FINAL DRAFT

MID-TERM EVALUATION OF THE SADGURU WATER AND DEVELOPMENT FOUNDATION'S FIVE-YEAR PLAN

by

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Aga Khan Foundation (AKF)
Sadguru Water and Development Foundation (SWDF)

January 1993

REP/93/NY

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SWDF TREE SONG

"Trees are our great friends
For good rains, grow more trees
Grow trees on fields and boundaries and make soil friable
Planted on waste land and control soil erosion
Trees are our great friends
Because
One tree is equal to ten sons
Trees give use fresh air
Trees give us cloth
Trees give use food
Trees give us medicine
Trees give us fodder
Trees give us fuel
Trees give us shelter
Trees give good environment and health
Trees conserve the soil
Trees having good rain
So trees are our good friends"

Used in role plays and songs
by the motivation group.
It was conceived of by
Jayswahl, Prashmi, Ashmita
and others.

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Abreviations and Conversions

Rupee (Rs) 100=		ca. USD 3.3 (at the time of field visit)
Rs 100	=	ca. NOK 21.45
1 lakh	=	100,000
1 cror	=	10,000,000
ca.		circa (approximately)
NORAD		Norwegian Agency for Development Cooperation
NORAGRIC		Norwegian Center for International Agricultural Development
AKF		Aga Khan Foundation
SWDF		Sadguru Water and Development Foundation
NGO		Non-Governmental Organization
B/C		Benefit/Cost
LI		Lift Irrigation (LIC-Lift Irrigation Cooperative)
Kharif		wet (monsson) season: June through mid October
Rabi		dry season: Mid October through mid February (irrigation season)
Summer		hot season: Mid February through May

1.0 EXECUTIVE SUMMARY

SWDF has successfully achieved its output targets. The outputs, both technical and social, have had significant positive development and environmental impacts on the target groups. The methodology is technically, socially and economically sound, and represents an excellent investment of donor and government funds. SWDF is well managed, yet as it evolves it will require some change, some of which has been started, to achieve its strategic goals. This report aims to assist in that process.

1.1 The Evaluation

In 1990, SWDF embarked on a five year plan which was to benefit 16,500 households in 75 villages mainly through the development of local water resources. In light of this, the overall objective of this mid-term evaluation as stated in the terms of reference is to:

- review the progress made by SWDF towards the fulfillment of the program objectives as laid out in the five year project proposals written in June 1989 for the period 1990-1994

- help SWDF to chart strategic directions and to undertake mid-term corrections.

The team was comprised of the following members:

Ingrid L.P. Nyborg, Researcher, Norwegian Center for International Agricultural Development (NORAGRIC)

Robert Mitchell, International Development Consultant. (recruited by AKF)

Dr. Sindhu Phadke, Professor, Mahalaxmi Trust Chair, Tata Institute of Social Sciences, India

Jan Erik Studsrød, Researcher, NORAGRIC

The evaluation took place in India from November 22 - December 7 1992. The Team was provided with extensive background material to help in the evaluation, as well as a separate report prepared by SWDF's Director and staff summarizing the project's progress.

The evaluation itself was a combination of numerous field visits, attendance at regular staff meetings, observation of regular village motivation and training meetings, and special meetings with staff (both in groups and individually), villagers, and government officials.

The team presented preliminary findings in Dahod on December 3 to Sudhir Rao of AKF. These findings were again presented to NORAD/New Delhi on December 7. An expanded executive summary was submitted to NORAD/New Delhi at the end of December. The current document represents the final draft of the report, submitted in January 1993.

1.2 Technical, Socio-Economic and Environmental Components

Since its start in 1975 SWDF has developed considerable technical expertise. Technical designs and implementation are undertaken by SWDF own staff. Since 1988 there has been a considerable strengthening of the technical staff. The technical achievement of SWDF would not, however, have been possible without the highly competent work of the other sections of the organization.

1.2.1 Physical Targets

The physical targets set forth in the five year plan have all been reached. In some cases the goals have been exceeded. This is partly due to a combination of increased availability of government funds and a very strong demand for SWDF services.

30 lift irrigation schemes and 41 check dams have been completed. As a result 4050 and 5566 acres in kharif and rabi season respectively can potentially be irrigated. More than 11 million seedlings have been transplanted and 4578 acres have been developed as a part of watershed development activities.

The technical structures (check dams, LI schemes etc.) are generally very sound. There is an emphasis on using locally available materials of high quality. The technical designs and workmanship have been observed by numerous visitors in various capacities to be of very high quality. The older schemes visited are still well maintained.

1.2.2 Benefit/Cost Analysis

A simple benefit / cost analysis was performed to illustrate the long term benefits and the economic sustainability of SWDF schemes. The model is based upon an average scheme integrating the four main technical components: lift irrigation (LI), a check dam, watershed development and social forestry. Many, but not all SWDF schemes include all four components. Such a scheme would typically serve about 100 beneficiaries (700 people). The results from the B/C analysis are exceptional and compare favorably with most any Third World development investment.

The B/C analysis which includes direct costs and conservatively estimated direct quantifiable benefits, clearly indicates that investment in SWDF programs is based on sound economic and developmental decisions. This conclusion is strengthened by the existence of a wide variety of economic, environmental and social benefits not accounted for in the model.

1.2.3 Non-Monetary Benefits

Non-monetary benefits of SWDF projects include positive environmental effects such as increases in the water table, reduced soil erosion and an increase in the vegetative cover. Further benefits include reduced migration rates, improved housing, increase in literacy rates, skills development, increased food security, decreased risks from drought, improved access to fuelwood, improved political confidence and participation.

1.2.4 SWDF Schemes vs. Government Schemes

A comparison of government and SWDF check dam programs revealed the superior quality of SWDF programs. This was substantiated in interviews with senior government officials. Government officials also pointed to the better management of SWDF LI cooperatives by the villagers, including their more equitable distribution of water.

1.2.5 Agricultural Output and Environmental Effects

Due to the increased availability of water for irrigation purposes there has been a large increase in agricultural output as one or even two more growing seasons have been added to the traditional monsoon crop. This dramatic increase in food production is the single most important factor for the rapid development in the project area.

The overall impact on the environment is positive. It is apparent that there has been an increase in the water table, decreases in the rates of soil erosion and an increase in the vegetative cover in the project area. To enhance this, we suggest:

- Increased effort should be made to create multistoried canopies in designing more ecologically benign agroforestry systems. For example, inclusions should be made wherever feasible of a shrub layer as well as planting of more multipurpose tree species. An increase in the planting of fodder species would help bridge the current short supply of fodder during the summer season.

1.2.6 Planning, Monitoring and Evaluation

Each SWDF section keeps a wealth of data on its activities, which it summarizes in quarterly reports and passes on to the monitoring and documentation section. With the aid of computers, this section compiles the data from each section, making it available to any section which may require it in the future.

With such a wealth of information at its fingertips, the monitoring section has the potential to be an extremely valuable documentation center for both the project and outsiders. In addition to monitoring and evaluating results, this unit could also play a key role in consolidating the longer term plans from each section to periodically produce a village plan. This could be produced, for example, every 6 months as a way to help the sections, central management and the villagers keep track of all of the activities planned for each particular village.

In general, we see a need for:

- Strengthening of the monitoring and documentation section to enable existing data to be more accessible to staff and others, and to develop participatory methods of monitoring and evaluating. An outside consultant could be useful in the early stages.

More specifically, we suggest SWDF:

- Concentrate on developing a combined data-set at the *village level*.

- Decide by which criteria SWDF wishes to evaluate it's performance at the village level. These criteria should be the same for each village to allow SWDF to compare its progress in different villages with the same or different combinations of schemes. Criteria could include measures of food security, income, vegetation cover, quality of housing, drinking water quality and availability, health and nutrition, fuelwood availability, migration, education/literacy etc. (including others which *staff and villagers* decide are important to measure).

- Determine the most appropriate source of data for each of the criteria. It is important to make a list of the data currently available in the SWDF database to get an overview of existing data-gaps.

- Determine the frequency of collection and level of aggregation. Two previous consultants have stressed the need to monitor the range of individual's responses to the various interventions as well as the need to look at village averages.

- Develop appropriate formats of the data for planning, monitoring and evaluation. It is important that the users (staff, villagers and outsiders) find the village presentations easy to understand and utilize.

- Explore different ways to collect different types of data. The data required for use by SWDF is both quantitative and qualitative, and there are a number of alternatives available when choosing methods of data collection for both types. Formal surveys may be appropriate in some cases, however, they can often be time consuming and require extra resources in compiling and interpreting. Recently the monitoring section, together with the watershed section, undertook a participatory rural appraisal of Gamana village in Rajasthan. The villagers, under the guidance, of SWDF staff produced resource and social maps of very high quality. The results were impressive and such exercises could potentially be used more regularly as a part of SWDF planning, monitoring and evaluation activities.

- Define topics of interest to the project but outside of its capacity which can be addressed by visiting researchers. Since the project does not have the capacity to do extensive research of its own, it could instead use outside researchers, as has been the practice to date. It would be an advantage to promote research cooperation with institutions both within and outside of India. This cooperation could lead to important advances in the understanding of the project's interaction with the natural environment.

1.3 Organizational and Community Development Aspects

1.3.1 SWDF Organizational Approach

SWDF's uniqueness lies in the manner in which it has utilized large government and other national/international resources, with appropriate technology and effective social mobilization. The sequence and timing of program components are adopted to the beneficiaries priorities and perceptions. The principles of equity, social justice and public accountability which govern SWDF operations facilitate credibility and social mobilization.

After a systematic strategy to promote community awareness and commitment of beneficiaries, SWDF provides initial support in organizing LI Cooperative societies through training and supervision of office bearers. Thereafter, LICs are encouraged to take over responsibility for managing the various tasks e.g. deciding on selection and salaries of staff and methods of water charges, schedules for distribution of water, recoveries of dues; maintaining accounts; resolving conflicts etc. Considerable variations are allowed in L.I.C.s management practices, as also their dependence on SWDF. The goal of SWDF is to promote complete community self-reliance.

1.3.2 Strategies for Social Mobilization - Development of Village Organizations and Leadership

SWDF strategy for social mobilization consists of various elements: development of village organizations such as LICs, cadres of LIC office bearers, village-based volunteers assigned to various activities e.g. social forestry, biogas, preventive health care; nursery raisers; health motivators who are given special training in preventive health care in addition to safe delivery; supervisors selected from among the better-educated tribals to keep close contact with the beneficiaries of various program activities and SWDF section staff.

SWDF organizational strategies include extensive efforts to motivate and educate the beneficiaries about various programs through meetings in villages or at SWDF office, exposure visits by potential participants to more experienced program villages, broadening the scope of knowledge and awareness of single purpose functionaries, to increase general social awareness. Regular joint meetings of functionaries from different villages are used by SWDF to review field experiences which provide opportunities to learn from each other, note

problems/shortfalls in performance if any, identify corrective actions needed and timely follow-up in the field of future plans agreed in meetings.

1.3.3 Participation of Women

SWDF has consciously encouraged the participation of women by using several methods: persuading L.I.C.s to include women on managing committees; developing program activities with exclusive or predominant participation by women, e.g. nursery raising, biogas operators, health motivators, income-generating activities (garments and bead ornaments). The participation in various activities and meetings has enhanced the confidence of women, provided them income and decision-making power over use of their earning, thus enhancing their social and economic status. Women have benefited by SWDF programs through increased family food-security and stability due to eliminating the need of migration; saving of time and effort through availability of fuel-wood from their own trees or because of biogas plants in some cases. The opportunities of participation in SWDF programs has enhanced the prestige and self-esteem of women and improved their access to amenities and government services.

- SWDF should continue to develop new longer-term income earning opportunities for women as they continue to gain confidence and skills from project activities.

1.3.4 Training for Social Mobilization

Besides more structured initial training by SWDF staff exposure visits, on-the-job training through placements of new functionaries with more experienced ones, SWDF staff use a variety of training aids such as plays, stories, pictures, photographs, games and songs with learning messages. These enable participants to develop greater awareness of themselves and their situations, and motivate them to empower themselves through new learning and organizing themselves as a joint force in fighting problems like corruption, exploitation and social injustice.

- In training, there is a need for documentation of selected SWDF experiences to serve learning/training needs of SWDF staff, other NGOs and government officials. It is also desirable to create the position of a Training Coordinator to cope with new and more challenging training tasks ahead.

1.3.5 Conclusion:

The implementation of SWDF programs has facilitated in making the tribal beneficiaries more confident, articulate in their demands and aware of their rights. The food security and stability, with elimination of the need for migration have enhanced their motivation for preventive health, education, savings for future, improvement of housing and ability to tide over exigencies. They now have better access to public amenities through the pressure they have learned to exert on government officials and politicians. SWDF has demonstrated that this achievement is sustainable and feasible through relatively modest costs of government and other resources and appropriate technology combined with effective social mobilization.

- We feel SWDF should continue in the directions they have chosen to date, which promise to further the empowerment of all villagers, both men and women.

1.4 Management and Finance

SWDF delivers excellent development services on schedule, within budget, and with high and quick benefits compared to costs. There is, however, relatively little structured or written

material on how SWDF manages its operations. SWDF staff is excellent at doing, and in describing what it does and why, and some of the impact. But it has some weaknesses in describing how it manages the overall process. This weakness is, in the short term, not a serious issue. However, longer term plans for delegating more responsibility from the directors to the staff, training other NGOs, training new staff and improving monitoring functions would benefit from a more formal presentation of how SWDF manages to integrate its activities so successfully. It is recommended that:

- SWDF document how it manages its existing planning, implementation and monitoring procedures for field operations, for all activities, identify gaps or uncertainty in the management of these activities, and add some simple components to clarify or strengthen the activities or management process. The output of this exercise should be short. Consultant assistance could be useful. The objective is not to write a bureaucratic procedures manual. Short guidelines, allowing for flexibility, are sufficient. Following this exercise, a similar process could be used for other head office functions.

1.4.1 Organizational Sustainability

A key issue is how will SWDF be managed and by whom, in 5 to 10 years. The founding directors would like to eventually take a less active role. In the last 2 years, much of the responsibility for planning and implementing the field operations has been delegated to senior staff. This is a healthy evolution, and efforts are underway to continue this process. To assist this process, it is suggested that the Board assume additional responsibilities, personnel and staff development policies be improved, and longer term plans such as training other NGOs be implemented as soon as possible.

As in any organization, there is a certain amount of staff turnover at SWDF. This turnover, mostly at the junior lelvel in the last year, is not a serious issue at the moment, and within the bounds of what could normally be expected. The present staff is young in SWDF experience, mainly due to the doubling of staff size over the last three years. Existing efforts to retain experienced staff should be strengthened, and someone should be assigned to focus on implementing improved personnel, recruitment and staff training procedures. While personnel policies in terms of pay and benefits are apparently better than average for NGOs in India, it would nevertheless be useful to:

- Have a simple career development path and strategy which is transparent and clearly understood by all staff.

- Supplement incomes, with increased pay or benefits where necessary, and where the reasons are clear to all staff (For example, some of the senior engineers or trainers may have higher opportunity costs than other staff). At minimum, pay increments should keep pace with inflation, which may increase if new economic policies in India are not well implemented.

- Plan a longer term staff training program and internal budget for both in-house and external training, so the staff know well in advance that they will receive training; and staff should be consulted more systematically on the type of training required.

1.4.2 Board of Trustees

The board, at least a minority of it, appears to be reasonable informed on major issues. Active strategic and operational authority has been largely delegated to the Director. This has basically functioned quite well in the past, as seen in SWDF's outstanding performance. In the past few years, however, SWDF has evolved from a small NGO, to a larger one with broader and more complex operations, financing and strategic options. This expansion has

placed more responsibility on the Director, in effect, overloading him. Since Board members, in any organization, are usually more helpful if they have specific additional activities, we suggest the Board might wish to undertake the following activities:

- Management of the corpus fund.
- Fund raising in the private sector in India or elsewhere.

1.4.3 Advisory Council

- It is suggested that the purposes and role of the Council be clarified, and as with the board, some specific objectives be set for them to achieve. One possible activity may be to prompt government to plan financial commitments to SWDF to reduce the suspense in government funding.

1.4.4 Next Five Year Plan

- It is suggested that the next plan include some objectives regarding management of SWDF as an organization, and perhaps objectives for the Board.

1.4.5 Financial Sustainability

The reliability of future funding, particularly for staff and overheads, is an issue of considerable concern to the Director. This "risk" may be overemphasized for four reasons: SWDF has not significantly publicized its accomplishments and investment potential; its proposed corpus fund and training center services have the potential to generate considerable income; its cash flow management could benefit from the use of more modern techniques; and staff and overhead costs are a small part of its total budget. The following options should be considered:

- Longer term cash flow projections, some modern risk assessment techniques, and more use of computers.
- Use of short term loans for working capital (SWDF has never used its line of credit).
- Negotiations with donors to allow some flexibility in short term alternative uses of funds, or to gain more definite longer term commitments.

1.4.6 Meeting Demand

SWDF's program is becoming well know to many villages. There are about 100 village applications on file, about 50 of which may have potential for lift irrigation. To meet a larger portion of this demand, SEDF has decided to train other NGOs to implement similar services. Construction of a Training Center has started, and sufficient funds will likely be available from AKF, NORAD and Stanrose for its completion in 1993. To design, test and implement a training program for other NGO's will likely require a year or two. While some planning has already been initiated, it is suggested:

- SWDF appoint sufficient staff to design and test training materials as soon as possible.
- A meeting be held between the Directors and donors to resolve their concerns about funding and planning the operations of the Training Center.

2.0 THE EVALUATION

In 1990, SWDF embarked on a five year plan which was to benefit 16,500 households in 75 villages mainly through the development of local water resources. In light of this, the overall objective of this mid-term evaluation as stated in the terms of reference (appendix 1) is to:

- review the progress made by SWDF towards the fulfillment of the program objectives as laid out in the five year project proposals written in June 1989 for the period 1990-1994

- help SWDF to chart strategic directions and to undertake mid-term corrections.

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Jan Erik Studsrød, Researcher, NORAGRIC

The evaluation took place in India from November 22 - December 7 1992. The team met at the NORAD/New Delhi office on 22/11 for an orientation by NORAD (G.V. Rao) and AKF (Sudhir Rao), before leaving for Dahod, Gujarat that evening.

