of the cooperative, three women have to be co-opted on the cooperative committee. Those who are already members of the Executive Committee vote for the “co-opted” member. For the moment, being co-opted as a committee member does not give more rights than those of a nominal member, but Sadguru wants to ensure that women committee members have the same status as other Executive Committee members. This has already succeeded in a village in Jhalod Taluka, where the Kachumber falia elected one female and one male member. In another village, Chanasar-III, a woman member became the chairperson because of the number of votes that she got as compared to her male partners, and, thus achieved a similar status as men. Ahmed (1999) describes how she performs as well as men do. She sets a new model in irrigation governance. This contrasts with other women committee members in other villages, who are co-opted members, while, in reality, their male kin perform all duties.

In one village in Dahod Taluka, a wife of an operator in the irrigation system started sharing this responsibility with her husband. All accepted this. Myths on women's technical incapacities and the belief that operators and mechanics are men's work are still very strong. Women themselves are also reluctant to take up such roles, although Sadguru encourages and trains women to operate the system on their own.

### **Training and Awareness Raising**

Through the lift irrigation cooperative training and leadership and management training, the organization is trying to sensitize members on the role of women in irrigation cooperatives. At the

community level, women are encouraged to participate not only in various cooperative meetings, but also in training and exposure and study tours. While the efforts by Sadguru lead to wider recognition of the importance of women in irrigation, change is slow. Irrigation management at the committee level remains almost exclusively dominated by men.

## 5. Conclusions

Women are more strongly involved in field irrigation than is commonly assumed. In two-thirds of all households women are involved in this task. Mostly, they work together with their male kin, but in 13 percent of all households, women are the only ones to perform this task. With regard to other water management tasks that farmers normally carry out, men assume those responsibilities more often than women, also in households in which field irrigation itself is a joint affair. The women who do perform such managerial tasks are generally treated in the same footing as men. No gender-specific problems were reported. Some women participate in general body meetings.

Formal membership criteria of the cooperative are disadvantageous to the male and female irrigators who are not land titleholders. Formally, secondary rights of “nominal membership” are offered to female kin. Sadguru’s reconsideration of legal measures, combined with their continued awareness raising, encouragement, and training of women, are especially relevant for the households in which women alone are responsible for irrigation, as was the case in 13 percent of the households in the present study.

Women’s inclusion in committees and in paid jobs as secretary, distributor, and operator, started recently. In some of these rare first cases, women performed as well as men did. Their examples may especially be followed by women who irrigate either alone or with their husbands and who, therefore, will probably be most motivated to assume such new roles of irrigation leaders. Sadguru’s support for women’s economic and social empowerment in other domains than irrigation may also appear an indirect, but effective routing to improve women’s status within the family farm and irrigation management. Women’s self-confidence, skills, and leadership qualities that are built in other domains than irrigation are likely to contribute considerably to their successful participation in Irrigation Cooperative Management Committees as well.

**A. Village Tandi, Jhalod Taluka**

Total population	:	1,600
Male	:	795
Female	:	805
Number of households	:	300
Number of hamlets	:	4
Total village area (ha)	:	250.86
Forest area	:	-
Total wasteland (ha)	:	41.91
Gaucher land (ha)	:	21.95
Water sources	:	river, wells and hand pumps
Market distance (km)	:	5
Village groups	:	
Youth groups	:	1 (22 members)
Women groups	:	2 (80 members)
Women milk cooperative	:	1 (95 members)
% of tribal population	:	90
Number of families in the irrigation project area	:	116
Area under irrigation		
kharif (acres)	:	180
rabi (acres)	:	270
summer (acres)	:	35
Total (acres)	:	485
Source of water for lift irrigation	:	River Machhan
Year of Formation of lift Irrigation Co-operative	:	1993–94
Executive members	:	12
Women in the executive committee	:	4
Capital costs (million Rs)	:	1.3

## Operational cost (Rs).

	1997–98	1998–99
Water rate (per acre)	180	180
Water charges collected	30,742	60,210
Maintenance expenses	20,673	21,549
Electricity bills	16,899	12,743
Salary	20,850	18,995
Profit	---	7,350.70

