

Project on Reviving and Constructing Small Water Harvesting Systems in Rajasthan

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Department for Asia

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Sida Evaluation 03/40

Department for Asia

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Executive Summary

A. Details of the Project

Tarun Bharat Sangh has been working in Alwar district of Rajasthan since 1985. Starting with various activities at village level, TBS has focused on revival of traditional water harvesting structures (locally called Johads). Till date, TBS has built about 3200 Johads with the help of funding from various sources.

B. SIDA's support

Sida's support to TBS started in year 1994-95. Until 2003, Sida had disbursed about Rs. 16.2 million to TBS. The extent of funding by Sida has varied from a minimum of 9 % of total funding in 1997-98 to 77% in 2001-02

C. Details of Work done

- 62% of the total funds received by TBS have been spent directly on building water harvesting structures and on mobilising communities.
- TBS has built 576 structures with Sida's support in 292 villages falling in 15 districts of Rajasthan. 497 (86%) structures have been built in Alwar district while only 79 (14%) have been built in 14 other districts of Rajasthan.
- 168 of these (29%) have been private structures while 408 (71%) have been community structures. 91% of the total fund provided by Sida has been spent on community structures while only 9% has been spent on private structures.
- In terms of river catchments, almost 70% of structures supported by Sida fall in Ruparel catchment followed by Sahibi (15%).
- In as many as 199 (35%) villages, only one structure (sometimes only one field bund) has been made.
- Although, in local folklore, water harvesting structures are called by various names, documents from TBS have described all structures by the generic name Johad.

D. Findings

1. Scale of Work

The scale of work adopted by TBS is staggering. On the positive side this scale has shown that rejuvenation of traditional water harvesting structures on a wide scale is indeed possible. On the negative side, the need for expansion has prevented TBS from integrated work at village level, affecting the health of village institutions. The staff of TBS has also not been able to find time to upgrade their skills due to intense work pressure. TBS now needs to limit its scale to build models of excellence in integrated water management. An efficient management structure for monitoring health of numerous structures built is also urgently needed.

2. TBS' Method of Working

a. Organising communities for water resource management: TBS started organising communities for building traditional water harvesting structures as a means of drought proofing. For a brief period, TBS also had to take a stand against marble quarrying in Sariska National Park. Time and again, long drawn out struggles between TBS and village people versus Government have taken place over various issues. In most such cases, people's and TBS' stand have been vindicated. These victories have created a strong bond between TBS staff and village people and have given TBS a commendable grassroots level credibility in the project region.

- b. Methods of expansion:** The method of expansion of TBS is based on:
- i. Spread of information through word of mouth and by kinship networks
 - ii. Three Padyatras organised by TBS every year.
 - iii. Involvement of traditional conservation methods and religious leaders

TBS has ensured that work is taken up only when there is a demand from a village. This has ensured that the programme remains demand-driven and not supply-driven. However, excessive emphasis on demand and kinship networks has made scale unmanageable and intensity very weak. TBS' approach has also restricted it from following a river catchment approach, leaving huge areas in catchments uncovered.

c. Village Institutions: Gram Sabhas are informal institutions built by TBS. Most Gram Sabhas have remained dormant after TBS withdrew from the village after construction of the Johad. However, in some villages, the Gram Sabha has taken up further activities. Support from TBS to these Gram Sabhas was found to be dependant on the amount of support that the Gram Sabha could extract from TBS. There was little evidence of an organised strategy on the part of TBS to monitor and strengthen these Gram Sabhas.

3. Project Gains

The following gains from the work done by TBS stand out clearly:

a. Release of Social energy: Work done by TBS has led to a release of social capital in many villages. Some village institutions have moved towards protecting forests, building schools and other developmental works.

b. Increased water availability: The work done by TBS has had a positive impact on water availability in the region both in agriculture dominant and animal husbandry dominant villages.

c. Impact on agriculture:

- In agriculture-dominated villages, increased surface and groundwater has translated into significant economic gains, especially from the Rabi crop.
- In villages where a significant proportion of village lands have been treated, most households have protected themselves against ill-effects of drought for 3 to 4 years. There is also a marked reduction in distress migration.
- Soil erosion on agriculture fields has been reduced significantly by voluntary field bunding on farmers' fields leading to increased agricultural productivity.
- In some villages, farmers have diversified into cash crops due to assured water availability leading to an increase in agricultural income.
- In some villages, utilisation of wastelands for agriculture is also reported.

d. Impact on animal husbandry

- In animal husbandry dominated villages, increased water availability has led to change in livestock composition towards more milch cattle and therefore a greater income.
- Construction of water harvesting structures on grazing plateaux has also led to an increase in water and fodder availability in grazing lands.

e. Other positive spin-offs of TBS' work

- The process of building Johads has resurrected village institutions in many villages.
- In many villages, Johad building has led to protection of forests in catchments.
- Significant reduction in drudgery of women in fetching water, fuel wood and fodder.
- In a few villages, women's groups have also been motivated to fight against social evils.
- Positive impact on education of girls and health are also reported.
- Quality of TBS' structures has forced Government to raise the quality of their work.
- In some villages, people have started building Johads on their own.