Upon arrival in Dahod, the team was given an introduction to the project by the Director and Co-Director, Mr. and Mrs. Jagawat, and provided with extensive background material to help in the evaluation (see list of references in Appendix 2). In addition, Mr. Jagawat. with input from the staff, had summarized the project's progress in a separate report. Both the background studies provided and the report prepared specifically for the evaluation, were invaluable in providing data and orienting the team on the project's progress.

The evaluation itself was a combination of numerous field visits, attendance at regular staff meetings, observation of regular village motivation and training meetings, and special meetings with staff (both in groups and individually), villagers, and government officials. A detailed schedule of meetings and activities can be found in appendix 3).

The team presented preliminary findings in Dahod on December 3 to Sudhir Rao of AKF. Some parts of the draft report and general findings were discussed by the team with Mr. and Mrs. Jagawat on December 6, in order to check the accuracy of statements, seek clarification and correct factual errors. These findings were again presented to NORAD/New Delhi on December 7. Due to political disturbances in India at the time of the team's departure and difficulties in communication logistics between the team members, the team submitted an extended Executive Summary to NORAD/New Delhi in December 1992. The current document represents the final draft of the report, submitted in January 1993.

The team would like to express its appreciation to the Directors and other staff of SWDF, who gave their utmost to ensure an effective evaluation. They set up meetings and provided transport for the team whenever required, even if it meant many hours overtime.

3.0 INTRODUCTION

Sadguru Water and Development Foundation (SWDF) was established by the Stanrose Group of Companies in 1975 to work in the tribal areas of Panchmahals, Gujarat. The activities of the early years of the project have been described in numerous reports and therefore will not be repeated here. References to activities during that period, however, will be made throughout this report for purposes of illustration and comparison.

In 1990, SWDF started a five year plan for which funding was received from the Indian Government, AKF, Ford Foundation, NORAD and the Stanrose Group. According to the five year plan document, the activities to be carried out under this period were to be organized around four major types of technical interventions:

- check dam construction
- lift irrigation development
- social forestry
- watershed management.

In SWDF's organizational structure, each of these activities has it's own separate section and staff, which interact with the other sections in planning and implementation. We found that much of the project data and documentation centers around the physical targets of these four main areas, sometimes giving the impression that the project is almost exclusively technically oriented, and that other activities are small by-products of these activities. We feel that this description does not give a complete or accurate picture of all of the core activities of SWDF. There are two additional sections which play key roles in the functioning of SWDF, the Lift Irrigation Cooperative Cell, and the Training, Motivation and Health section. As will be discussed in detail in the report, these sections are critical to the success of the technical components, and must also be seen as main activities of SWDF. There are also two new components which have been added during the five-year plan; biogas and income generation. While these are still limited in their scope and therefore not main activities of the project, they represent an important part of SWDF's long-term strategy to give villagers a choice in sustainable technologies and income opportunities. Thus, in this evaluation, we will consider SWDF as it actually has developed and functioned since the five-year plan was initiated, and not limit our analysis to the content of the five-year plan document.

Before proceeding, however, one point should be clarified. Throughout the SWDF documentation, the term "beneficiaries" is used. SWDF uses this term to refer to the households effected by the programs. This may cause some confusion to outsiders who normally use the term to refer to individuals. In this report we have tried whenever possible to specify whether we refer to households or individuals to avoid this confusion. We suggest that SWDF in the future make this distinction in their data and reporting so as to avoid any misinterpretations.

4.0 TECHNICAL, SOCIO-ECONOMIC AND ENVIRONMENTAL COMPONENTS

4.1 Physical Targets and Achievements

Since its start in 1975 the Sadguru Water and Development Foundation has developed considerable technical expertise in its various departments. Technical designs and implementation of the various programs are undertaken by SWDF's own very capable staff. Since 1988/1989 there has been a considerable strengthening of the technical staff, partly due to the availability of funds from the Ford foundation and the AKF. The technical capability was further strengthened after 1990 when the five year plan was initiated and additional financial support was secured from NORAD. It is however important to point out that the technical achievements of SWDF would not have been possible without the highly competent work of the various other sections of the organization. This aspect is covered in more detail elsewhere in this report.

In the five year plan specific physical targets were set out for each of SWDF's main technical components. For the purposes of the mid-term evaluation, the targets have been broken down to represent the period 1990 to 1992. The physical targets are presented below together with the achievements and a short discussion.

4.1.1 Lift irrigation schemes.

Table 1

Lift Irrigation Targets and Achievements

YEAR	No LI Schemes in 5 year plan	Total cost Million Rs	Expect. govt finance million Rs	Actual No. LI schemes implemented	Total cost. million Rs
1990	8	7.04	4.0	10	
1991	8	7.04	4.0	8	
1992	8	7.04	4.0	12	
Sum	24	21.16	12.0	30	33.9

Since the initiation of the five year plan altogether 30 schemes have been completed. With a target of 24 for the first three years of the five year plan SWDF is well above the planned target. This has been possible due to an increase in the availability of government funds.

The average cost for the construction of one LI scheme was estimated at Rs 0.88 mill. in the five year plan. In this estimate 10% managerial cost was included. The total cost of the 30 schemes was Rs 33.9 mill. The average cost being Rs 1.13 mill. Considering the fact that the five year plan was written in 1989, the increase in average cost per LI scheme seem quite reasonable. Inflation in India has been about 10% over the last few years .

There is a large difference between the size and cost of the various LI schemes. The cheapest one costs only Rs 251,403, while the most expensive costs Rs 2.36 mill. The average cost per potential irrigated acre was Rs 6080.

Appendix 4 gives basic details of the lift irrigation schemes executed in the period 1.1. 1990 to 31.10 1992.

4.1.2 Water Resource Development (Check Dams)

Table 2

Check Dam Targets and Achievements

YEAR	No. of dams in 5 year plan	Total cost (Rs. million)	Expected govt support (Rs. million)	No units completed	Actual cost (Rs. million)
1990	11	6.05	2.5	10	
1991	12	6.05	2.5	10	
1992	12	6.05	2.5	21	
TOTAL	35	18.15	7.5	41	13.68

The construction of check dams are important in capturing runoff water from the surrounding watershed and to collect water from upstream that otherwise would have been lost. These dams are thus extremely important as they make it possible to use surface water for an extended part of the year for irrigation as well as other purposes. Quite often the building of check dams is necessary to efficiently utilize LI schemes and these projects often go hand in hand.

The average construction cost for the of one check dam is Rs. 0.32 mill. The variation in size is great. The cost of the smallest check dam was only 16% of the cost of the largest dam. Some of the larger check dams also support several LI schemes. The combination of check dams and lift irrigation is indeed a very viable alternative to other irrigation possibilities, e.g. flow irrigation and tubewells.

The most important direct benefit of the check dams is of course the increased availability of water for a longer part of the year. Some of the schemes have water year-round while others dry up during the last part of the rabi season or the beginning of summer. Increased availability of water is mostly utilized for irrigation for the a second and sometimes even a third crop during the summer season. Other effects includes an increase in the water table in the adjacent lowland areas and a consequent increase in the vegetative cover. As for direct economic benefits these are difficult to assess. Some of these are captured in the C/B analysis in section 4.2.

4.1.3 Social Forestry Development

Table 3
Tree-Planting Targets and Achievements

YEAR	Tot. seedlings to be raised (in millions)	Expected govt support (Rs million)	Managerial support (Rs million)	Actual planted (in millions)	No. of households
1990	4.0	4.0	0.40	4.156	4169
1991	4.0	4.0	0.40	3.568	3829
1992	4.0	4.0	0.40	3.168	2875
TOTAL	12.0	12.0	1.20	10.892	10873

SWDF started its social forestry program in 1982, the above table looks only at the last three years of operation. The actual number of beneficiaries must be multiplied by the average size of the household which is about 7 to get the total number of people that directly benefit from the development of social forestry.

The cost per seedling which includes raising the seedlings, digging pits and planting comes to about Rs 0.55. With a survival rate of about 50% (the survival rate reported by SWDF) the total cost per seedling is about Rs 1. This is only about 15% of the cost of raising 1 seedling in the government nurseries (planting included). The government support the program and contribute Rs 1 per seedling.

The various direct and indirect benefits from the social forestry program (the program is actually a mixture of social forestry, farm forestry, agroforestry and wasteland development) are rather difficult to measure. Some of the benefits are captured in the B/C analysis while others are discussed in later sections.

4.1.4 Intensive Watershed Development Program

Table 4
Planned and Actual Area of Watershed Development Activities

YEAR	Tot target in 5 year plan. (acres)	Actual area covered (acres)	No of households benefiting
1990	500	500	270
1991	2000	2000	681
1992	2000	2078	903
TOTAL	4500	4578	1854

The per acre cost of watershed development is Rs. 825, which includes the construction of gully plugs, stonewalls, building of terraces and earthen bounds, digging contour trenches, planting soil binding grasses etc. (SWDF managerial cost included, the cost of tree planting excluded). Of this 40% of the cost is shared by the beneficiaries which contributed their labor. For example, at an average cost per households of Rs. 1307 (Rs. 825 per acre), farmers would provide labor equal to circa (ca) Rs. 523, and receive the rest (minus materials) as payment from the program. The immediate benefit of this program may be hard to capture but some indicators are available.

The increased vegetative cover will reduce/stop splash erosion. Whatever erosion that still exists will be captured by the physical structures and not transported away from the area. The availability of fodder will increase from soil-binding grasses (benefits from tree planting discussed elsewhere). In addition some wasteland is converted into cultivable land. As a result of the watershed development program (since 1/1/90) 306 acres have been converted from wasteland to cultivated land. Given an initial low yield of 400 per acre of maize this gives about 10 kg of maize per capita. In addition there is an increase in yield on existing cultivable land by 1/3 the first year and 1/2 the second year. Some of this land would also benefit from LI schemes with a consequent much higher increase in the output per acre.

The development of watershed has also resulted in decreases in the runoff of soil and the sediment load of the local bodies of water.

4.1.5 Technical Soundness (check dams, LI schemes, biogas plants)

It is clear that the SWDF staff really are proud of what they are doing. During the team's various field visits we were often accompanied by the various people in charge of the particular projects. The pride they showed when we were shown the various projects speaks for itself. Check dams and pump houses are often painted in bright colors and the overall look is that of maintenance and cleanness. There is an emphasis on the use of high quality, locally available materials . The overall soundness of the technical designs and workmanship have been observed by numerous visitors in various capacities to be of very high quality. The team has no reason to question this aspect of SWDF's work.

4.2 Benefit/Cost Analysis

To illustrate the long term benefits and the economic sustainability of SWDF schemes, a simple benefit cost (B/C) analysis is presented in this section. The model and data were selected together with SWDF staff.

It should be noted that SWDF engineers already conduct a simpler, yet effective, B/C analysis using the potential rabi crop as the main benefit to assess the feasibility of LI and check dam schemes prior to implementation. Some costs and benefits are excluded in their model. It would be useful if they expanded their model to include more costs and more benefits by integrating more of the data that has emerged from various internal and external studies, while still maintaining the short time spent on analysis.

4.2.1 The Model

The model is based on an average scheme, integrating LI, a check dam, watershed development and social forestry (most SWDF schemes now combine all four components - only about 28% do not have a check dam and L.I.) This average scheme has:

- 210 acres irrigated in rabi, 35 acres in summer
- a 50 HP, electrically powered pump
- design life of 50 years.

Such a scheme would typically serve about 700 persons, or 100 families (beneficiaries). Although all schemes have a diesel backup engine, most of them are connected to the electrical grid shortly after commissioning (further analysis could be done to assume some time on diesel since electricity is not 100% reliable).

The model used here includes :

- The costs and benefits of all four program components
- The cost of SWDF extension services
- Benefits from an improved kharif crop, and summer and rabi crops
- The negative effects of drought

It does not include monitoring costs, office overheads, all transport, all salaries, and internal training costs. Also omitted are the biogas, women's income generation, and health programs. The net benefits, without these is already so pronounced that further requirements or sensitivity analysis is unlikely to alter the conclusions substantially. Nevertheless, SWDF

staff can develop the model further - it is only a draft. With more time our assumptions could be reassessed, and a range of cases outside the average one used here could be included.

A social B/C approach was not used. Hence, wages to villagers for construction or for management of the LI cooperatives are treated as costs and not benefits. Only easily quantifiable benefits are included. The numerous additional social and economic benefits are listed at the end of the analysis and a covered later in the report.

4.2.2 Data

The data is based on actual 1990-92 prices and costs; average crop yields and distribution are based on SWDF farmer interviews and field sampling techniques. These were supplemented by data in other consultants reports, the substantial staff experience, and our own rapid appraisals.

4.2.3 Assumptions

The assumptions include :

- 10 year period, older LI coops have been operating successfully for 16 years
- Initial investment in LI and check dam in year 1, with benefits to rabi crop starting in year 1.
- Initial investment in forestry and watershed development in year 2, with benefits from watershed starting in year 3 and from forestry in year 4.
- All SWDF extension services stop after 5 years.
- Discount rate of 16% , the current rate for long term deposits.
- Droughts in year 4 and 8 leading to total failure of the rabi and the less extensive summer crop (based on historical data).

4.2.4 Results

The analysis and results are shown in table 5. Data on the crop yields, acreage and prices are shown in tables 6 and 7. The basis for the calculations is shown in appendix 5.

The results are :

NPV (Net Present value): 4,643,300 at 16% discount rate
IRR (Internal Rate of Return): 186 %
B/C (Benefit Cost Ratio) : 2.9

These results are exceptional and compare very favorably with most any development investment. They also indicate that SWDF schemes are feasible and sustainable, perhaps even as commercial investments. This is quite an accomplishment for any NGO. It is clear that donor, government and private sector investment in SWDF programs are based on sound economic and developmental decisions. This conclusion is strengthened by the existence of a wide variety of economic, environmental and social benefits not accounted for in the model (see next section).

Seldom is such a tough economic analysis, not using a social BC approach, applied to any NGO program, or even bilateral/multilateral programs. SWDF is thus somewhat unique, since one can so clearly demonstrate that benefits out-weigh costs. It is a welcome case study of success in development. However, economic sustainability is only one aspect of success; others will be addressed in the remainder of the report.

Table 5

Benefit/Cost
Analysis Results

Cost benefit analysis											
in 1000 rp											
	Year	1	2	3	4	5	6	7	8	9	10
CAPITAL COST											
	1. Check dams	330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2. Lift irrigation	1130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3. Social forestry	0.0	165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4. Watershed dev.	0.0	270.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ONGOING COST											
	5. Electricity	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	6. Maintenance	8.0	8.0	8.0	0.0	8.0	8.0	0.0	8.0	8.0	8.0
	7. Coop salaries	10.0	10.0	10.0	0.0	10.0	10.0	0.0	10.0	10.0	10.0
	8. Agric inputs (Rabi & Sum	174.0	174.0	174.0	174.0	174.0	174.0	174.0	174.0	174.0	174.0
	9. Agric inputs (Kharif)	0.0	0.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
	10. Sadguru extension	2.5	2.5	2.5	2.5	2.5	0.0	0.0	0.0	0.0	0.0
TOTAL COSTS		**1664.5**	**639.5**	**241.5**	**223.5**	**241.5**	**239.0**	**221.0**	**239.0**	**239.0**	**239.0**
BENEFITS											
	Crops										
	11. Rabi & Summer	1222.0	1222.0	1222.0	0.0	1222.0	1222.0	1222.0	0.0	1222.0	1222.0
	12. Kharif	0.0	0.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0	480.0
	13. Social forestry	0.0	0.0	0.0	218.0	272.5	327.0	381.5	436.0	490.5	545.0
Total benefit		**1222.0**	**1222.0**	**1702.0**	**698.0**	**1974.5**	**2029.0**	**2083.5**	**916.0**	**2192.5**	**2247.0**
Benefit - costs		**-442.5**	**582.5**	**1460.5**	**474.5**	**1733.0**	**1790.0**	**1862.5**	**677.0**	**1953.5**	**2008.0**
DISCOUNT RATE		0.16									
NET PRESENT VALUE		4643.3									
SUM (BEN-COST)/SUM (COSTS		2.9									
Internal Rate of Return		186%									

Table 6
Agriculture Cost, Output & Benefits
Kharif crop

	Area in acres	Input Cost Before Rs. /Acre	Input Cost After Rs. /Acre	Yield before qt/acre	Yield after qt/acre	Market rate Rs /Qt	Difference in output	Difference in input
Paddy	21	400	650	5	7	450	18900	5250
Maize	126	200	400	3	4.5	435	82215	25200
Pigeon pea	63	250	350	50	70	300	37800	6300
Total	210						479115	36750

Table 7
Agriculture Cost, Output & Benefits
Rabi and Summer Crops

Rabi crop	Area in acres	Input Cost Rs/acre	Yield qt/acre	Market Rate Rs/qt	Total input	Total output	Output-input
Wheat	63	600	16	425	37800	428400	390600
Gram	84	350	8	660	29400	443520	414120
Maize	42	550	8	435	23100	146160	123060
Mustard	21	300	5	750	6300	78750	72450
Total	210						
Summer crop							
Mung bean	35	300	4	800	10500	112000	101500

4.2.5 Indirect Benefits not Included in the B/C Analysis

Some social B/C analyses include positive weights for gender effects, income distribution, or for reaching the lowest income groups. An argument could be made for including some weight for these since the project achieves all these objectives. Omitted or only partially included in the analysis are the following benefits :

- environmental effects mainly due to elevated water tables, such as increased reliability of domestic water supply and increased forage & water for cattle. Some of this effect is captured in the increased Kharif crop;

- decreased pressures on urban facilities since the migration rate is reduced to a very low level.

- primary school attendance and literacy has substantially increased, as well as access to health services, since the families now remain in the villages,

- improved opportunities for more intensive and varied cultivation.

- improved supply of forage from rabi and kharif crop residues.

- skills development, for example in masonry, learned from building dams and pump houses. These skills lead to better off-farm jobs.

- increased food security, where villagers can store an extra year's grain supply and decrease the risks from drought.

- improved access to fuelwood, which saves time in collection and leaves more manure for fertilizing crops.

- improved political participation, seen in improved confidence and lobbying skills which gain better government services .

- improved remittance income in the long term, from improved opportunities to attend post primary education.