## B. Village Chhasiya-1, Jhalod Taluka

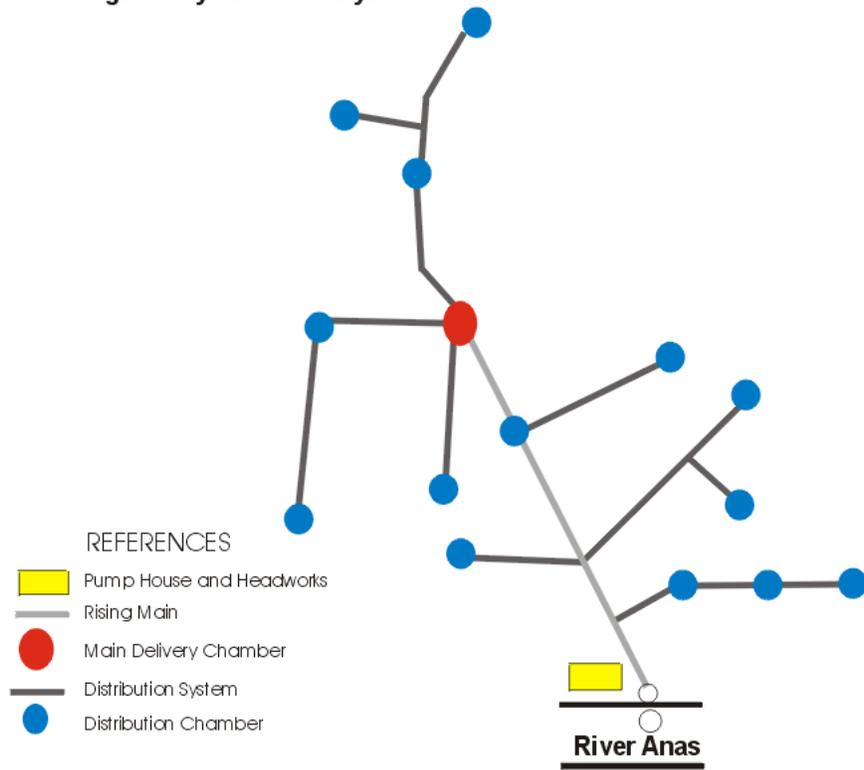
Total population of Chaysia-I,II	:	1,218
Male	:	611
Female	:	607
Number of households	:	338
Number of hamlets	:	1
Total area (ha)	:	408.81
Forest area (ha)	:	84.01
Wasteland (ha)	:	49.27
Gaucher (ha)	:	46.51
Water sources	:	river, wells, hand pumps
Market distance (km)	:	16
Village groups	:	Women's saving and credit groups-2 25 members
Number of families in the irrigation project area	:	43
Area under irrigation	:	
kharif (acres)	:	60
rabi (acres)	:	90
summer	:	
Total (acres)	:	150
Source of water	:	River Anas
Formation of Lift Irrigation Cooperative	:	1996-97
Executive members	:	12
Women in the executive committee	:	3

### Operational cost (Rs).

	1997-98	1998-99
Water Rate (per acre)	160	160
Water charges collected	12,596	25,156
Maintenance Expenses	149	924
Electricity Bills	3,695	9,220
Salary	3,500	10,100
Profit	5,016	4,992.50

The lift irrigation scheme was constructed at a cost of Rs 1.1 million on the Anas river, a major river flowing through this tribal belt.

### Lift Irrigation System: Chhasiya-I



## **Literature Cited**

Ahmed, Sara. 1999. Changing gender roles in irrigation management. Sadguru's lift irrigation co-operatives. *Economic and Political Weekly* 3,596–3,603. December 18, 1999.

Government of Gujarat. 1996. *State Irrigation Co-operative Bye Laws*. Gandhinagar, Gujarat, India.

**Postal Address**

P O Box 2075  
Colombo  
Sri Lanka

**Location**

127, Sunil Mawatha  
Pelawatta  
Battaramulla  
Sri Lanka

**Tel.**

94-1-867404, 869080

**Fax**

94-1-866854

**E-mail**

[iwmi@cgiar.org](mailto:iwmi@cgiar.org)

**Website**

[www.iwmi.org](http://www.iwmi.org)