4. Reasons for Success

TBS' work on water harvesting has been successful because of the following factors :

- Traditional and simple water harvesting structures built based on existing skill base.
- Considered a work of religious merit in local worldview.
- Involvement of sadhus, sacred tree and sacred grove traditions, etc.
- Quick demonstration effect of TBS' work in terms of large water body in a parched land
- Low cost of structures built allowing village communities to mobilise contributions.
- Lower cost and better quality of structures compared to those built by Government.
- Problems at community level sorted amicably by local workers of TBS.
- Clean and transparent financial operations.

An analysis of TBS' "star" villages reveals that in almost all such cases:

- The need for works was high as the village was situated at upper end of catchment.
- The percentage of land treated in such villages is comparatively very high.
- In almost all these villages, forest conservation has been a priority.
- Strong village level institutions were formed in these villages.
- TBS has been in regular touch with these villages.
- An integrated approach to resource management has been adopted in these villages.

5. Extensive documentation of work done by TBS and its impact

TBS has promoted extensive documentation its works through strategic alliances with journalists, research and educational institutions and interested individuals at State and national levels.

6. Impact of TBS on National and State Water Policies

The following impacts of TBS on State and National level water policies can be seen:

- Formation of a National water network and other events for mobilising people from various crosssections in the country on issues of community-ownership of water.
- TBS has influenced state drought relief works to ensure that more budget is spent on water harvesting structures rather than works not directly relevant to drought proofing.
- In Sariska Tiger Reserve, TBS has moved from a position of conflict with the state to that of collaboration. Due to TBS' work, water harvesting structures are now part of the Park's Soil Conservation works.
- Many of the large number of visitors from other states have been inspired by TBS' work to take up such works in their areas.
- TBS has been able to cultivate well-meaning officers within Government and has responded well to requests from Government for collaborations.

7. Developing Strategic Alliances

TBS has been able to mobilise excellent support for its work due to strategic alliances forged at various levels and sections and maintained through thick and thin.

8. Changing Demand from TBS in recent years

Due to publicity received by TBS in recent years, the role of TBS is fast changing from a grassroots agency to a support level agency for the following:

- Training staff of NGOs in Rajasthan in water harvesting.
- Establishing credibility of structures and TBS' work in academic circles.
- Helping various organisations in public advocacy, especially against repressive Acts of the Government (such as privatisation of water rights).
- Mediation between Government and civil society.
- To play an active role at a global, national and state level for influencing water policies.

Currently, TBS does not have a well thought-out strategy to respond to these demands. The core team of TBS also needs to be trained for the same.

9. Areas for urgent gap-filling by TBS

a. Strategic planning for expansion: The scale of work that TBS pursues is a drag by itself. TBS has not been able to refuse demands for new water harvesting structures from other districts. As more of such demands are met, financial and human resources of TBS are spread very thin. This leaves no time for integrated work or for capacity building of staff.

None of the river catchments where TBS works has been treated completely so far. There is also lack of a proper monitoring system for keeping track of Johads built by TBS, making monitoring and follow-up impossible. TBS also needs to urgently consolidate and formulate a clearly-outlined strategy for programme expansion and implementation.

b. Poor maintenance and follow-up of structures built: The focus on constructing new Johads has also made improving quality of village institutions for maintenance of structures a casualty. In some villages, Johads not maintained by village people have been “built” under a new grant. TBS needs to urgently incorporate strategies for maintenance of structures into its implementation strategy so that it becomes a part of the programme.

c. Channelise social energy for integrated resource management: In recent years, TBS’ emphasis has shifted from integrated works to large-scale replication of Johads. The pursuit of scale and consequent lack of time have now made integrated work very rare.