- improved houses, since the beneficiaries spend most of their time now in the village, they have the opportunity to improve housing.

There is evidence, both anecdotal and observed, to substantiate these benefits. This is only a partial list.

4.2.6 Further Improvements in the Model

There was insufficient time to do an adequate sensitivity analysis. Furthermore, the following elements or refinements are not included:

- the costs and benefits of SWDF programs in health, biogas, fruit and vegetable production, and women's income generation are omitted.

- additional staff costs, overheads and travel expenses (Total SWDF salaries and benefits are about 14 lakh rupees per year)

- subsidies for electricity and fertilizer.

- costs of operating the LI scheme on more expensive diesel power, which happens occasionally.

The net result of these effects will not likely alter the results substantially . The benefits will still out-weigh costs, even on narrow, commercial terms.

4.2.7 Comparison of SWDF and Similar Government Programs

SWDF provides infrastructure and complementary services much more efficiently and effectively than similar government efforts. For example, the table below compares recent SWDF and government efforts in construction check dams.

Table 8

Comparison of SWDF and Government Check Dam Programs

	SWDF	Government
No. of dams per year	18	2 to 3
Avg. cost per dam	Rs 330.000,-	About 15% less
Engineering staff (Dahod, Jhalod)	7	20
Design	Professional and innovative	Using standard design repetitively
Construction time	3 months	2-3 years
Locations	More remote and challenging sites	Near roads
Life of dam	Long, no failures in 16 years	Very short in many cases (62 check dams in district not functioning)
Village Supporting Development Activities	Extensive	Few

Similar contrasts could be listed for the LI schemes. It should be noted that the SWDF projects are not any smaller than similar government schemes. SWDF has recently constructed the largest check dam (118 meters in length) in Panchmahal District.

Sadguru's superior qualities have been known for a number of years. Reports by government officers in 1984-85 clearly point out the superiority of the design, choice of equipment and necessary village organizational components. SWDF claims the cost of large scale canal irrigation is not less than Rs 20,000 per acre. Their cost for a LI scheme and check dam is about Rs 7000 per acre..

In interviews with senior government district officials they were unusually candid in emphasizing the better quality of SWDF programs. It was quite apparent that some departments serving tribals area are demoralized or ineffective. The response to suggestions for SWDF to train government staff was considered at best pre mature, and at worst a waste of time. It appeared that they would prefer simply to fund SWDF programs.

Other government and cooperative officials openly described the better management of LI cooperatives and water distribution in SWDF schemes. "Might is right" was one summary of the style of management in non-SWDF schemes, where those with money or power obtain increased water privileges.

Government officials themselves are quite open in contrasting the superiority of SWDF programming to their own. For government officials to describe an NGO program with such clarity is unusual, anywhere.

4.3 Impact of Activities on the Natural Environment

4.3.1 Agricultural yield improvement

Before SWDF, the villagers were reliant on monsoon rains for their agriculture production. Even though some had access to irrigation they represented only a small fraction of the

villagers. Subsistence crops of maize, paddy, pigeon peas and black gram is typically raised in the area. Pigeon pea and black gram is often intercropped with maize, some of this is used for cattle fodder. In the winter season (rabi) the typical crop is wheat and gram.

There is a great variation in the quality of the soil in the area and this is of course reflected in a great variation in yields. A typical farmer is however likely to have various types of soil on his/her land. The soil is in general extremely low in organic matter (organic matter being important in storing and releasing nutrients. An increase in organic matter will also greatly improve the water holding capacity of the soil).

There is a great variation in crop yields and some estimates show that in the same villages yield varies from 50 kg to 400 kg of maize per acre (rainfall irrigation only). Some of the increases in yield are captured in the B/C analysis above.

4.3.2 Improvement in irrigation potential

Water harvesting has been a key element in SWDF since its inception in the mid seventies. The expansion of SWDF during recent years in other activities continues to rely on various efforts to utilize and optimize the use of available water. Key program elements are building of check dams to utilize run-off water over a longer period of time, the building of LI schemes to make water available for irrigation purposes, the deepening of wells and the use of portable pumps to irrigate areas outside LI schemes. The development of watersheds will also indirectly have an effect on the potential for irrigation.

Since the onset of the five year plan, 30 LI schemes have been completed. Five more are under construction and expected to be completed early 1993.

With the completion of these schemes a total of 4050 and 5566 acres during the kharif and rabi season respectively have the potential of being irrigated. The average irrigated acreage per LI scheme is 185 acres with a range of 90 to 317 acres (Rabi season). In the five year plan SWDF estimated a yearly increase in irrigation potential (only in Dahod and Jhalod in a total of 75 LI schemes) of 1334 acres (season not specified). It will thus be safe to say that the irrigation target has been achieved.

The lives of almost 18 000 people have directly benefited from the improved irrigation potential.

4.3.3 Increase in vegetation cover

It is difficult to estimate the vegetation cover in the area due to severe lack of adequate data. No studies have to our knowledge been carried out that estimate the increase in biomass in the project villages. Reasonably accurate data about number and age of trees are available but no increment data for the area is to be found. Lacking is also the percent increase in vegetation cover in the area

According to anecdotal information there used to be heavy forest cover throughout the tribal areas as recently as 25-50 years ago. SWDF has estimated that as much as 75% of the land was covered with forest 50-75 years ago. The presence of good wildlife and abundant supplies of other forest products is vividly remembered by the people we have spoken to. One old informant in Gamana village in Rajasthan said that about 50 years ago the Government gave concessions to private contractors who cut down the government forests in the area. During the time he grew up the dominant species of trees were Sabar, Kadai, Teak, Dhovda, Chadi , Bamboo, Gandiyare, Dhamar, Chatea Alady Siwan ,Khair etc. The abundance of trees also helped the people in the area when grains were in a short supply. Sometimes they could live

on fruits found in the forests for up to two weeks at the time. These fruits included Umra, Timru, Katealla, Dhavda No Gond, (Gum), Billy. As recently as 25 years ago some of these fruits were still found and used by the locals. Today none are found.

SWDF estimated on the basis of remote sensing pictures (taken in 1985-86?) that little more than 3% of the district was covered with forests, this included trees on private land. In the main areas where SWDF operates (Dahod and Jhalod Tehsils) about 21 % and 19% of the total area respectively is designated forest land - land owned and controlled by the Government. The term forest land is however highly misleading as in some areas even the smallest bush has long since disappeared. A serious afforestation effort by the government can hardly be seen. Due to lack of control and community involvement the few existing teak plantations will soon wither.An outline of the social forestry activities undertaken by SWDF is listed below.

Table 9
SWDF Social Forestry Activities

Year	No of beneficiaries (households)	Actual plantation (no. of trees)	Area covered (acres)
1982	140	300,945	300
1983	563	1,183,000	1,183
1984	642	434,032	434
1987	1,576	871,689	872
1988	1,788	3,080,588	3,069
1989	3,005	4,633,811	4,633
1990	4,169	4,156,362	4,156
1991	3,829	3,568,326	3,568
1992	2,875	3,168,496	3,168
Total	8,587	21,397,249	21,383
1990-92	10,873 (76111 people)	10,893,184	10,892

Since the initiation of the five year plan more than 10 million trees have been planted on a total of almost 1100 acres or about 2.5% of the total land area in the main program area of Dahod and Jhalod Tehsils. This will directly benefit almost 11 000 households or about 76 000 people. On the average 1 431 trees have been planted per family member participating in the social forestry program. As can be seen from the table above almost 50% of the total area covered with forest has been planted since 1990. It is pertinent to note that about 40- 50% of the trees are planted on field boundaries/borders and the other half is planted on land not well suited for agriculture. SWDF stresses the importance of planting trees on land not well suited for agriculture.

While no hard data exists, visual evidence shows that the areas around the check dams have experienced an increase in vegetative cover due to the increase in the water table.

The microclimatic conditions are likely to change with the increase in vegetation cover. Lower average temperatures and a higher humidity can be expected. While no scientific

work has been done in the area to substantiate this, several villagers we spoke to mentioned these aspects this when we discussed the environmental effects of the increase in tree cover in the area. The same informants also pointed out the benefit planting trees had on reducing soil erosion. This is also conveyed to the villagers participating in the social forestry and other programs by the SWDF motivation section. The motivation section, in close cooperation with the other SWDF sections, prepares role plays, songs and other material that is used to motivate and educate villagers about the benefit of planting trees as well as in a whole range of other activities.

4.3.4 Livestock

Livestock is of key importance in the household economy in the project area. While SWDF does not have any specific program that addresses the needs of the villagers regarding the development of livestock, many SWDF programs have both direct and indirect effects on the development of livestock in the area. Traditionally animals have been grazed partly on government forest land and, after harvest, on village land. Bullocks are used as draft animals and virtually every household owns a couple. In addition animals are kept for the production of dung (fertilizer and fuel), milk, meat and as assets. Particularly buffaloes are used as valuable assets. The size of the herds have, however, been severely limited by the amount of fodder available - particularly during the summer months, and by the lack of people to herd the animals when necessary (due to migration). The low quality of fodder during larger parts of the year has also had a negative impact on milk production etc.

With a significant increase in agricultural production and a consequent increase in the availability of crop residues the amount of fodder available has increased. The watershed development activities with the use of trees and soil-binding grasses have also increased the availability of fodder for a longer period of the year. The more recent shift from eucalyptus to a more diversified selection of tree species will also increase the availability of high quality fodder during times of the year when this is in short supply. This development should be further strengthened.

There are signs that the composition of herds in the project are shifting from smaller ruminants to larger (cattle and buffaloes). While some of this shift most likely can be correlated with the increased availability of fodder and more labor for cattle herding, it is also quite evident that with the general increase in the standard of living in the project villages people are changing their investment priorities. Farmers stressed that economic improvements led not merely to investment in more cattle, but also to the improved health of existing cattle, thereby increasing their value as well.

4.3.5 Environmental sustainability and effects

The use of ground water

The state of Gujarat has for centuries been subjected to serious droughts and often subsequent famines. The most recent one occurred from 1985-88. A more efficient utilization of water, particularly ground water, has been a popular policy goal in Gujarat as well as in India in general. Improved water management is believed both to increase food production and help alleviate the seriousness of recurrent droughts.

In many parts of Gujarat the pumping of ground water to be utilized for agricultural purposes has indeed led to a serious lowering of the water table. While green fields can be found in many parts of Gujarat and India amid drought stricken villages a serious question can in many cases be raised about the environmental sustainability of the techniques utilized to make

water available for such purposes. There has also been fierce debate regarding the social equity of such water policies.

Large scale deforestation has further contributed to the lowering of the water table and a high rate of soil erosion.

The recharging of ground water depends largely on the extent of rainfall and on the rates of percolation and run-off. The rate of percolation depends on the characteristics of the soil while the amount of run-off depends mainly on soil characteristics as well as density and type of vegetative cover, and the slope and configuration of the surface. If there is adequate vegetation cover the run-off will be reduced and more of the water will gradually recharge the ground water. The rate and intensity of rainfall is another important factor

Panchmahals district received in the period 1901-51 on the average 988 mm of rain, 133 mm more than the state average. But rainfall is highly erratic with sometimes only 20 rainy days during the wetter part of the year (July -August). According to SWDF most of the rainfall occurs in about 20 hours during this season. When the land is barren little water percolates in to the soil and the high run-off dislodges soil particles with a high rate of erosion as a result (Bhatia, B. Lush Fields and Parched Throats: The political Economy of Groundwater in Gujarat. WIDER, United Nations University, Helsinki, 1992)..

Forest not only reduces the run-off of soil and water but the soil water reservoir under a forest cover tends to supply water to the vegetation for a longer time compared to the soil water under grass-covered or barren areas.

With some of these points in mind, how does the work implemented by SWDF and its beneficiaries add to the environmental sustainability of the project area?

SWDF approach

SWDF basic philosophy is to develop ecological and technical (eco-technical) systems that aim at keeping precipitation as near as possible to where it falls. The objective of *in situ* conservation of water is to reduce the surface flow of excess water and to increase the time available for infiltration and thus reduce the total run-off from the area. An important part of this policy is to build check dams, often several dams downstream in order to capture the maximum amount of run-off water. These dams are deliberately kept rather small in order to not submerge large areas of fertile land and to make lift irrigation feasible in a decentralized way (the government constructed a large dam in the fifties close to one SWDF village that submerged large areas of fertile land in order to make water available for a flow irrigation system. Villagers lost some of their best land and did not benefit from the increased availability of flow irrigation). The dams are further designed to be durable and the built up of silt is controlled by having the possibility of opening gates(needles) and create a flush effect.

While the check dams stores run-off water, watershed development aims at reducing the water flow and erosion rates. (described under watershed development)

Vegetation cover

The most visible environmental effect of SWDF water harvesting efforts is the increased vegetation cover, partly around the check dams and in the watershed development areas. For a more detailed discussion refer to section 4.3.3.

Soil erosion

SWDF has started to monitor erosion rates in Rajudia and Kheda villages, but the sample size is rather small and goes back only one year. The results so far show that erosion rates are greatly reduced, even without a fully developed vegetative cover (due to the building of physical structures like gradonies etc.). The reduction in the sediment load in the various streams was commented by villagers and we were told that in some areas surface water was again drinkable.

Water table

SWDF has over the last three to four years monitored almost 50 wells in three different villages (Ambajaran, Kheda and Rajadia). The average depth of these 50 wells was taken in October

Table 10

Actual Average Depth of Water in Wells, and Annual Rainfall

Village	1989 (meters)	1990 (meters)	1991 (meters)	1992 (meters)
Ambajaran, 10 households		4.53	5.68	5.28
Kheda, 24 households	1.54	2.67	4.38	3.29
Rajadia, 15 households	2.10	3.39	4.88	3.29
Annual rainfall (in millimeters)		*1168 mm*	*725 mm*	*610 mm*

It is evident from the table that there has been a notable increase in the depth of the water in the wells despite a decrease in the average rainfall during the same period. A further sign of an increase in the water table is the number of new wells that are dug in the area.

Salinization

One of the most serious problems that often occurs in irrigation projects is salinization. The problems of salinity on irrigated land is most common in arid and semi arid areas where evatransporation exceeds rainfall . Salinization takes place when salt is carried to the soil surface by the capillary movement of soil water. Excess sodium chloride deters plant growth and also affect the soil structure. Insufficient drainage, poor management and low water quality are normally to blame. (Bie et al, "Environmental Challenges for Norwegian Development Cooperation in Himachal Pradesh and Rajasthan, India: a report to NORAD/New Delhi. Ås, 1992.).

The undulating terrain, good soil drainage together with proper management explains why no evidence is to be found of salinization the project area.

To conclude, the overall environmental impacts of SWDF activities are in general positive.

4.3.6 Public land development

About one third of the project area is designated as forest land - land under government jurisdiction. Today there is little evidence of forests left on these lands, they are mostly grass-covered hills. Some efforts have been made by the government to afforest part of these areas - without much success. In the village economy these areas do, however, continue to play an important role as grazing land etc. SWDF has on a number of occasions approached state and national governments in order to get access to some of this land. SWDF wants to participate in the development of forest land adjacent to the villages where they are already involved. There is a vastly underutilized biological potential that if realized could greatly improve the well-being of the local people and also improve the environment. SWDF has been unable to get the necessary government support to embark on this.

Government policy regarding the utilization of and control over government forest land seems nevertheless to be changing. It has evolved from a strict controlled policy with the aim of producing industrial wood to a policy that centers more around a concern for the environment and a concern for the livelihoods of the rural poor. It remains to be seen whether this new policy will trickle down to remote tribal areas.

4.4 Impact of activities on household environment

The technical, environmental and cost/benefit analyses presented above deal mainly with the impact of the programs at an aggregate level and concentrate on the physical aspects of the programs. This section will concentrate on their impact at the households level, both in terms of monetary and non-monetary effects. In assessing this impact, the following should be kept in mind. All schemes are not implemented in all of the villages. For example, out of a total of 75 villages, 21 (28%) are without lift irrigation schemes or check dams (they were not found to be feasable). These 21 villages have instead different combinations of other schemes i.e. watershed management, well-deepening and social forestry. The nature of impact on these villages can thus be quite different than for those with lift irrigation schemes or check dams. The SWDF data does not always make clear this distinction, making statements on the effects of different combinations of programs more difficult. There are, however, numerous case studies, often from older schemes, from which inferences can be made. In fact, if we assume that the program has continually improved (which it clearly has), the successes of the past may even be exceeded by the newer schemes.

4.4.1 Food self-sufficiency/security

Baseline studies indicate that the majority of households in the program area were not able to produce enough food to eat on their own holdings, and were forced to migrate to other areas for employment. Families often had only 2 meals per day, and there was little variety in diet. It is clear from several studies and interviews that this changes dramatically with the installation of lift irrigation. In Gamana village (Rajasthan), some farmers claimed to have sold a surplus even after the first rabi harvest, while the majority showed a surplus from the second year of operation.

The data is less clear for areas without lift irrigation. Watershed management and social forestry schemes have shown improvements in food self-sufficiency, however, these results take a little longer than in lift irrigation villages (benefits accruing on the average in the third year). But there is still great potential. SWDF data has in some instances shown a 30% increase in productivity where the watershed program has been applied to existing fields, which can be an indication of increased food availability. Also, any new areas taken into production would also constitute an improvement. Where social forestry has been implemented, the sale of trees in years of drought has considerably decreased the vulnerability of households to food shortages.

In addition to increasing the amount of food grown, households are also growing a greater variety of crops, including vegetables. Advice from SWDF and government extension agents on possible new varieties, as well as nutritional advice from SWDF's staff are a part of all of the schemes. Detailed studies on nutritional improvements have not, however, been carried out in the program area (see section 5.4 for more comments on diet)

4.4.2 Migration

One of the most immediate benefits of the various programs, particularly from lift irrigation, is a significant reduction in the migration rates. Traditionally the population in the project area has migrated for up to 8 months every year due to lack of food and income earning potential in their home villages. The overall impact has not yet been estimated but a number of case studies document a drastic reduction in the number of people migrating as well as the length of the migrating season. While it was quite common to leave the area in October-December and not return until the monsoon season in June-July, the few people that migrate now do so only for two to three months during the summer. Typically the average daily wages are Rs. 25,- for men and Rs. 20 for women or Rs. 50 for a couple in the urban areas, and Rs. 30 per couple doing agricultural labor. This is barely enough to keep them alive when taken into account the necessity of buying all their food, the cost of travel as well as the need to buy fuel. According to many of the migrants they could not afford any other lodging than they were able to get for free.

In a study done by SWDF in February of 1992 of the effect of newly commissioned LI schemes in 11 villages, the following reductions in migration rates were documented.

Table 11
Migration Rates

Name of scheme	Year of commissioning	Migration rate before (approx.)	Migration rate after (approx.)
Junapani	1989-90	70%	7%
Tanda	1989-90	75%	8%
Sabli	1989-90	60%	10%
Rajadia	1980-90	65%	6%
Tanachiya - 1	1990-91	80%	10%
Tanachiya - 2	1990-91	80%	11%
Kheda	1990-91	75%	9%
Ambazaran	1990-91	82%	8%
Dadagarh	1991-92	70%	5%
Chosala	1991-92	55%	10%
Kakadhila	1991-92	55%	11%

The installment of even recent LI schemes have a great impact of the migration patterns. Some of the schemes operated only on 50% of their capacity due to the use of diesel engines during the first season of running. With electricity installed the capacity will further increase and the impact on migration will be even greater.

Other evidence about the change in migration patterns is found in Nadine Grant's study where she looked at the SWDF Social Forestry program and the impact on women. Regarding

migration patterns she found a reduction of 80% compared to previous migration patterns. (Her sample included villagers who had recently joined the social forestry program)

During the review teams own field inquires these figures were confirmed by the villagers that were asked about their migration patterns.

The dramatic change in migration patterns have other effects on village life in general that is difficult to quantify. Suffice it to say that a more settled population will be more motivated for improvement in the education of children, more active in participating in the general organizing of village life etc (see section 4.4.6 for more on literacy rates).

4.4.3 Income/employment opportunities and skills development

The various project components have provided households with several new sources of income, some of which are temporary, and others which are longer term. SWDF has given the following estimations of aggregate employment generation for the three years 1990-1992:

	Immediate employment generation in person-days
Lift irrigation:	308,000
Check Dams:	325,000
Intensive Watershed Development:	188,850
Social Forestry:	341,100
Total:	1,162,950

The check dam and LI schemes offer farmers both short and long term income-earning opportunities. During the initial construction of the physical structures, villagers, both men and women, are paid as laborers. This contributes to reduced migration even during the first year of the scheme. In the longer term, the new skills developed in masonry and carpentry during this initial period allow farmers to earn better wages if they have to migrate for a few months in drought years, or if their services are needed in nearby villages. Also, those trained as LI cooperative secretaries receive a salary for their services. Initially these skills were taught only to men, however, women are now also being trained as secretaries.

In addition to the construction jobs, production itself during the rabi season allows farmers to switch from poorly paid urban jobs to working on their own fields to satisfy their needs. In some cases a surplus is generated which provides extra income. Despite the figures available from SWDF's database, however, it is difficult to get a clear picture of real income from production. The table in Appendix 6 shows gross income, expenses, and net income from each crop by village. Aggregate figures show an average net income of Rs. 6,000 per household from irrigation, which is higher than the Rs. 4,000 estimated in the five year plan. It is unclear, however, whether subsistence needs of households have been deducted from this amount, or if they have, how such estimations were made. This is an important question, since we know that farmers were not able to meet their subsistence needs before irrigation, and that it is likely that a large proportion of the increased production goes to own consumption (very few of the crops are non-food crops). A clearer presentation of consumption and income data would help in determining if there is a real increase in income, or merely a substitution of farm income for urban income. Other benefits connected with decreased migration i.e. increased school attendance would be in addition to any real income increase.

The watershed program also provides short and long-term income opportunities. Farmers receive payment for the initial construction of structures on their farms, but contribute 40% of

the costs in labor. For example, at an average cost per households of Rs. 1307 (Rs. 825 per acre), farmers would provide labor equal to ca. Rs. 523, and receive the rest (minus materials) as payment from the program. They are then fully responsible for the maintenance of their investments. Longer-term income opportunities would include increased crop area through bringing wasteland into production, as well as improvements in productivity. SWDF reports that land with low productivity treated in this program showed a 30% increase in yields in the very first year.

The social forestry program has become an important source of short-term income, particularly for women. Originally, the program had a target of 50% involvement of women in nurseries and planting. Now, however, the participants are exclusively women. This was a result of participant motivation rather than any change in the "quota" system. The number of seedlings provided per nursery has been limited to allow more nurseries to develop. Income from nurseries and planting activities is tied to a subsidy system managed by SWDF. Most of the seeds are provided by the District Rural Development Agency (DRDA) at a subsidized rate. DRDA also gives incentives for other activities, such as pit-digging, planting and tree-soil working. Under this program, nursery raisers can earn an average of Rs. 4,821 for 5-6 months work, and planters Rs. 451 for 2 weeks work (Conroy, 1991). This is about the same they could earn by migrating as farm laborers, but with the advantage of being able to stay in the village. After the initial establishment of trees on the farm, the demand for nurseries declines, and thus the income for some women disappears (a few nurseries remain to meet the demand of fill-in planting). When asked by the team what they will do when the short-term income from the nurseries declines, village women replied they will have to migrate again until the longer-term returns from the trees can be realized.

The long-term income earning opportunities from social forestry can be quite significant, particularly where conditions allow for the planting of plantations such as in areas which were previously forests. In Shankarpura, for example, average estimated income per year from the sale of trees is Rs. 6,085. In general, however, the average household earns ca. Rs. 2,000 per year, the figure used in our B/C analysis. It should be understood that trees have to date only been planted on private farmers' fields, since the government has not yet given permission to the project to develop public forest land. Also, income from trees is not realized until at least the third year after planting. This makes it difficult to introduce social forestry in areas without LI programs. LI programs curb migration, allowing villagers to participate in other, longer-term programs.

In addition to the main programs mentioned above, SWDF has started introducing biogas technology at the households level in some villages. The long-term effects include decreased fuelwood demand, as well as decreased demand for fertilizer where waste can be utilized in production. For those trained in masonry, biogas unit construction provides a longer-term income-earning opportunity as the program expands. While previously only men were trained as biogas masons, women are now being trained as well. A mason receives ca. Rs. 500 for each biogas unit constructed (70% government subsidized). SWDF reports that ca. 50% of all village households qualify for biogas units, but currently only about 100 units have been installed due to limited government funding. This is definitely an area for expansion if funding can be increased from donors.

Another new program started by SWDF after the initiation of the five year plan is the income generation program. The target group for these activities is women. Currently, the main activity is training women to produce quality crafts which are then sold to a national marketing/distribution network. Other possible income-earning activities are being explored as well. While aggregate income from the program has increased considerably over the past year (total of 7 lakhs in the first three quarters of 1992), individual income is modest. The challenge will be to develop income-earning opportunities for women which give a more significant return to their labor investment. This is a challenge in most developing countries

where women are often limited in their choice of investment opportunities. SWDF, however, has the potential over time to offer real choices to their participants. Training provided by SWDF for women in bookkeeping, business management, negotiation, etc. should continue. In the long-term as literacy rates improve for women, business skills training will be even more appropriate. Contact with national and international programs supporting the development of women's micro-enterprises is encouraged.

4.4.4 Land value appreciation

By law tribal land cannot be sold to non-tribals, and this of course reduces the number of actual land sales that take place. Within a family land is usually divided between the sons when the household head passes away, or when there is a major disagreement between the son(s) and the father. This has led to a fragmentation of land holdings and in some cases the availability of new land has been greatly reduced. In a previous section the great variation in land quality was briefly discussed. This factor is obviously important when the price of land is discussed. In a discussion with villagers in Gamana village they told us that an acre of bad quality arable land was worth about Rs. 2000, while good land was worth about twice that amount. The value of land is expected to increase by at least 100% if the land is irrigated. SWDF cites evidence that the land price in some areas has gone up to as much as Rs. 30,000 per acre. It is likely this figure represents the extreme, however, it clearly indicates that land prices have indeed risen sharply on irrigated land in the project area.

A further indication is the use of agricultural land as collateral (actually legally forbidden but still practiced in certain areas). According to SWDF's own figures it was difficult to get more than Rs 200 to Rs 300 when non-irrigated land was used as collateral.

4.4.5 Savings and credit

Credit and savings facilities are available from a number of sources in the project area, with varying interest rates. Rural banks lend at a commercial rate of 12% and give 9% savings interest. Large Area Multi-Purpose Societies (LAMPS) lend to farmers at a subsidized rate of 4%, and also pay 9% interest on savings. Officially, external moneylenders, which are so prevalent in other areas of India, are not allowed to operate in the tribal areas. Villagers, however, told in interviews that they sometimes borrow money from big landlords, where a Rs. 500 loan must be paid back in double after 2-3 months. Other sources of credit include relatives either in the village or the surrounding area. Farmers can also borrow money on their jewelry , where the interest rate in Dahod is 36%.

Case studies reveal that many of the poorer villagers were experiencing high levels of indebtedness before the projects, and had trouble getting loans. The projects have contributed to relieving this indebtedness by providing farmers with income from the variety of sources mentioned earlier. Most farmers in the schemes have received loans through the subsidized program offered by the government LAMPS. Because of the profitability of the production (both crop and tree), farmers have reduced their dependence even on these subsidized loans. Discussions with farmers at Biyamali revealed that only 25% of the farmers now need to use loans to get inputs for the cropping season. The remaining 75% now use their own assets to purchase what they require.

Savings traditionally takes the form of investment in jewelry or livestock. This is still generally the case, which is not too surprising when considering that return on savings is at 9% while inflation is currently at around 10%. Nevertheless, several of the programs have encouraged farmers, particularly women, to save their earnings in bank accounts Both the social forestry scheme and the women's income generating scheme have been promoting the establishment of savings in the woman's name. Nearly all of the women in the income

generation group have a bank account, where their earnings from sales are deposited directly. They have from Rs. 300-1000 each on account (see table 13). Women in the social forestry program had an average of Rs. 950 saved. On the basis of interviews and case studies, women like the idea of saving at the bank because it was safe there, they got interest, and they could have more control over its use. The income generation group said they were seldom pressured by their husbands for their savings.

4.4.6 Human resource development

Health

Perhaps the bottom line of any integrated rural development project is the nutritional and health status of its young children as well as lactating and pregnant women. Nutritional status is not only affected by the availability of food to households but also by how it is distributed within the household and the health status of the household members.

The improvement of villagers' health and child care is one of the major objectives laid out in the five year plan. In addition to the more physical development described elsewhere in this report an important part of SWDF focus is on preventive health care. In is important to note that this program cooperates closely with other SWDF programs and as such should not be viewed in isolation. It may however be appropriate to review some of the basics details of the program.. The numbers in the table below refer to the number of people served in Dahod, Jhalod and Jhabua, the majority being in Dahod Tehsil. It is unclear from the data, however, why the number of beneficiaries have decreased during the three-year period.

Table 12

SWDF Health Program Beneficiaries (individuals)

Nature of work	1990	1991	1992
First aid treatment	103009	85389	63548
Pre natal care	4654	3762	1375
Post natal care	1679	677	361
Adm. of oral rehydration sol.	1113	1486	1293
Total	110455	91234	66577
No wells purified	1172	1129	832

At the village level, there are honorary health workers that are trained by SWDF. It is common that child deliveries take place in the villages and part of the program has focused on improved training of both male and female birth attendants. This year there were 1994 deliveries at home, 342 at hospitals, 20 elsewhere with 87 infant deaths and 19 miscarriages in the project area. This gives an infant mortality rate of only 37. The Indian average is about 100 and in Gujarat about 94. A remarkably low figure indeed if the numbers are accurate.

In her assessment of the SWDF free ante natal program Dr. Anna Cohen (1990) concludes that the program is reaching all the women in the villages covered by the program. Further that the program has a positive effect on the health of mothers and babies but that the women in general suffer from poor nutrition as the weight of babies in the second week after birth is only 3 kg.

Literacy

The change in literacy rates is positively related to the dramatic change that has taken place in the migration patterns in the villages in the project area. It is further related to the overall improved economic and social condition of the villagers. SWDF does not carry out its own studies regarding literacy rates, but relies on the government census data. These censuses are carried out every 10 years and to our information the results from the 1991 census are not yet available.

Some previous baseline and impact studies do however clearly illustrate the change in literacy rates in some of the villages participating in one or more of the SWDF programs. R. Mucklestone (1991) in his study on the impact of SWDF activities in one of the villages participating in the programs (Sahada) found a 250% increase in primary school attendance in the village (since 1984). While the village got a LI scheme 8 years earlier, most other SWDF activities were initiated at a much later stage.

In their review of the 1981 census SWDF found a significant difference in the increase in literacy rates among the people in Shankarpura village as compared to the change in the district as a whole. In Shankarpura village there was an increase in the literacy rates from 4% to 11.5 % for women and from 17.4% to 28% for men over a period of 5 years. In Gujarat the average literacy rates for tribals were 14.12 % in 1971. (An Atlas of Tribal India, 1989). According to the same source the literacy rates were only 6.5% for tribals in Rajasthan.

4.4.7 Improved Housing

It is difficult to assess improvements in housing in the projects that have been implemented since the 5 year program was initiated. The general improvement in the economic situation in the project villages is already substantial (discussed elsewhere in this report) and coupled with increased availability of construction material, improvement in housing is expected. With particular reference to the social forestry program, wood from the woodlots will generally be available after the first 3-4 years after the initiation of the program. Fast growing species like Eucalyptus planted on field boundaries benefits from the use of irrigation and the fertilizing of the agricultural fields. After 3-4 years they can be utilized for house building etc.

A look at some older schemes gives an indication of what is expected to happen in the future. In the oldest SWDF project, in the village of Shankarpura, 85% of the villagers have constructed new and better houses, the rest of the villagers have renovated existing houses. Even in the village of Biyamali, which does not have a social forestry program, 60% of the villagers used stones from a nearby quarry to build new houses, and another 15% renovated their old houses..

During a number of field visits to a various villages , it was visually obvious that there was a great difference in the quality and size of housing of those villages with SWDF programs and those villages that had yet to benefit from the programs. On a visit to a village where SWDF just had started a LI scheme (it was opened the day before we arrived) we had the opportunity to visit several houses and by the look at the houses and the utensils the household possessed it was evident that compared to the older SWDF villages the newer ones were significantly worse off.

4.4.8 Fuelwood Self-Sufficiency

The availability of fuelwood has increased in all villages that participate in the social forestry program. In general SWDF estimates that villages that have participated in the social forestry program achieve fuelwood self sufficiency after approximately 3 years. At that time the fastest growing species can be pruned and branches, etc. can be used as fuelwood. This view is somewhat challenged by R. Mucklestone (1991) that in one village found that even though the amount of dung used was significantly reduced the villagers still used crop residues and partly still relied on collecting fuelwood in a nearby "forest" and some even illegally cutting down roadside trees. The village got their first social forestry program in 1986-87 and a second was started in 1989-90. The overall size of the program was however relatively small due to lack of proper planting areas e.g. areas not well suited for agriculture.

Nadine Grant however found that virtually all the villagers in her sample that had been involved in the social forestry program had become totally self sufficient in their fuelwood requirements. She estimated that each household had saved Rs. 1500 by year 8 by growing their own fuelwood. Her findings are reinforced by Czech Conroy(1991) , in his study of Shankarpura village he found that all the respondents were self sufficient in their requirement for fuelwood. The social forestry program was initiated 8-9 years before the time of the study. The villagers still used a small amount of dung, mostly to ignite fires and also to heat their plow blades for sharpening.

Evidence from several baseline surveys conducted by SWDF staff as well as guest researchers suggests that before the initiation of the SWDF various projects the lack of fuelwood and the subsequent reliance on manure and crop residues led to extremely low soil fertility as well as low animal production. Given the choice the villagers were quite aware of the benefit of using dung as fertilizer instead of as fuel but in many cases dung was the only year-round source of fuel for many of the villagers. They also preferred to use crop residues as fodder instead of as supplementary fuel but due to the extreme scarcity of fuelwood they felt they did not really have any options.

4.4.9 Workloads

The provision of water and fuelwood has also played an important role on reducing the workload of women and children. In the villages studied by Grant, women were previously using an average of 7 hours collecting fuelwood every three days. After the project they were using only one hour every three days. This represented a savings of over 700 working hours a year, or the equivalent of Rs. 1,200/- (based on agricultural labor rates). Improvements in access to drinking water would be expected to have a similar effect,.

4.5 Impact of activities on community environment

The SWDF projects implemented earlier have had a very positive impact on the village community. The increases in income and improvements in the standard of living of the household has created a growing demand for services and infrastructure at the village level including paved roads, electricity, bank branches, additional school rooms, post offices and even telephone facilities. None of these are SWDF project activities, and thus their existence is due solely to the ability of the villagers to demonstrate their need to the government.

In interviews with villagers from several villagers, the team was told that many of the social problems of the past such as drinking and thieving is now almost non-existent. In Biyamali, the men themselves volunteered the information that previously that village was

notorious for drinking, but now, 75% of the men have stopped, and former thieves are now growing maize. The status of women within the community will be discussed detail in a later section.

4.6 Planning, monitoring and evaluating program activities

Each SWDF section keeps a wealth of data on its activities, which it summarizes in quarterly reports and passes on to the monitoring and documentation section. With the aid of computers, this section compiles the data from each section, making it available to any section which may require it in the future. This section also keeps track of the many research and case studies done by both staff and visiting researchers. This data has been a particularly important source of information for this evaluation team

In September 1992 the monitoring section, with the help of the watershed section, performed a participatory rural appraisal (PRA) of Gamana Village (Rajasthan). The results were impressive, particularly the demographic and resource maps which the villagers themselves produced. In discussions with the rest of the section heads, they agreed that every section should join in this process when approaching a new village. It would be most effective if the sections got together to decide what type of information each section needed, and discuss the different methods which could be used to obtain it. It should be realized that there is a wealth of information on the type of data which can be collected through participatory methods, of which mapping is only one example. We have already seen that, for example, the estimation of crop yields seems to have been improved by using both farmer interviews as well as field samples. All data could then be consolidated by the monitoring section into village profiles for use by all the sections.

This exercise could be extended to include the monitoring of villages on, for example, a yearly basis. A meeting could be held with the village development committee each year to discuss the progress of activities in that village, updating the previous year's information. This would benefit not only the SWDF staff, but also the villagers, who would further develop their ability to evaluate their own performance.