This has also changed the perception of village level, who perceive TBS as an agency providing a single point service, that of building Johads. The social capital accumulated in the process of building of Johads is thus lost and is not channelled into building sustainable institutions for overall development. The net result is that integrated village water management plans are not prepared any more, leaving many village resources undeveloped.

d. Adequate preparation to respond to changing roles: TBS does not seem to have a clearly outlined strategy on how it will respond to changing demands on it.

e. Gaps in cognition of priority areas: TBS needs to develop an organisational response to following major issues:

- i. Equitable distribution of water within various economic sections in the villages.
- ii. Demand-side water management at river valley level.
- iii. Incorporating modern technology such as low-cost drip irrigation, sprinkler irrigation, evaporation retarders and Groundwater mapping in its work.
- iv. Role of Panchayati Raj Institutions in TBS’ work
- v. Role of Gender in TBS’ work

10. Organisational health of TBS

TBS needs to urgently implement the following:

- A transparent and well-outlined personnel policy incorporating Provident Fund, Medical allowance, Accident Insurance, a regular pay scale,
- A well-planned capacity building programme for TBS staff.
- The dependence of TBS on foreign funds for its activities is very high. TBS needs to also increase funding resources from Indian and corporate donors.
- TBS does not have sustainability mechanisms such as corpus in place.

The above situation must be urgently rectified if TBS has to grow as a leading organisation.

E. Conclusions

1. Scale of Work

- The scale of expansion using kinship networks and demand-driven approach has diffused human and financial resources and has made maintenance of structures built earlier difficult, if not impossible. There is also little time left for capacity building of workers.
- However, the scale of work has given TBS an excellent reputation in the State. This reputation can be used to develop integrated water resource models in clusters of villages incorporating development of land, forest and water-based Common Property Resources.

2. Shifting to an Integrated approach again in selected clusters

Villages where work has already been done are best grounds for building integrated models, as the amount of effort required here would be miniscule compared to efforts in a new cluster. An intensive village ecosystem-based approach of programme implementation needs to be taken up now as against an extensive Johad building approach.

3. Consolidation of water harvesting works done earlier

Currently there is a very loose but ineffective informal system to get feedback about health of Johads constructed. This needs to be changed and village people must be supported to get into the habit of maintaining these structures again.

4. Ensure equitable distribution of benefits of TBS' work within villages

After creating large bodies of water, TBS needs to ensure that this water is available to all sections in an equitable manner. The only way this can be done is by discussing issues of equitable distribution before any work is started and by building strong and vibrant Gram Sabhas.

Experiment with Participatory Irrigation Management Schemes

TBS should also assist village communities financially and technically for setting up participatory irrigation management schemes. For this, TBS needs to make preliminary assessments of existing water use pattern and for designing mechanisms for equitable sharing. Capacity building and exposure visits for TBS staff for learning such works from other agencies could be taken up. Also, the rich traditions in the project area regarding equitable water distribution could be documented and built upon.

5. Demand-side water management at river catchment level

At a river catchment level, issues of equity between villages become important and must be resolved. TBS has made a good beginning by forming the Arvari Sansad, a federation of 70 Gram Sabhas of villages in Arvari catchment. TBS must invest more energy at enabling the Parliament to become an effective water-management organisation.

6. Improving quality and productivity of CPRs, especially grazing lands and forests

The health of water harvesting structures is intimately related to the health of the grazing lands and forest areas. With the advent of water harvesting structures, encroachments on grazing lands are on the increase, which could be disastrous for landless and poor sections. Protection and improving CPRs thus becomes an urgent priority for TBS.

7. Policy Advocacy for Water Management in Rajasthan and India

The reputation and experiences of TBS have now reached a stage where it can play a key role in policy advocacy for water management at state and national level. TBS could take up a number of activities at state and national level for the same.

8. Capacity Building of TBS staff to respond to changing demands

The role of TBS is fast changing from a grassroots agency to a support level agency for capacity-building and public advocacy at national and state level. TBS staff urgently needs an intensive capacity-building programme to help them manage earlier works more efficiently and to take up the new challenges before them.

9. Improving Organisational Health of TBS

Providing an appropriate social security net to its workers is dependent on TBS' own financial viability. TBS therefore needs to take steps towards enforcing a sympathetic personnel policy and building up a corpus.

F. Recommendations

1. Scale of Work Done

Limit expansion of work into districts that adjoin Alwar and share river catchments with Alwar. The aim should be to saturate river catchments where TBS already has a sizable presence.

2. Shifting to an Integrated approach again in selected clusters

New expansion should be in clusters where the "star" villages of TBS exist. An intensive programme for integrated resource development should be taken up. The specific activities that can be taken up could be identified after an open-ended Microplanning exercise.