With such a wealth of information at its fingertips, the monitoring section has the potential to be an extremely valuable documentation center for both the project and outsiders. In addition to monitoring results, this unit could also play a key role in consolidating the longer term plans from each section to periodically produce a village plan. This could be produced, for example, every 6 months as a way to help the sections, central management and the villagers keep track of all of the activities planned for each particular village.

In order to ensure the most effective use of existing information and determine its needs for new information, SWDF staff needs to re-evaluate the type of data being collected by each section, and the level of data aggregation. We offer the following specific suggestions:

1) Concentrate on developing a combined data-set at the *village level* which will give a basis for planning, monitoring and evaluation.

a) Decide by which criteria SWDF wishes to evaluate it's performance at the village level. These criteria should be the same for each village to allow SWDF to compare its progress in different villages with the same or different combinations of schemes. Criteria could include measures of food security, income, vegetation cover, quality of housing, drinking water quality and availability, health and nutrition, fuelwood availability, migration, education/literacy etc. (including others which *staff and villagers* decide are important to measure). It seems some of this data is already available for some of the villages. By

making it more consistent it would be a powerful tool in giving insight into which programs are more effective in which situations.

b) Determine the most appropriate source of data for each of the criteria. This could be already existing data collected by the sections or monitoring unit, data collected by others i.e. the government, or new data. It is important to make a list of the data currently available in the SWDF database to get an overview of where the data-gaps are.

c) Determine the frequency of collection and level of aggregation. The frequency of data collection would depend on the type of data and the capacity of data collectors. Two previous consultants have stressed the need to monitor the range of individual's responses to the various interventions and well as the need to look at village averages.

d) Develop appropriate formats of the data for planning, monitoring and evaluation. It is important that the users (staff, villagers and outsiders) find the village presentations easy to understand and utilize. This could mean, for example, different formats for use by villagers than staff. It would also be useful to make it clear to the users how the various estimates came about, for example, the methods used in estimation.

2) Explore different ways to collect different types of data. The data required for use by SWDF is both quantitative and qualitative, and there are a number of alternatives available when choosing methods of data collection for both types. Formal surveys may be appropriate in some cases, however, they can often be time consuming and require extra resources in compiling and interpreting. Much valuable information, both quantitative and qualitative, can be obtained through participatory methods, such as those used in the recent SWDF survey at Gamana. Participatory methods (i.e. PRA - Participatory Rural Appraisal) allow the villagers themselves to become more directly involved in the planning and evaluation of activities.

3) Define topics of interest to the project but outside of its capacity which can be addressed by visiting researchers. Since the project does not have the capacity to do extensive research of its own, it could instead use outside researchers, as has been the practice to date. It would be an advantage to promote research cooperation with institutions both within and outside of India. This cooperation could lead to important advances in the understanding of the project's interaction with the natural environment. Cooperation between researchers and project data collectors could give insight into important long-term changes in the natural environment of the area which would be invaluable for expansion into other areas. It should be possible, for example, for project staff in the course of their regular duties to take simple measurements which over a period would give researchers and planners the rare long-term data needed to make more conclusive remarks on the state of the environment.

4.7 Recommendations for technical, economic and environmental components

1. Strengthening of the monitoring and documentation section to enable existing data to be more accessible to staff and others, and to develop participatory methods of monitoring and evaluating (see detailed suggestions is section 4.6 above).

2. Increased effort should be made to create multistoried canopies in designing more ecologically benign agroforestry systems. Inclusions should be made wherever feasible of a shrub layer as well as planting of more multipurpose tree species. An increase in the planting of fodder species would help bridge the current short supply of fodder during the summer season.

5.0 ORGANIZATIONAL AND COMMUNITY DEVELOPMENT COMPONENTS

5.1 SWDF Organizational approach

A great deal has been said about the technical competence of SWDF in designing water-harvesting schemes and their efficient implementation. In comparison, the community organizational aspect of their program has not received much attention, nor prominence. In the context of repeated and serious short-falls of massive Government investments of infrastructure inputs failing to raise the standards of living of large sections of population living below the poverty line, SWDF stands out as one of the few success stories. The key element in SWDF approach has been the development of land and water resources through a carefully designed combination of appropriate technology, efficient use of Government and other external resources to cover the capital costs with a parallel thrust at social mobilization of the tribal communities to ensure effective implementation and operation of the programs. The other unique aspect of SWDF approach is the rapid and significant improvement in the life of people who have long resigned themselves to a wretched existence. Most of the Lift Irrigation (L.I.. schemes) have brought about substantial improvement in food security and reduced massive migration of people to other areas in search of employment even during the first year of operation. Within two to three years, L.I. schemes in combination with social forestry have ensured sufficient food for the families throughout the year, and even some storage of grains to cover exigencies such as drought, some fire-wood for cooking and trees as an insurance for the future.

Another notable feature of SWDF approach has been the timing and sequence of program components which are carefully adjusted to the beneficiaries' priorities and perceptions. Thus, L.I. schemes were the first type of intervention, social forestry came next, and was broadened in 1989 to a more comprehensive water-shed development strategy. Preventive health care was introduced only after people had achieved adequate food security and annual migration, which was between 60 - 75%, was reduced drastically to 5% to 10%, and when people had achieved some degree of stability to be able to think about better nutrition, immunization and safe child birth, etc.

Perhaps, one of the most crucial aspects of SWDF approach which ensures significant, quick and tangible improvement in the life of a seriously under-developed and remote region without creating a backlash of vested interests is the strong underpinning of equity, social justice and public accountability governing all SWDF operations. If, for instance, an L.I. scheme for reasons of topography cannot reach out to all farmers, SWDF has been careful to give priority to these left-out farmers in allocating assistance for deepening of wells or providing portable diesel pump-sets for irrigation and also by construction of check dams, to cover areas not included by community irrigation systems.

If an existing Government flow irrigation scheme already serves the relatively better-off farmers whose lands lie in the vicinity of a canal, SWDF has made a conscious attempt to serve the poorer farmers who have no access to canal irrigation scheme by installing an L.I. scheme, e.g. Kakadkhila L.I. scheme in Limkheda Taluka.

Major part of the funds for L.I. schemes of SWDF has come from government sources with whom SWDF has maintained a very positive relationship. SWDF has taken meticulous care in technical design and workmanship, and avoided delays in construction. If Government funds for particular schemes were not fully spent, balances have been promptly returned. If a scheme can be completed within three months, all possible efforts are made to avoid delays caused by unexpected difficulties. The complete and transparent financial accountability and

integrity of SWDF staff undoubtedly helps them to serve as role-models for the beneficiaries and must be acknowledged as a strong positive feature of SWDF operations. This aspect has many spin-off effects in terms of creating awareness among the beneficiaries about their rights and responsibilities and empowering them to raise their voice against exploitation, graft and attempts at dominance by the more powerful elements.

An intimately related aspect of the philosophy of equity and social justice is the consistent SWDF attempt to enable the tribal communities to manage and sustain various developmental programs, initiated with SWDF support. Nowhere is this approach more evident than in the management of Li: Cooperative societies which show a wide range of self-sufficiency and independence. After an initial training in management of the cooperative societies imparted by SWDF staff, the societies are encouraged to take care of their operation on their own to the extent possible. SWDF provides support only when societies ask for it. There are L.I.C.s such as Biyamali, Limkheda, Navanagar, Bhima, Kawali and others which are between two and ten years old, which have become completely independent of SWDF and in fact, the Director, on our visit to Biyamali on 25th November 1992, apologized for not meeting the members of the society for over five years. Dadhgarh L.I.C. in its first year of operation, as noted in the team's visit, had decided its own system of water charges to be paid by members on a per-hour supply of water (as distinct from per-acre-per-watering system in many others) and were sorting out the problems of adjusting the rates for those farmers who were getting their supply at a lower rate due to the location of their farms. SWDF has encouraged L.I.C. members to select management systems which the farmers themselves think will work best.

There is considerable variation among the 70 and add L.I. cooperative societies with regard to distribution of operational responsibilities among paid employees, such as secretaries, pump and motor operators, water distributors and watchmen. Practices relating to whether or not they are paid, levels of salaries and working conditions also vary among societies. While in the initial stages the cooperative societies may need SWDF help in major and minor repairs of equipment, some of the older societies have not approached SWDF for years for this purpose. The style of communications between the management and members also show considerable variation in terms of use of formal or informal channels. Most importantly, the level and quality of participation of members and the influence of political affiliations on the management of L.I. Cooperatives also shows a variety of patterns. SWDF has succeeded to steer clear of political bias, and while there have been occasions when some members have accused SWDF of tilting the balance in favor of some faction, their political neutrality is generally accepted. (Caroline Whitby, Community Management of Lift Irrigation Schemes, SWDF, 1992).

5.2 Strategies for Social Mobilization

An interesting point to examine is how SWDF has managed to transfer the responsibility of tackling the complex process of running L.I. schemes to tribal people who have no prior experience in this area. SWDF has never installed an L.I. scheme without ascertaining the community's needs and commitment to run the scheme. Even after the difficult tasks of mobilizing financial resources from various government and non-governmental sources, and completing the construction with perfect technical competence by SWDF, the beneficiaries are left with many difficult tasks. For instance, membership must be mobilized; water distribution has to be timely and as per requirement of individual members; recoveries of charges must be completed; government audit requirements must be complied with; and conflicts among members have to be resolved. These are just a sample of the tasks which must be managed. As the awareness and information regarding the benefits of L.I. schemes become more wide-spread, the community leaders now approach SWDF with requests for L.I. schemes

in their villages. Since there are now more requests than can be met by SWDF, the tasks of social mobilization have become somewhat easier.

SWDF has developed through their fifteen years of experience very pragmatic and efficient strategies for social mobilization.

5.3 Development of village organizations and leadership

SWDF has developed through social mobilization. Each SWDF program component is based on a foundation of awareness among the potential beneficiaries with respect to their needs and the means of fulfilling the same, their responsibility in the tasks involved and a clear articulation of their commitment. There are many instances where SWDF has waited for people to reach the stage of requesting SWDF help even though the technical feasibility of a program was established for quite a while. This coincides with the use of a wide variety of means of communication by SWDF staff e.g. joint meetings of members from several villages, exposure visits, opportunities for potential beneficiaries to attend meetings in other villages, and the deployment of a number of village volunteers and leaders who are better informed by SWDF through a variety of contacts with SWDF staff.

At present, there are a number of trained functionaries, motivators, volunteers and committees from the villages attached to various programs who mobilize their own communities.

The following list will clarify the point: -

L.I. Societies	70
L.I. Societies executive committee members	840 (approx.)
Local birth attendants (Motivators)	150
Volunteer workers (General purpose)	39
Biogas users-cum-motivators	172
Biogas plants masons	25
Nursery raisers (social forestry)	200
Income generation activity participants	65
Water-shed village level workers	15
Supervisors of social forestry, health, biogas, etc.	50

A regular system of orientation/training, supervision and follow-up has been the back-bone of SWDF strategy. The above mentioned functionaries include both men and women in varying proportions. Whereas women are a relatively new and small category in L.I. management committees at present, the nursery growers for social forestry are all women. While traditional birth attendants are predominantly women, there is more than a sprinkling of older men who have traditionally served as birth attendants in the SWDF project areas.

Regular meetings between each category of functionaries - whether volunteers, traditional birth attendants or L.I. societies secretaries and Chairmen - are used to impart necessary knowledge and skills for their respective functions, review experiences in the field, take corrective steps needed or modify program targets if necessary and agree on future plans for the next fortnight, month or quarter as the case may be. Availability of irrigation facilities is combined with timely farm inputs and extension services to impart knowledge about new practices.

These meetings which are attended by persons from different villages, are conducted in a relaxed and informal manner with SWDF staff providing advice regarding their problems, and encouraging them to share their experiences actively in the discussions. Each meeting is used to impart some new learning (for instance, L.I. society members hear about a new hybrid

variety of *Ber* - a fruit) and includes some element of fun and entertainment such as songs or games which contain some useful messages thus making them interesting for members. Participants are paid bus-fares for attendance and always served tea and snacks. More structured training sessions are complemented by training on-the-job, and participation in meetings where new functionaries learn from the more experienced ones.

A prompt and effective back-up to sustain community initiative is provided by supervisors, who are selected from among the better educated tribals, and who get a regular salary from SWDF. The speed and thoroughness of the follow-up action by SWDF promote a high level of peoples participation. An example may illustrate this point: Volunteers report to a Supervisor about low germination of seeds distributed for nursery raising. The Supervisors weekly meeting with the SWDF section executive discusses corrective action: e.g. additional supply of short-duration variety of seeds, or replacement by a drought-resistant variety of seeds, with instructions to volunteers, who in turn convey the messages to nursery raisers.

A conscious strategy used by SWDF is to broaden the horizons of single-purpose functionaries by giving them information about other aspects in order to create a large support base of community awareness. Thus, the traditional birth attendants have now been trained to handle other preventive health tasks, such as ante-natal and post-natal care of mothers, nutrition, diarrhea prevention and referral of complicated cases to government health centers, etc. Similarly, members of local communities for social forestry learn about blindness caused by Vitamin-A deficiency so that they may support raising of green leafy vegetables by households.

5.4 Participation of Women

There is no doubt that women are participating in larger numbers and in various ways in SWDF activities. Social forestry introduced by SWDF in 1982, now annually involves more than 200 Nursery Raisers who are all women, each of whom earns up to about Rs. 4,000/- net per season - a substantial income by any standard. The linking of this activity with support from Gujarat Women's Economic Development Corporation and various government departments illustrates how SWDF has constantly tried to link beneficiaries to other governmental and non-governmental programs, and thus decrease their dependence on SWDF.

In the early years of Sadguru's LI cooperative formation, the participation of women in the management of the coops was vitually non-existent. It was seen as a man's organization, despite the fact that women contributed significant agricultural labor. One of the institutional factors which reinforced the male dominance of these organizations can be seen in the by-laws of the coops. In order to be a coop member, one must hold title to land in the village. In this tribal area, however, women do not normally hold title to land. If she is widowed, she will remain the head of the household, but the land title will pass to her son.

Despite this situation, Sadguru has in recent years been very active in working to include women as full partners in the LI coops. While they can have little impact over land title practices, Sadguru has pushed for a change in the by-laws, which now allow women to run for office in the cooperative.

This institutional change, however, is only a small part of Sadguru's activities during the 5-year plan period to integrate women into the LI coops. Women are encouraged to be present at and participate in all cooperative meetings during their formation and functioning. Specific training for women in the coops has also been initiated. The LI cooperative section of Sadguru has recently co-opted a female trainer from the motivation section to work exclusively on motivating women to participate. Groups of women from the cooperative are also brought to Saguru for training in the running of the cooperatives, in the hope that they will be able to be better represented in the executive committee. as well as positions such as secretary and

operator. The L.I. Managing Committees, which for some time have been an exclusive preserve of men, are beginning to include some women members, who are seen to be participating in the deliberations, and can even get away with jokes about defaulting male members when recoveries of dues are discussed.

Starting with a small beginning a couple of years ago, the income-generating program, (ready-made garments and bead ornaments) now provides supplementary income, albeit modest, to 65 women. During the current year up to October 1992, articles worth over Rs. 7 lakhs were sold. All of these women, as well as volunteer workers attached to various programs and supervisors now have bank accounts (please refer to a list of back deposits of a random sample, in Appendix) and enjoy the freedom to spend the money as they wish: e.g. purchase of household articles, small ornaments in daughter's wedding, cattle, children's education etc.

The very fact that many women regularly attend meetings convened by SWDF in Dahod or other villages has given them a new status. Unlike in the past when they were meek enough to be discouraged by husbands from attending the meetings, they come in large numbers and do not wait to obtain their husbands' permission. The contacts with SWDF and of course the training in preventive health care, for instance, has given "Health Motivators" a new confidence, and they receive prompt attention from the staff of government health centers in referrals, when they mention their being "SWDF trained", which stands out in contrast to the casual and often indifferent attitude of the latter previously.

The farm forestry program provides an increasing number of women in SWDF project area fire-wood for cooking, which saves them about Rs. 1,800/- a year, as well as time spent in collecting it from the forest. The 172 biogas users, all women, welcome the convenience in cooking, economy in time and fuel, and seem able to learn the techniques of operating the plants without any difficulty. Their positive experience is bound to inspire other families for making use of biogas and thus stop using cow-dung for fuel in favor of its use as a valuable manure.

There is considerable awareness among SWDF beneficiaries, and women in particular, about the importance of personal and environmental hygiene, and measures to prevent illness, although it is difficult to know to what extent health practices have been adopted. The traditional birth attendants, renamed as "Motivators" seem fairly knowledgeable about precautions regarding safe delivery, hygiene, prevention of tetanus, immunization for children, food for nursing mothers, use of colostrum, etc. Mention must be made of the very effective use by SWDF trainers of simple teaching aids e.g. stuffed cloth model of a new-born baby complete with umbilical cord. The participants learn about precautions regarding tying and cutting the cord with a sterilized blade and use of antiseptic to prevent infections, through SWDF staff demonstrating the correct procedures.

Women reported a greater use of wheat in their previously maize-dominated diet. Some use of pulses and vegetables is also mentioned by most respondents, although, one suspects, not in sufficient quantity or variety. The team visited a meeting of women in a village where SWDF staff demonstrated how to mix vegetables with cereals and pulses in order to obtain a higher nutritive value and balance. The one tangible change in villages covered by irrigation is that families have enough food to eat and can save some supply for future to tide over an emergency, such as a drought.

In response to questions regarding changes, women mentioned that there was no need to migrate in search of employment and food any more, and there was "Shanti" meaning a sense of well-being and stability. Women have to take the major brunt, both physically and psychologically, of food shortage and migration, which implied, as they put it, living without shelter in the sun and cold, leaving young children behind while leaving for work

sites in unfamiliar regions. There seems to be a very palpable feeling of relief on their faces, as a result of food-security and family stability. This also improves their motivation for education, learning new skills, savings for the future, and more importantly a distinct enhancement in self-esteem and confidence.

SWDF has already been exploring new avenues of income generation for women, e.g. silk worm rearing. Attempts are being made to benefit from the experience of successful NGO ventures, such as SEWA - Ahmedabad (Self Employed Women's Association). Experience in other parts of India suggests the possibility to explore new skills such as block-printing, screen-printing, doll-making, toy-making, bamboo crafts etc., which do not require literacy, and which might capitalize on their innate sense of colors. Probably Dahod and other urban areas might provide scope for food-craft and catering. "Annapurna" in Bombay may be contacted to explore possibilities of obtaining their support not only for introducing marketable food items but also on the business and managerial aspects. The present efforts of SWDF to encourage beneficiaries to participate in exhibitions in other cities has helped to broaden their horizons. They are also learning to handle contacts with marketing agencies e.g. "Gurjari" - a government outfit which provides an outlet for articles produced. There is considerable scope for increasing production of bead ornaments and negotiations have been initiated by SWDF for their export to other countries through OXFAM.

5.5 Training for Social Mobilization

A reference has been made earlier in this section to the manner in which SWDF has learnt to maximize the learning/teaching value of all contacts with beneficiaries, such as review and appraisal of experiences and plans for coping with impediments, exposure visits, on-the-job training etc. An attempt is made here to illustrate how SWDF has devised an extensive repertoire of training devices, e.g., role-play, pictures, photographs, stories, games, humorous skits, etc., to suit the varying educational levels and perceptive abilities of learners. A typical example of a monthly meeting with participants of income-generating activities will illustrate the point.

This meeting is attended by nearly 35 participants, all women, and SWDF staff in charge of the Section. The first part consists of items such as: payments for completed work, distribution of new work orders, sorting out problems, if any, regarding quality of work, time schedules, followed by introduction of some new designs. The second part of the session would sometimes include a small play which is enacted by some participants who have rehearsed it earlier. An example:

" A corrupt 'Talati' (a village revenue official) demands and gets a bribe of Rs. 10/- from a woman who requests his action on a pending application for a certificate of land record. Another woman, with a similar need, refuses to pay the bribe and reports the matter to the Taluka Official, who takes the 'Talati' to task for demanding a bribe and threatens strong action in case their is repetition of such unacceptable behavior."

A lively discussion ensues, with several participants relating their own experiences, both positive and negative. SWDF staff use this opportunity to educate the women regarding the various types of government functionaries e.g. school teacher, Auxiliary Nurse Midwife, Sanitary Inspector, Anganwadi Workers etc., and their respective functions. This may lead to other issues such as: powerlessness of individuals against wide-spread corruption, need to organize for a joint protest, use of voting right to remove a corrupt "Sarpanch" (village Headman), each person's responsibility to be alert about their rights to services etc. The SWDF Co-Director has prepared over 50 scripts of short plays on a variety of themes.

A reference may be made here to the need to develop systematic documentation of selected experiences for the valuable contribution these can make not only for the learning of SWDF

staff, but also for the training of NGOs and government officials. For instance, case studies could be developed around situations which have challenged the skills of SWDF staff. There has been an occasion where the villages refused to utilize water made available through an L.I. scheme because of a rumour that the water would damage their crops. The measures taken to overcome the crisis could sensitize staff on cultural aspects as well as the supportive roles played by leaders from other villages who have benefitted from L.I. schemes. It would also be useful to prepare process accounts of important meetings in order to help staff to analyze the various group processes involved, roles of individuals in influencing group interaction, ways in which SWDF staff can utilize group situations towards constructive goals, etc.

The establishment of a training center to deal more adequately not only with SWDF's existing training activities, but also with the training of other NGOs and government officials for replicating SWDF program has been referred to in another part of the team's report. Suffice it to say here that this latter part would involve much greater complexity and analytical and planning ability. What SWDF has learnt over a long period by doing , appraising, modifying and adapting, a deceptively simple process, has to be conveyed to participants who do not have a similar background, nor an identical work situation. The position of qualified and experienced training coordinator, at an appropriate time, will be helpful for this purpose. This position is needed to fulfill the cumbersome and challenging tasks of analyzing the training/learning contents for various categories of trainees in terms of the philosophy, concepts, knowledge, skills, learning goals and strategies, preparation of learning/training materials, etc.

5.6 In Search of a New Identity

The large numbers of beneficiaries whom the team met in their villages or at SWDF-convened meetings in Dahod appeared neatly dressed, confident and quite vocal in expressing their demands, and relaxed enough to share a joke with us. The women wore colorful dresses and their faces glowed with pride when they reported on their performance and laughed heartily when one of them would play a humorous role in a skit. SWDF staff and others who are familiar with this eastern part of Panchmahal district commented on the transformation they have seen in the people during the last 15 years of SWDF operations. Previously, the tribals were fearful, slovenly and diffident in the presence of any officials, and it used to be impossible to get them to attend meetings in such large numbers.

The Manager of LAMPS (Large Agricultural Multi-Purpose Cooperative Society) at Mahudi village told us that about ten years ago, he had to go searching for beneficiaries in their villages. Now they approach him for a variety of things such as: receiving farm input kits, selling of their surplus yields, loans to cover expenses of weddings, etc. Thanks to the improvement in their incomes and the influence of SWDF ethos, he said the recovery rate for loans is significantly higher in SWDF project villages than in other villages. The people have more information and access to a variety of government sponsored schemes for their benefit, such as digging of wells, biogas plants, purchase of agricultural implements and bullocks, etc. Government officials and politicians visit their villages more frequently because of SWDF programs and the tribals have been using these opportunities to get better amenities for their villages -- schools, health centers, hand-pumps for drinking water, electricity, roads, etc. Their isolation has decreased and their integration with the mainstream of national development has significantly improved.

The families have enough to eat and many can store grains for the next year as a cushioning against possible drought. They are no longer forced to migrate in search of employment, and in fact employ labor on their fields during peak periods of activity. The previous practice of sharing bullocks among two or more families has been replaced by full ownership. Many have

renovated their houses or built new houses with the use of wood from the trees they own. More children are enrolled in schools and some attend colleges. There is an increase in occupational skills. For instance, Sahada village alone has 40 skilled masons. They now have the capacity to tide over exigencies such as droughts or crop failures.

The remarkable achievement is that the people are managing the complex tasks of running their L.I. Cooperative Societies and exercise their right to learn through mistakes and to find their own solutions to problems encountered. This progress has been achieved without any damage to their social cohesion or cultural incoherence, as has been noticed in some parts of North-Eastern regions of India, which are experiencing an erosion of traditionally egalitarian and community orientation. Furthermore, SWDF approach has resulted in significant enrichment of the ecological resources of the area. SWDF has demonstrated that this type of change can be replicated to cover 77,000 tribal families and 1,55,000 acres of land in Panchmahal District of Gujarat at a modest cost of about Rs. 100 crores for construction of 500 L.I. Schemes and 1,100 check dams and portable pumps. (Jagawat H. "Problems and Potentials of the Tribal Regions of Gujarat" a paper presented at the State level Seminar at Baroda 16 - 17 May 1992).

Lest we forget, this remarkable change is feasible only when appropriate technology is *combined with effective social mobilization.*

Table 13

A Detailed List of Bank Accounts of SWDF Women Beneficiaries*

Village where woman lives	Name of Bank	Amount in Rs.
Katwara (vadi falia)	Dahod Urban Bank	560/-
Sahada	- do -	580/-
Ranapur	- do -	1,550/-
Biyamali	- do -	775/-
Gamdi	- do -	650/-
Khangela	- do -	630/-
Chandwana	- do -	620/-
Raliyati Hujjar	- do -	725/-
Ravalikheda	- do -	465/-
Hadmat Khunta	- do -	725/-
Jesawada	P.D. Co-OP Bank Jesawada	500/-
Bhamatalai	- do - Garbada	300/-
Sahada	P. Gramin Bank Panchwada	700/-
Sahada	- do -	800/-
Boriala	- do -	1,000/-

*The beneficiaries include a random sample of participants of the Income Generating Program, and volunteers and supervisors attached to program activities.

6.0 MANAGEMENT, ADMINISTRATION AND FINANCE

This chapter presents an overview and assessment of SWDF management, financial, personnel and Board functions. The analysis which leads to recommendations to improve future operations is grouped into three interrelated themes:

- Organizational Sustainability
- Financial Sustainability
- Meeting the Demand for Services

Prior to discussion of these, an overview of the management of field operations sets the background.

6.1 Management of Field Operations

As shown in the previous chapters, SWDF does deliver excellent development services on schedule, within budget, and with high and quick benefits compared to costs. These accomplishments place SWDF in the upper echelon of NGOs or other development agencies; and obviously these results are a very positive statement on the management and staff skills.

There is however relatively little structured or written material on how SWDF manages its operations. To find out more, the Evaluators conducted a series of group and individual interviews with section heads and staff. Items discussed included:

1. The sequence of SWDF activities at the village level from introduction to withdrawal.
2. Planning, integration of activities, budgeting, monitoring.
3. Decision making within field operations.
4. Staff development, and how staff learns.
5. Strengths/weaknesses, and changes in the management processes in last few years.
6. Future directions and needs.

Items 4,5, and 6 are discussed in more detail in the next sections.

The staff can clearly articulate how they implement the flow of activity, and much of the decision making is legitimately driven by the level of response from villagers. The management methods used for items 2 and 3 above, tend to be informal, based on monthly plans developed in general and section meetings.

The staff are less capable of describing how <u>all</u> the activities in a particular village are planned, managed, and monitored from beginning to end (termination of services or provision of minimal services). One reason for this is that there is no long term planning horizon for activities in a particular village other than general annual aggregate plans; another reason, one SWDF is addressing, is that the Monitoring Unit is weak, partly because the difficulty in finding a suitable person to lead it. Much of the detailed longer term planning is done separately within the sections. The monitoring tasks for each village are also more difficult without a more comprehensive longer term plan and indicators to monitor. These and other

related issues haven been raised in previous AKF consultants reports: Jonathan Hamshire, "Program Planning, Budgeting and Monitoring Assessment" Sept., 1991.

Nevertheless, informal integration of activities does take place, and the integration has improved. Few mix-ups in sequence or scheduling appear to occur. Three key sections (engineering, LI Cooperative cell, and motivation/training) conduct the initial survey and feasibility studies; and more methodical participatory research and analysis (PRA) techniques have been introduced to assist more systematically the beneficiaries to map out the development possibilities. After these initial stages of intervention, the longer term, overall process is less documented, and less clearly understood by all staff.

Essentially, SWDF is excellent at doing, and in describing what it does and why, and some of the impacts. But it has some weaknesses in describing and documenting how it manages the overall process. (As the Director commented "Doers can't write"; a fair point, which prompted the consultants to consider the converse statement). This weakness is, in the short term, not a serious issue. Many staff have enough experience to gauge the rhythm of future activity, without more formal procedures.

However, SWDF's strategy includes the following longer term objectives:

- Devolving more management responsibility from the Directors to Staff
- Training other NGOs
- Improving the monitoring functions

It will be difficult to achieve these objectives without a more systematic description of the flow of activities in a village; how these are planned and managed; and how they will monitored. Certainly SWDF, for example, can show other NGOs what they do, but the NGOs will also have to learn how to do it, i.e., training in managing the process. Such material would also be a useful framework for training new SWDF staff.

It is recommended that:

- SWDF document how it manages its existing planning, implementation and monitoring procedures for field operations, for all activities; Identity any gaps or uncertainly in the management of these three activities; Add some simple components to clarify or strengthen the activities or management process.

The output of this exercise should be short. Consultant assistance could be useful. The objective is not to write a bureaucratic procedures manual. Short guidelines, allowing for flexibility, are sufficient. The output will provide a framework for delegating more responsibility downwards and training other NGOs or new SWDF staff. Following this exercise, a similar process could be used for other, head office functions.

6.2 Organizational Sustainability

6.2.1 Future Needs

A key issue is how will SWDF be managed and by whom, in 5 or 10 years. The founding Directors would like to eventually take a less active role. Currently their responsibilities include: most of the external relations and correspondence with donors, government, NGOs and evaluators; personnel and recruitment; some of the training of villagers and staff; relations

with the Board and Advisory Council; advocacy to improve government policies; development of the activities of the new training center; leading planning meetings, financial planning and management; writing of progress and annual reports; strategic planning.

In the last 2 years, much of the responsibility for planning and implementing the field operations has been delegated to senior staff. This is a healthy evolution, and efforts are underway to continue this process.

Nevertheless, most observers would conclude that the Directors shoulder more management responsibilities, within the headquarters operations, than is healthy in the longer term. Their unusual energy, skills, and commitment are beyond normal expectations. Their high standards of performance will be impossible to replicate, in one or two persons.

The Director would like to broaden the base of responsibility for central management functions. The constraints include: hiring and retaining suitable persons to work in Dahod, a rather remote location with fewer services than larger urban centers; financial uncertainty over the sources and reliability of longer term funds to pay for head office expenses and more staff; and insufficient documented, simple, procedures for the full range of SWDF activity. The second item is the most pressing concern of the Director in discussions regarding new staff or new staff responsibilities. The last item was analyzed in the previous section of this report. Long term financial sustainability and cash flow is assessed in section 6.3.

6.2.2 Staff, Personal Policies, and Staff Development

The present, more experienced staff are very skilled in their particular specialties, some reaching beyond international standards. Some of them would benefit from increased management responsibility combined with some short term management training.

Within the existing distribution of operational and management responsibilities, the number of staff, presently 77, may be somewhat insufficient, given that some of them appear to work overtime frequently. The existing number is definitely insufficient in the context of adding a few new functions for the staff, to relieve the Director of some responsibilities.

The staff turnover rate in the last 10 months, based on comparing staff lists over the period, is about 19%, with an equal number of men and women leaving, nearly all of them at the junior level, and some of these were short-term positions. Such turnover is not a serious issue, and within the bounds of what could be normally expected.

The staff is young in SWDF experience. The median length of service is about 2 years, mainly because the staff size has more than doubled in the last 3 years. In some respects, the youth of the staff and their impressive accomplishments demonstrate that their skills are quickly mobilized within the SWDF system. On the other hand, their youth is one constraint on assigning them more management responsibility. Existing efforts to retain experienced staff can be strengthened with improved personnel policies and staff development planning, along with assigning some one who can focus on implementing these improved procedures.

Personnel policies in terms of pay and benefits, and annual increments, are apparently better than average for NGOs in India, and in working with SWDF one has the satisfaction of being with one of the best, and actually seeing significant short term impacts. SWDF is currently considering a pension plan and housing assistance. Nevertheless, it would be useful to:

- Have a simple career development path and strategy which is transparent and clearly understood by all staff.

- Supplement incomes, with increased pay or benefits where necessary, and where the reasons are clear to all staff. (For example, some of the senior engineers or trainers may have higher opportunity costs than other staff). At minimum, pay increments should keep pace with inflation, which may increase if new economic policies in India are not well implemented.

- Plan a longer term staff training program and internal budget for both in-house and external training, so that staff know well in advance that they will receive training; and staff should be consulted more systematically on the type of training required.

On the last point another issue could be raised: donor support and the timeliness of their support. Much of the budget for training is from donors. The consultants witnessed a situation where senior staff overseas training was confirmed by donors at the last minute, despite SWDF efforts to gain earlier financial commitments. Clearly the donors will have to improve their response time, otherwise any planning for training will not be effective. On the other hand it would be useful if SWDF had a short term training plan, listing training needs and proposals for specific staff members, to present to donors. This plan should project about 2 years into the future.

In the area of staff recruitment, some of this is delegated to senior staff (e.g. the hiring of junior engineers), and the Director may start to use senior staff in the recruitment process for the Head of the Monitoring Unit. Modern management practice emphasizes the involvement of senior, and even junior line staff, in the selection of new staff, even at levels above theirs. Ultimately it is both the senior and junior staff that have to work more closely with whomever is chosen. SWDF efforts in this regard should be continued.

6.2.3 The Role of the Board of Trustees and Advisory Council

In order to assure the organizational sustainability, the role of the Board and Advisory Council is an important determinant.

Board of Trustees.

The Board is comprised of five private sector executives mainly from the Mafatlal group of industries (textiles), and three others, excluding the Director and Co-Director who are also Trustees. (The Mafatlal group founded SWDF in 1975). Currently they meet once a year. A review of the minutes of the last two Board meetings indicates that three members attended, the same private sector persons in each case. (No interviews were held with these Board members, who are based in Bombay).

The agendas cover major financial and strategic issues, for example:

- Auditors report and annual progress
- Funding
- Expansion into Madhya Pradesh and Rajasthan.
- The Training Center
- The corpus (endowment) fund
- Staff salaries and benefits

The Board, at least a minority of it, appears to be reasonably informed on major issues. Active strategic and operational authority has been largely delegated to the Director. The Director is well aware of his overall responsibility to the Board. While such situations are common in most NGOs or corporations, anywhere, there is a case for placing responsibility for a few other specific activities on the shoulders of the Board, i.e., give them something to do, beyond their overall and general responsibility. The reasons for this proposal are as follows:

- SWDF has evolved from a small NGO, to a larger one with broader and more complex operations, financing, and strategic options.

- This expansion has placed more responsibility on the Director, in effect, overloading him.

- Board members, in any organization, are usually more helpful if they have specific additional activities.

Specific activities that the Board might wish to undertake are:

- Management of the corpus fund (see section 6.3.3, below)

- Fund raising in the private sector in India or elsewhere.

Given their experience, they may be well placed to carry out these functions. Currently, the Director intends to assume these responsibilities. In many NGOs these are common Board functions.

It is suggested that the Board assume some specific tasks and targets to assist SWDF, beyond their general oversight responsibilities. In effect, to delegate more responsibility upwards. This would make the organization less dependent on the Director.

It is also suggested to note the activities of the Board in Annual Reports.

The Advisory Council

The Council was originally comprised of 13 members, 4 donor representatives and 9 rural development government officials at the Gujarat State and District level, in contrast to the predominant private sector composition of the Board. The Council was formed about 1 1/2 years ago, at the suggestion of NORAD, apparently to bring the major funding organizations together periodically. The Council has met only once to date, and provided some advice on planning and the training center, with little apparent follow up as a whole. SWDF is in the process of expanding the membership to include Central, M.P., and Rajasthan government representatives.

It is suggested that the purposes and role of the Council be clarified and, as with the Board, some specific objectives be set for them to achieve.

One possibility may be to prompt government to plan financial commitments to SWDF, to reduce the suspense inherent in government funding.