3. Consolidation of water harvesting works done earlier

Strengthen village institutions for maintenance of structures through adequate support and through:

Ensuring community mechanisms

- Documentation of traditional methods of vegetative and structural stabilisation.
- Documentation of ALL old and new Johads built in a folio.
- Separate padyatras for maintenance of Johads built earlier
- A separate team for monitoring and ensuring health of structures built.
- Making maintenance schedules part of the programme.
- A computerised MIS system for monitoring Johads constructed.
- Rewards for the 10 best-maintained Johads in the district.

4. Ensure equitable distribution of benefits of TBS' work within villages

- Make regulations for equitable distribution of water part of village institutions.
- Take up awareness programmes about sustainable and equitable water use.
- Promote improved composting methods and indigenous seeds for water conservation.
- Work on Participatory Irrigation Management.

5. Demand-side water management at river catchment level

Enhance the capacity of the Arvari Parliament in demand-side water management by:

- Documentation and incorporation of traditional practices of equitable water distribution.
- Collection of rainfall data through schools in Arvari Catchment.
- Regular meetings with Parliament and Gram Sabhas.
- Support negotiations between downstream and upstream village institutions.

6. Improving quality and productivity of CPRs, especially grazing lands and forests

- Incorporate regulations for protection of CPRs into village institutions.
- Awareness Programmes for protection and management of grazing lands and forests.
- Take up construction of water harvesting structures in CPRs.
- Raising centralised or village nurseries for plantation in CPRs.

- Fresh afforestation in grazing lands where there is no root stock.
- Promotion of *charagah* development and improved grasses.
- Document extent of encroachment on Gowchers in project villages.
- Try reversing encroachments by organising village communities.
- Honour villages where removal of encroachment has been done by community action.
- Documentation of traditional methods of CPR conservation such as sacred groves.
- In-situ and ex-situ conservation of medicinal plants by plantations and herbal gardens.
- Involvement of *Gunis* and *Vaidyas* in conservation efforts.
- Collaborate with Forest Department for protection of degraded forest lands.

7. Policy Advocacy for Water Management in Rajasthan and India

State level

- Conduct regular capacity building programmes for stakeholders at State level.
- Organise State-level workshops and move towards a more equitable State Water Policy.

National level

- Organise National Workshops on issues related to national water policy.
- Identify and award exemplary works on water management.
- Continue regional and national level padyatras for mobilising public opinion.

Set up a National Resource Centre on Water:

- National resource library to collect publications on issues of water management.
- Conduct study, documentation and publication of key issues on water.
- Publish exemplary works on water management.
- Maintain postal and electronic mailing lists for information dissemination.
- Organising capacity building of stakeholders in water management.

8. Capacity Building of TBS staff to respond to changing demands

- Workshop for formulation of Project Strategy of TBS and for setting up an M & E system.
- Workshop for Training Need Assessment in light of project strategy.
- Writing workshop for TBS staff.
- Trainings on various subjects to increase capacities of staff.
- Exposure Visits to GO and NGO integrated resource management projects.
- Exposure Visits to projects

9. Improving Organisational Health of TBS

Personnel Policy

Design and implement a proper and sympathetic Personnel Policy incorporating PF, gratuity, Medical allowance, Life and accident insurance, etc.

Build a Corpus

Seek funds from donors and build a corpus for financial stability.