6.2.4 Influencing Government Policies

SWDF takes a pragmatic approach to influencing the policy environment. Part of SWDF's success can be attributed to its effectiveness in arguing, on behalf of beneficiaries and NGOs, for improved government policies.

Past accomplishments include: improved NGO access to government funding for lift irrigation and other programs; reduced charges for connecting schemes to the electrical grid; changes in government technical specifications for LI; and convincing the Madhya Pradesh Government that LI schemes can be very effective investments. SWDF also participates in State development planning exercises, and advocates improved development programming in articles in major newspapers, or at conferences.

SWDF also continues to press for more active involvement by NGOs and Tribals in developing "forest" reserves controlled by the Forestry Department; and to assure equitable charges and dependable supply of electricity from the Gujarat Electricity Board.

All this valuable activity tends to get lost in the overall description of SWDF programs (e.g. Annual Reports). It is suggested that SWDF highlight, briefly, these efforts in reports to donors. The information is there, it is simply a matter of summarizing it in one place.

Most of the advocacy work is done by the Director. One can suggest this continue, and if other functions continue to devolve to other staff, he would have more time to promote improved government policy. He is a unique resource in policy development.

6.2.5 The Next Five Year Plan

Many development organizations focus only on objectives regarding the target group. Although their needs are paramount, the organizational needs of the implementing agency tend to get overlooked. SWDF's current Five Year Plan is no exception.

It is suggested that the next plan include some objectives and targets for SWDF as an organization; and perhaps some for the Board. These would help assure its long term vitality and health. For example, SWDF should specifiy the main management issues it expects to face, and how and when it will address them.

6.3 Financial Sustainability

Many of the discussions with the Directors about the future, and associated charges in procedures, management, training, or more staff, hinge on the Director's concern about financing. How can SWDF be assured that it can make a commitment to pay its staff and overheads over the long term? Two areas of significant potential are examined in this section: improved financial planning (and cash flow management); and the proposed corpus (endowment) fund. But first, a few observations on budgeting, accounting, and sources of funding.

6.3.1 Budgeting, Accounting and Sources of Funds

The budget in the original Five Year Plan (1990 - 94) was about Rs. 146 Million (Alternate A). Expenditures to date plus projected budgets total about Rs. 166 million as shown in Table 14.

The increase is due to inflation, and increased government and donor funding which has led to increased outputs in some components.

As shown in Table 14, government sources in 1990-92, averaged about 40%; AKF about 30%; and NORAD about 10%.

The major expenditures are for village infrastructure - LI, check dams and watershed development - which comprise well over 50% of costs. Staff costs and overheads are only about 10%, a low figure in comparison to both NGO and bilateral/multilateral programming in rural development. The efficiency of SWDF expenditure is clearly demonstrated in the B/C analysis in Section 4.2.

Table 14

SWDF Expenditure and Sources by Percent

	Expenditure (Rp Millions)	Sources (%)					
		Govt.	Stanrose	Farmers	F.F.	A.K.F.	NORAD
1990	22.2	50	2	18	4	26	--
1991	27.4	30	2	22	1	32	13
1991 Estimate (31 Oct)	38.2	39	3	7	1	31	18
1993 (Budget)	42.0	19	8 (incl. other)	19	1	39	13
1994 (Budget)	36.5						
Total	166.3						

Govt. = District, State and Central Indian Government
Stanrose = Stanrose Companies
Farmers* = Beneficiaries Contributions
F.F. = Ford Foundation
AKF = Aga Khan Foundation
NORAD = Norwegian Agency for Development Cooperation

*This is not an expense on SWDF accounts, it is recorded in LI Cooperative accounts.

Accounts are audited in detail by a chartered accountant every two months (there are too many vouchers to do it at year end), so the cash position is accurately known and financial control and reporting more than adequate.

Budgets for the period 1993 to 97 have been prepared. They reflect a decrease in annual outputs in line with SWDF strategy to assist other NGOs to implement its type of program, and also a conservative budgeting strategy.

It is expected that some funds for program costs (eg. LI infrastructure) will continue to be available in the long term from government, assuming no major change in government policy. Longer term donor funding for these costs can be justified on the basis of a sound investment, with excellent development impacts.

The reliability of future funding, particularly for staff and overheads, is an issue of considerable concern to the Director. This "risk" may be overemphasized for four reasons:

- Its staff and overhead costs are a small protion of its budget.
- SWDF has not significantly publicized its accomplishments and potential; SWDF is an excellent investment for donors, government or private sector.
- Its proposed corpus fund, combined with increasing opportunities for consulting and training services, have potential to generate considerable income.
- Its cash flow management and financial planning, while more than adequate, could benefit from exposure to, and adoption of, more modern techniques.

The last two items are explored in more detail below. At this point, it is recommended that the existing donors clearly assure SWDF of their medium term commitment to finance staff and overhead costs, until the corpus fund has acquired significant capital and the transition to the next stage in SWDF's development is well underway.

6.3.2 Financial Management and Cash Flow

There are a variety of modern techniques in financial management to reduce the level of discomfort that managers of any organization in the NGO or private sector face: Can I pay the bills and salaries when they are due? Use of liquidity ratios and modern cash flow management might assist SWDF.

The monthly aggregate cash position, over the last year, was briefly examined. Deposits in cash or short term investments, vary from Rs. 2.3 million to Rs. 11.4 million, with an average of Rs. 7.4 million. On the surface, this appears to be a healthy cash position, for example, monthly salaries and benefits are only about Rs. 150,000 with a minimum of Rs. 5.5 million perceived as the "comfort level" to meet all obligations. (By paying suppliers invoices promptly SWDF receives considerable discounts).

However, the cash resources are segmented in different accounts so the above description can be misleading. By regulation, government funds cannot be mixed with foreign funding, and different sources can only be used for specific purposes. SWDF rigorously adheres to these requirements.

To improve SWDF's comfort level, it is suggested that potential for simple improvements in financial management be examined further. If found feasible, training of existing staff, or extra staff, responsible for these tasks would lower the perceived risks.

Some options that should be examined are:

- Longer term cash flow projections, some modern risk assessment techniques, and more use of computers.

- Use of short term loans for working capital. (Surprisingly SWDF, whose beneficiaries use small agriculture loans to assure their survival, has never used its large line of credit from a local bank.)

- Negotiations with donors to allow some flexibility in short term alternative uses of funds, or to gain more definite longer term commitments.

6.3.3 The Corpus Fund and Fundraising

Beginning in 1993 budget, SWDF has proposed to start a Corpus (endowment) fund which will eventually generate sufficient investment income to pay for most of staff, staff training, and overheads. This approach is strongly supported by the Consultants. Conventional donor funding has well known long term risks; and government sources are not always reliable, and most of them cannot fund non-program costs.

SWDF has proposed that a Rs. 20 million fund be built up, in Rs. 4 millions increments over the next 5 years. Investment interest from this fund would, at 10%, yield Rs. 2 million a year, compared to the present costs of Rs. 2.7 million for staff and overheads. (Increasing its consulting services to other NGOs is an additional source of income.)

The Director with some help from the Board, has researched how such a fund would function within various legislation under which SWDF operates. These Acts specify how the Corpus fund must be managed and the utilization of income. Most of the fund would be invested in low risk government securities.

Sources of potential funding include donors, the private sector, or individual contributors. It is unlikely that AKF or NORAD can use their funds for such purposes. Another option within the donor community is the use of counterpart funds (local currency funds generated from the sale of donor commodity or equipment imports, e.g. food aid). Donors in some countries, with government approval, have used this mechanism to capitalize NGO endowment funds (e.g. USAID). The potential for the use of counterpart funds in India should be explored further.

Corporations and individuals are another source. Approaching them requires a fund raising strategy which the Director has started to put together. Since the private sector in India is presently adjusting to new economic policies, the Director may approach the Indian community in the USA.

Another approach would be to set up a matching grant system, whereby donor or corporation funds would match individual contributions in a set ratio. As suggested in section 6.2.3, it may be useful to get the Board more activity involved in fund raising for the corpus fund; or alternatively, to release the Director from other tasks to focus more on fund raising.

The accomplishments and potential of SWDF's program would likely be very attractive to contributors. However, to tap these resources efficiently will take considerable planning, time, and some personnel. There are specialists in fund raising who could assist SWDF. It is recommended that the Board or donors assist in acquiring such services.

6.4 Meeting Demand

SWDF's program is becoming well known to many villages in Gujarat, M.P., and Rajasthan. Formal and informal applications come almost daily. To address the demand, the strategy is to continue programming in about 10-15 new villages a year, plus training other NGOs to implement small irrigation and watershed schemes. The NGOs would be trained

systematically when the new Training Center is completed. No other NGOs presently have the capability to implement LI schemes.

There are about 100 village applications on file, about 50 of which may have potential for LI. Clearly, demand presently exceeds the supply of services.

The strategy to meet this demand is sound in theory. In practice it will require more training resources to implement.

Construction of the Training Center has started, with the Hostel about 50% completed, and the foundations for the main training facility dug. Sufficient funds for the physical facilities will likely be available from AKF, NORAD and Stanrose to complete the Center in late 1993.

Previous consultant reports, and the donors, have expressed some concern that the design of the training program, the "software", particularly for training other NGOs, is lagging behind the physical facilities. One would expect the design of the training program to proceed in parallel with the physical construction, as in SWDF's approach to irrigation infrastructure whereby the training and construction occur simultaneously. To design, test, and implement a training program will likely require a year or two. NGOs will require training in <u>how</u> to implement similar schemes (not just training in the what and why of these schemes, as outlined in Section 6.1). The material for such training has not yet been prepared, nor have staff been assigned to carry out these tasks. Even after the NGOs are trained there will be a considerable period before they are capable of achieving a significant level of performance.

Hence to begin to match existing demand, it is again recommended that SWDF appoint sufficient staff to design and test the "software". This staff, themselves, may require training and visits to similar training centers. The process has started. Contacts with some potential NGOs (about 8) have been established; and there is an upcoming opportunity to visit the training programs of Bangladesh NGOs.

In summary, more comprehensive planning for the Training Center is required. As in other topics in this chapter, the key requirement is the appointment of some staff who would be responsible for carrying out these tasks. Funding for additional positions is of concern to the Director. It is suggested that he and the donors meet to resolve their concerns about funding and planning. Communications on this issue appear to be weak.

6.5 Summary of Recommendations

a) <u>To SWDF:</u>

Management of Field Operations

- Document how it presently manages the planning, implementation and monitoring of field operations, for all activities; Identity any gaps or uncertainly in the management of these three tasks; Add some simple components to clarify or strengthen the management process.

Personnel Policies and Staff Development

- Have a simple career development path and strategy which is transparent and clearly understood by all staff.

- Supplement incomes, with increased pay or benefits where necessary, and where the reasons are clear to all staff. (For example, some of the senior engineers or trainers may have higher opportunity costs than other staff). At minimum, pay increments should keep pace with inflation which may increase if new economic policies in India are not well implemented.

- Plan a longer term staff training program and internal budget for both in-house and external training, so that staff know well in advance that they will receive training; and staff should be consulted more systematically on the type of training required.

Next Five Year Plan

- Include some objectives and targets for SWDF, itself, as an organization.

Financial Sustainability

- Explore opportunities to lower perceived risks of future funding, e.g. modern cash flow management techniques.

- For the Corpus fund, explore donor counterpart funds as a potential source, and use the assistance of a fund raising specialist to tap other contributors.

Meeting Demand

- Appoint sufficient staff to plan and implement the training of other NGOs.

b) <u>To the Board and Advisory Council</u>

- Assume some specific responsibilities beyond the general oversight and advisory functions, to release the management burden on the Director.

c) <u>To Donors</u>

- Clearly assure SWDF of their medium term commitment to help finance staff and overhead costs, until the Corpus fund has acquired significant capital.

- Explore opportunities to match foreign or local individual or corporate, contributions to Corpus fund.

- Provide assistance to acquire specialist services in fund raising.

- Meet with SWDF to resolve the weaknesses in communication regarding the planning, and funding of additional staff, for the training activities of the new Training Center.

APPENDIX - A

SCOPE OF SERVICES

1. THE PROJECT

Consultant team, along with other members of the team will conduct a mid term evaluation of Sadguru Water and Development Foundation, Dahod, Gujarat for its programmes on management of Natural Resources.

INTRODUCTION:

The Eastern part of Panchmahals District in Gujarat is among the poorest regions of India. The degraded hilly lands of Panchmahals is inhabited mostly by tribals The destruction of forest has resulted in seasonal migration for livelihood. The main crops of this area are maize, paddy, wheat and gram. Yields in rainfed areas are extremely low.

During the last century, the Panchmahal region has been heavily deforested, leaving a landscape of rolling treeless hills. The tribals with small agricultural holdings have been forced to resort to rain-fed agriculture, animal raising and fuel-wood selling to survive.

The Sadguru Water and Development Foundation (SWDF) was established by the Stanrose Group of Companies in 1975 to work in the tribal areas of Panchmahals. SWDF is a non-political, secular and non-profit organization.

The overall objectives of SWDF were:

- to strengthen the rural economy by undertaking appropriate measures for agricultural and allied development programmes, improving health and education facilities in the rural areas
- arrest and if possible, eliminate the tendency to migrate from rural to urban areas in search of livelihood

1. BACKGROUND

SWDF embarked on a five year plan in 1990. The core of SWDF approach was to combine existing resources with well planned external inputs and management to create productive land use systems. The interventions planned under this five year programme consisted of:

- private land development

- social forestry
- water resource development
- public land development
- livestock grazing

The cross cutting themes of the 5 year plan included:

- people's participation
- savings and capital accumulation
- monitoring, evaluation and documentation

The five-year plan was envisaged to benefit 16,500 people in 75 villages with benefits of Rs.3,300.00 to Rs.7,200.00 per family. The total anticipated cost of the five year plan was USD 7.6 million (INR 114.9 mill).

2. THE MID-TERM EVALUATION

The overall objective of the mid-term evaluation is to:

- review the progress made by SWDF towards fulfillment of the programme objectives as laid out in the five year project proposals written in June 1989 for the period 1990 to 1994.
- help SWDF to chart strategic directions and to undertake mid-term corrections

In particular, the evaluation team will address the following issues but should neither be limited to nor constrained by them

a. **Technical, Economic and Environmental Components:**

to review the technical, economic and environmental facets associated with SWDF's work during the implementation of the five year programme. Questions to be addressed should include:

- what were the physical objectives and targets set out in 1989 and what has been achieved to date in terms of both direct and indirect effects
- at what cost has the above been achieved?
- to what extent have Sadguru's programme activities raised land and water productivity?

- what are the net economic benefits of the programme activities?

- how and in what ways have these activities contributed to household and village economies?

- what are the identifiable environment effects of these programme activities?

- are the programme activities likely to be sustainable both economically and [illegible].

- are these programme activities technically sound?

- review of non-monetary impact of SWDF's programmes including the following:

  food self sufficiency and security, agricultural yield improvements, improvements in irrigation potential, increase in vegetational cover, the usage of fuelwood, the size and quality of houses, the migration rate, general improvement in village amenities, land price appreciation, credit-worthiness of individuals, drinking water availability etc.

b. **Organizational and Community Development Components**

Review the impact of SWDF's programme on its target communities and on their ability to participate in their own development, with a specific requirement to suggest strengthening or mid-course corrections to SWDF's programme. This programme would include:

- what village organizational development has Sadguru undertaken to implement its programme and what has been achieved to date

- are Sadguru's village organizations (VOs), groups of women and men likely to become sustainable

- how effective is Sadguru's approach to VO development?

- what is the level of people's participation in VO development?

- are women sufficiently involved in VO development? What is the social and economic impact on women?

- and have these components contributed to raising the status of women?

- are training needs appropriately identified and met?

- review of impact studies of SWDF's programmes

c. **Management, Administration and Finance:**

review the functioning of SWDF as an organization with particular reference to the following issues:

- how have Sadguru's managerial and administrative capabilities grown? Have they kept pace with the growth of programme activities?

- what are their strengths and weaknesses? Including (among others) the following factors:

  - range and level of skills
  - control and control systems
  - delegation
  - staff strength and stability

- what new managerial and administrative demands are likely to be made on Sadguru in the future? And how well is it prepared to meet these future demands?

- how has Sadguru financed its growth? How can Sadguru become financially self-sustaining:

  - for its core costs
  - for its programme costs

FRAMEWORK FOR MID-TERM EVALUATION

This evaluation will be jointly conducted by the two major donors AKF and NORAD. AKF will depute one consultant and NORAD will depute the rest of the members of the evaluation team. Ideally, one member of the team should be woman. The team should have expertise and balance in its composition to complete its assignment. The team shall be encouraged to give a short but precise report which would include details on each of the terms mentioned above. The tentative programme would be for a maximum period of two weeks at SWDF including time for report writing. The field visit would be undertaken during November and the report deadline could be December.

3. TIME SCHEDULE

The duration of the assignment will be for a maximum of 5 person working weeks. (3 weeks including preparation 150 hours for Ms. Anne Mossige and 2 weeks including preparation 98 hours for Ms.Ingrid Nyborg). The report should be completed by the 8th December 1992.

The final report has to be submitted to NORAD not later than 15 December 1992.

During this period, the consultants will visit the organisation Sagduru Water and Development Foundation, Dahod, Gujarat in India.

for NORAD/INDIA

Gunleiv S. Ulleu

Oslo, 10/11/92

APPENDIX 2

LIST OF BACKGROUND REFERENCES

1. Review of training needs and plan for Training Centre by mr. Robert mitchell, Canada - March 1992.

2. A study of Community Management of lift irrigation schemes by Mrs. Caroline Whitby of Canada - February - 1992.

3. A Report of Sadguru's programme planning, budgeting and monitoring assessment by Mr. Jonathan Hampshire. U.K. September 1991

4. A study of Forestry programme by Mr. Czech Conroy ODA, U.K. September 1991

5. A study on tribal farmers lift irrigation by Dr. B.C. Barik published in " Social Changes " - June 1991.

6. A study of the development impact of Sadguru's programmes in Sahada village by Mr. Ronald Mucklestone of Canada - January 1991

7. A study of Biogas programme of Sadguru by Mr. Ronald Mucklestone of Canada - January 1991.

8. A note by Dr.Anthony Bottrall, former Programme Officer, the Ford Foundation, on his visit and interviews with the beneficiaries of Shankerpura village - October 199Ø.

9. Sadguru's coments on NORAD Review Team's report October 199Ø (Review report on item 11 below and this comment are tobe read togather as the comment were asked by NORAD and they were duly accepted by NORAD)

1Ø. A review of five years plan of Sadguru by the consultants of NORAD - October 199Ø

11. Evaluation report of forestry programme assisted by National Wasteland Development Board, Government of India - report Dr. Jayant Patil as a Consultant of NWDB & at present a member, Planning Commission, Govt. of India - March 199Ø

12. Summary and conclusions of lift irrigation of Sadguru in Panchmahal - A study done by Prof. Girija Sharan of Indian Institute of Management, Ahmedabad - January 199Ø

13. A study on the impact of Sadguru's Social Forestry Programme on women conducted by Ms. Nadine Grant of Canada - Dec. 1989

14. A report by International Consultant, Dr. Derek Poate of U.K., on Monitoring, reporting and impact assessment of Sadguru - November 1989

15. An article written by District Development Officer, in Govt. of India's house magazine on Sadguru's lift irrigation schemes, published in April 1989

16. A study of tribal lift irrigation co-operatives by Dr. K.K. Singh - June 1987

17. A study of lift irrigation schemes of Sadguru conducted by a Review Team constituted by Govt. of Gujarat - July 1985

18. A summary of comparative study of Sadguru's L I. schemes and Government's L.I. schemes - A study by Senior Superintending Engineer, Irrigation Deptt. of Gujarat state - October 1984

19. Detailed comparative study of Sadguru's L.I. schemes and Government's L.I. schemes - A study by Senior Superitending Engineer, Irrigation Deptt. of Gujarat state - October 1984

APPENDIX 3

N M SADGURU WATER AND DEVELOPMENT FOUNDATION, DAHOD

DETAILED FIELD VISITS AND OTHER ENGAGEMENTS OF

MID-TERM EVALUATION TEAM FROM
23rd NOVEMBER TO 6th DECEMBER 1992

Date	Engagements
23.11.1992	Arrival of team in the morning - preliminary discussion with the Director and chalked out detailed programmes of Evaluation Team - collected various documents from Sadguru's office.
24.11.1992	Visited Rajudia, Kheda and saw various integrated activities, lift irrigation, check dam, watershed development, agro forestry, horticulture, bio-gas, etc. Visited Sallopat check dam in Rajasthan - saw the proposed L.I. site at Monadungar, Rajasthan, from Sallopat. Visited Shankerpura village - saw the massive forestry programme - attended 2 meetings - one of women group consisting of about 40 women - and another meeting of men group of about 30 persons - inquired various matters from these groups. Met 4 topmost District Officials of the Development Departments as follows ; i. Mr. Pavagadhi, IAS, District Development Officer, Panchmahal. ii. Mr. Arif Sheikh, Project Administrator, Integrated Tribal Development project - Tribal Sub Plan, Dahod. iii. Mr. M.R. Katara, Director, District Rural Development Agency, Panchmahal. iv. Mr. Kishori, Assistant Project Administrator, Tribal Sub Plan, Dahod. Dinner with total staff of Sadguru in the evening.

Date	Engagements
25.11.1992	Visited Biyamali L.I. Scheme - saw the irrigation going on - discussed and interviewed the farmers in a group meeting - about 35 farmers group.
	Attended village motivators workshop at Dahod - 45 women village motivators were present - some questions were asked to the participants by the Team Members.
	Detailed interview with some Head of the Departments.
	Mr. Robert talked with some staff.
	The Team met Dy. Director, Agriculture, Mr. Manubhai Patel.
26.11.1992	Visited Kakadkhila L.I. Scheme and met about 50 beneficiaries and talked with them.
	Attended bio-gas users meeting at Dahod - all women participants.
27.11.1992	Visits to Dadhgarh Lift Irrigation and Check Dam and meeting with the Members of L.I. Cooperatives - it was an Annual General Body meeting of Cooperatives - participated by 35 men and 35 women - observed the discussions and Proceedings of the meeting.
	Visited Thunthi Kankasia lift irrigation - attended village farmers - members meeting attended by 125 persons - 50 % being women. Observed the discussion and Proceedings on various programmes to be implemented in that village.
	Lunch at Thunthi Kankasia village itself.
28.11.1992	Attended monthly coordination meeting of the entire staff of Sadguru at Dahod office.
	2 Members attended women village level workers meeting - 44 participants.
	Mr. Robert and Mr. Jan Erik interviewed some staff of Sadguru.

Date	Engagements
29.11.1992	2 members attended village meeting of forestry and other beneficiaries at Mahudi - about 125 persons attended - 50 % being women 2 Members visited Training Complex site at village Chosala. ALSO SAW LI AND CHECKDAM AT CHOSALA WITH SRINKLERS & DRIP IRRIGATION 2 Members visited village Gamana in Rajasthan where shortly watershed development and check dam work will be commenced.
30.11.199e2	Meeting with the Department Heads - thereafter individual meetings with the Department Heads.
01.12.1992	Meetings with the Department Heads, individually. Meeting with the Directors. Meeting with the Manager, LAMPS. One Member attended womens Income Generation meeting at Dahod.
02.12.1992	Meeting with the Directors. One Member visited Chosala Training Complex and Ranapur check dam. Report Writing..
03.12.1992	Discussion with the Director. Report Writing

APPENDIX 4

BASIC DETAILS OF NEW LIFT IRRIGATION SCHEMES EXECUTED DURING 1.1.90 TO 31.10.92

SR. NO.	NAME OF THE SCHEMES	INSTALLED CAPACITY IN H.P	HEAD IN MET-ERS	IRRIGATION IN KHARIF	RABI	H.W.	TOTAL	APPROX. NO. OF BENEFI-CIARIES	ACTUAL COST IN RS.
1	Junapani	70	45	88	175	-	263	90	925374
2	Tanda	50	31	170	170	-	340	85	848483
3	Sabli	110	43	150	200	50	400	100	1357003
4	Rajadia	120	55	150	300	150	600	150	1595159
5	Kawali	50	21	317	317	-	634	125	1294533
6	Semalpada M.P.	25	16	150	150	-	300	75	718109
7	Khedikhas M.P.	50	34	160	160	-	320	80	1133794
8	Tanachhiya - 1	60	42	115	230	-	345	110	1356734
9	Tanachhiya - 2	45	27	190	190	-	380	70	1107787
10	Kheda	100	54	108	162	108	378	80	954038
11	Ambazaran	10	17	72	108	72	252	50	946166
12	Dadgarh	50	37	120	180	-	300	90	1092927
13	Chosala	50	37	96	144	50	290	72	1537191
14	Moti Ranapur	80	35	210	315	-	525	150	2356881
15	Kakadkhila	50	20	240	240	100	580	120	1214767
16	Gultora - 2	20	27	60	90	-	150	31	578333
17	Dungarpur & Mandavov	30	25	144	96	45	285	117	664274
18	Sabrala	15	19	60	90	35	185	33	556434
19	Choti Pitol M.P.	40	31	46	144	-	190	62	995203
20	Mandli Nathu M.P.	50	32	120	180	-	300	72	1048847
21	Mathasula M.P.	50	33	120	180	-	300	127	1037482
22	Rakhadia	25	32	60	90	-	150	95	689249
23	Rachharda	80	38	210	315	-	525	133	1973416
24	Dharnarda	60	254	210	315	-	525	68	1550674
25	Mahudi	40	48	63	94	-	157	40	894911
26	Navapada M.P.	15	20	90	135	-	225	45	868878
27	Padatiya Faliya	50	42	96	144	-	240	37	1194524
28	Thuthikankasiya	80	54	120	180	50	350	58	1073489
29	Itawa	50	34	120	180	-	300	27	251403
30	Guwali M.P.	110	43	195	292	-	487	159	2072601
	Total	1635	1177	4050	5566	660	10276	2551	33888664

NEW L.I.SCHEMES STARTED FROM 1.11.92

1	Dab-Talai M.P.	80	41	150	225	-	375	83	1688660
2	Junagaon M.P	30	25	105	157	-	262	50	811395
3	Kaliya Ciran M.P	50	41	84	126	-	210	75	1080245
4	More Dungar M.P	30	41	54	81	-	135	27	652265
5	Jerjitgarh	70	33	156	234	-	390	100	1292410
	Total	260	181	549	823	-	1372	335	5524975

APPENDIX 5

Basis for C/B Calculation

1. Average cost of check dam = total actual cost of 41 dams constructed from 01/90 to 10/92, ÷ 41. Costs include : mobilization, salaries, training, village labor, in addition to capital cost. Note : only about 75% of actual irrigation schemes require a check dam

2. Average cost of LI system = actual costs for 30 systems from 01/90 to 10/92 ÷ 30. Costs included : Same as item 1.

3. Social Forestry Costs : About 4 million trees per year planted in 20 villages = 200,000/village. Assume 110,000 planted @ Rs. 1 each plus 15,000 for related SWDF salaries and extension services for 1 year.

4. Watershed Development Costs : Rs 900 per acre for 300 acres = Rs. 270,000. Costs include village labor, related SWDF salaries and extension for 1 year.

5*. Electricity Costs : 50 HP x Rs 192/HP/year, say Rs 10,000/year.

6*. Maintenance of diesel and electrical motors, pumps, pipeline, valves and outlets assumed to be zero in drought years, see item 11 below. Rs. 8000 per year based on average actual costs.

7*. Cooperative salaries for secretary and watchman, full year, and pump operator and water distributors, irrigation season only. Assumed to be zero during drought years, see item 11 below. Rs. 10,000 based on actual average data.

*Cost of items 5, 6 and 7 are paid by farmers to their LI cooperative which manages the LI Scheme. Electricity rates are based on the horsepower of the system not usage , and are charged irregardless of supply. Since electricity is sometimes not provided when required, and charged even in a drought year when there is no water to pump, these charges are a hot item in relations between farmers and the Electricity Board.

8. Costs of Agricultural. Inputs - Rabi (210 acres) and summer crops (35 acres). These are the costs of irrigated production, in addition to water costs i.e. electricity, maintenance, cooperative salaries. Cost includes fertilizer, seeds, pesticides, and labor. See matrix in Table 3 for costs by crop, and % of "typical" 210 acre scheme planted for each crop. Table 3 data is based on SWDF farmer interviews and field sample data collected in 1991. About one third of the LI Schemes plant a third crop on an assumed acreage of 50% of the 210 acres. Hence, 210 x 50% x 1/3 = 35 acres planted in the summer crop.

9. Costs of agricultural inputs - Kharif crop. The kharif crop, costs and benefits, is used as a proxy to capture some of the effects of watershed development in addition to some increase from improved extension services. Costs included are same as item 8; and data is in table 3. The farmers had a smaller kharif crop before SWDF assistance using meagre inputs with lower opportunity costs of labor. After SWDF watershed services the costs are increased. Cost after - cost before is used to calculate costs. The basis of the calculation of additional costs is shown in Table 3.

10. SWDF extension services. This cost includes the salaries and transportation costs for the SWDF Cooperative Cell to provide training, management, accounting and

agriculture extension services to the LI cooperative, assuming 5 visits per year, 100 km round trip, and 3 persons

11. Rabi and summer crop outputs/benefits. Benefits are based on the yield and price data during 1991-92, in table 4, based on 30 LI Schemes, 5 to 10 random field samples on a 1 square mile basis, and farmer interviews. The 1991-92 season was a year of average rainfall. During year 4 and 8, total failure of these crops is assumed because of drought.

12. Kharif outputs/benefits. These benefits capture some of the effects of watershed development (gully plugs, trenches, gradonies, land leveling, some trees, etc.) due to recharged water tables; and a smaller amount due to improved access to improved agricultural inputs. The basis of the calculation is shown in tables 3 and 4.

13. Social Forestry Benefits/Outputs. The survival rate of the seedlings planted, in item 3 above, will vary from 30% to 80%, the lower rate accruing during drought years. A long term survival rate of 50% was assumed i.e. 55,000 trees. Moreover, SWDF data, based on farmer interviews, indicates that the value of a tree after 10 years is Rs. 50 to 100. A value of Rs. 50,- was assumed. Hence the following series was used to value the trees in 10 successive years. Rs. 0,0,0,4,5,...,9,10. The sum of this series is about 50. The benefits from the trees start in year 4.

APPENDIX 6

CROPWISE YIELD IN RABI 1991-92

Sr. No.	Name of L.I. Scheme	Irrigation achieved in 1991-1992	16 425 700 Wheat	8 660 700 Gram	8 435 700 Maize	80 65 700 Onion	40 350 700 Pegionpea	8 750 700 Mustard	Wheat Income	Gram Income	Maize Income	Onion Income	Pegionpea Income	Gross Income	Expences	Net Income
1	Shankerpura	160	90	60	10	0	0	0	612000	316800	34800	0	0	963600	112000	851600
2	Kathla	110	30	70	10	0	0	0	204000	369600	34800	0	0	608400	77000	531400
3	Vadbara-1	100	45	45	10	0	0	0	306000	237600	34800	0	0	578400	70000	508400
4	Anas River	282	220	40	22	0	0	0	1496000	211200	76560	0	0	1783760	197400	1586360
5	Biyamali	105	85	10	10	0	0	0	578000	52800	34800	0	0	665600	73500	592100
6	Chhayan Fallya	70	30	30	10	0	0	0	204000	158400	34800	0	0	397200	49000	348200
7	Rampura	72	59	13	0	0	0	0	401200	68640	0	0	0	469840	50400	419440
8	Sahada	305	205	90	10	0	0	0	1394000	475200	34800	0	0	1904000	213500	1690500
9	Ranapur Buzarg	170	60	70	40	0	0	0	408000	369600	139200	0	0	916800	119000	797800
10	Navanagar	120	45	60	15	0	0	0	306000	316800	52200	0	0	675000	84000	591000
11	Gamdi	106	71	15	20	0	0	0	482800	79200	69600	0	0	631600	74200	557400
12	Gamla	60	10	50	0	0	0	0	68000	264000	0	0	0	332000	42000	290000
13	Khangela	76	40	36	0	0	0	0	272000	190080	0	0	0	462080	53200	408880
14	Matwa	153	37	116	0	0	0	0	251600	612480	0	0	0	864080	107100	756980
15	Hadmat Khunta	131	85	38	8	0	0	0	578000	200640	27840	0	0	806480	91700	714780
16	Dantiya	90	20	20	50	0	0	0	136000	105600	174000	0	0	415600	63000	352600
17	Rallyati Gujjar	56	16	22	18	0	0	0	108800	116160	62640	0	0	287600	39200	248400
18	Gultora	124	23	68	33	0	0	0	156400	359040	114840	0	0	630280	86800	543480
19	Chandwana	100	60	40	0	0	0	0	408000	211200	0	0	0	619200	70000	549200
20	Kadwal	57	10	40	7	0	0	0	68000	211200	24360	0	0	303560	39900	263660
21	Bhitodi	22	0	22	0	0	0	0	0	116160	0	0	0	116160	15400	100760
22	Vadbara-2	157	42	80	35	0	0	0	285600	422400	121800	0	0	829800	109900	719900
23	Bambela	162	145	17	0	0	0	0	986000	89760	0	0	0	1075760	113400	962360
24	Bhamatalal	180	90	90	0	0	0	0	612000	475200	0	0	0	1087200	126000	961200
25	Gungardi	125	60	65	0	0	0	0	408000	343200	0	0	0	751200	87500	663700
26	Zaribuzarga	218	64	113	2	39	0	0	435200	596640	6960	202800	0	1038800	152600	886200
27	Vanbhori-1	80	5	75	0	0	0	0	34000	396000	0	0	0	430000	56000	374000
28	Vanbhori-2	110	10	100	0	0	0	0	68000	528000	0	0	0	596000	77000	519000
29	Timifaliya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Motikharaj	213	133	80	0	0	0	0	904400	422400	0	0	0	1326800	149100	1177700
31	Bhima	300	0	0	0	0	300	0	0	0	0	0	4200000	4200000	210000	3990000
32	Godhar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Limkheda	130	30	85	15	0	0	0	204000	448800	52200	0	0	705000	91000	614000
34	Ravalikheda	235	4	227	4	0	0	0	27200	1198560	13920	0	0	1239680	164500	1075180
35	Dholakhakra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Gundikheda	100	35	60	5	0	0	0	238000	316800	17400	0	0	572200	70000	502200
37	Kheng	20		20	0	0	0	0	0	105600	0	0	0	105600	14000	91600
38	Kalakhunt	110	40	70	0	0	0	0	272000	369600	0	0	0	641600	77000	564600
39	Masuriya	160	45	115	0	0	0	0	306000	607200	0	0	0	913200	112000	801200
40	Junapani	51	4	47	0	0	0	0	27200	248160	0	0	0	275360	35700	239660
41	Tanda	70	5	65	0	0	0	0	34000	343200	0	0	0	377200	49000	328200
42	Sabli	70	20	40	10	0	0	0	136000	211200	34800	0	0	382000	49000	333000
43	Rajadla-kheda	144	92	26	26	0	0	0	625600	137280	90480	0	0	853360	100800	752560
44	Kawali	180	80	100	0	0	0	0	544000	528000	0	0	0	1072000	126000	946000
45	Semalpada MP	100	50	50	0	0	0	0	340000	264000	0	0	0	604000	70000	534000
46	Khedikhas MP	70	0	70	0	0	0	0	0	369600	0	0	0	369600	49000	320600
47	Tanachiya-1	35	0	35	0	0	0	0	0	184800	0	0	0	184800	24500	160300
48	Tanachiya-2	40	0	40	0	0	0	0	0	211200	0	0	0	211200	28000	183200
49	Kheda-Ambazaran	84	42	25	17	0	0	0	285600	132000	59160	0	0	476760	58800	417960
50	Ambazaran	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	Dadgarh	200	100	60	40	0	0	0	680000	316800	139200	0	0	1136000	140000	996000
52	Chosala	100	30	30	40	0	0	0	204000	158400	139200	0	0	501600	70000	431600
53	Moti Ranapur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	Kakadkhila	140	40	95	5	0	0	0	272000	501600	17400	0	0	791000	98000	693000
	Total	6053	2407	2835	472	39	300	0	16367600	14968800	1642560	202800	4200000	37178960	4237100	32941860

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Mid-term report.... for et NORAD-prosjekt.

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