The Project: design, objectives and results

A. Background

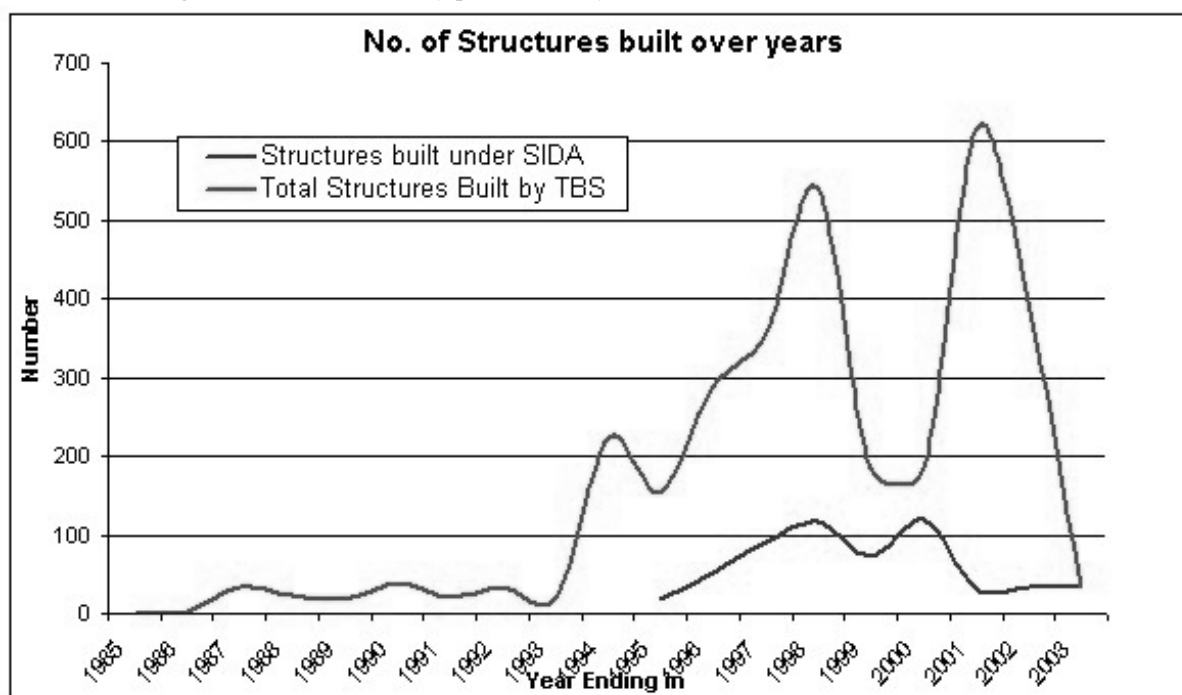
Tarun Bharat Sangh has been working in Alwar district of Rajasthan since 1985. In the initial years of its work, TBS focused on a variety of activities such as informal education, health, sanitation, promotion of compost, grain banks, awareness programmes against social evils such as child marriages, *Nukta*¹ and wide-spread addiction to alcohol. Discussions with village people gave TBS the idea that traditional water harvesting structures (locally called Johads) could be revived for all-round development of the area. The first two Johads (Chauntere wala Johad and Menwalon ka Baandh) were built in Gopalpura in 1986, mainly through village contributions and a food for work grant.

The impressive results of these Johads started a trend of building water harvesting structures that has not stopped so far. Till date, TBS has built about 3200 Johads with funding from various sources. As a demonstration effect of these Johads, in some cases village people have started building Johads on their own. Government programmes in the area under various departmental schemes have also started building Johads. By the time Sida started its financial support to TBS in 1995, TBS had already identified Johads as a successful intervention in the project area and had built about 418 Johads.

B. What is unique about TBS' approach?

Like TBS, many NGOs in India have worked on revival of traditional water harvesting structures and on various aspects of rural development. However, TBS possesses two exceptional characteristics compared to other NGOs:

- a. The **scale** at which it has replicated Johads. (See graph below for number of Johads built by TBS over the years).
- b. The building up of an integrated natural resource management programme using water harvesting structures as an entry point activity.



¹ Nukta – Social custom in which a household needs to throw a lavish lunch thirteen days after a death in the family. Some households are never able to pay off the debt taken for Nukta.

C. Design of project and SIDA's support

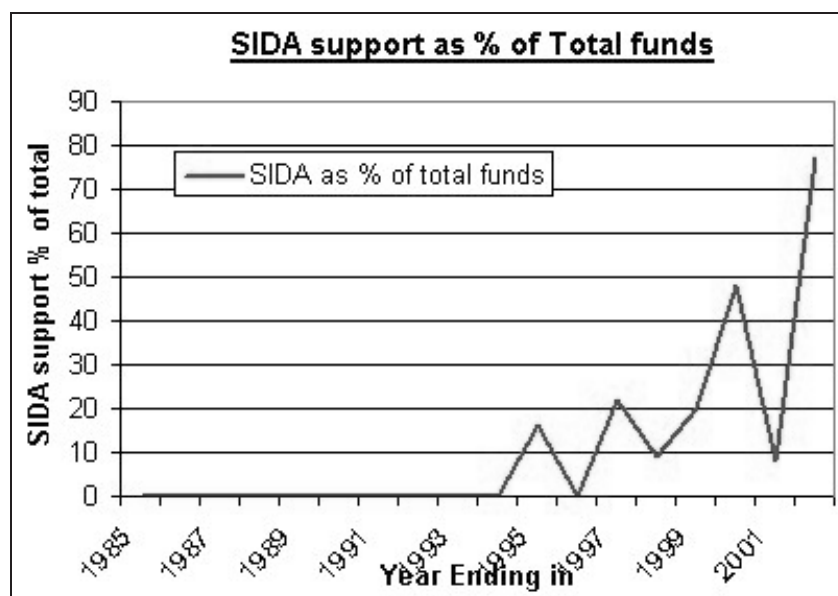
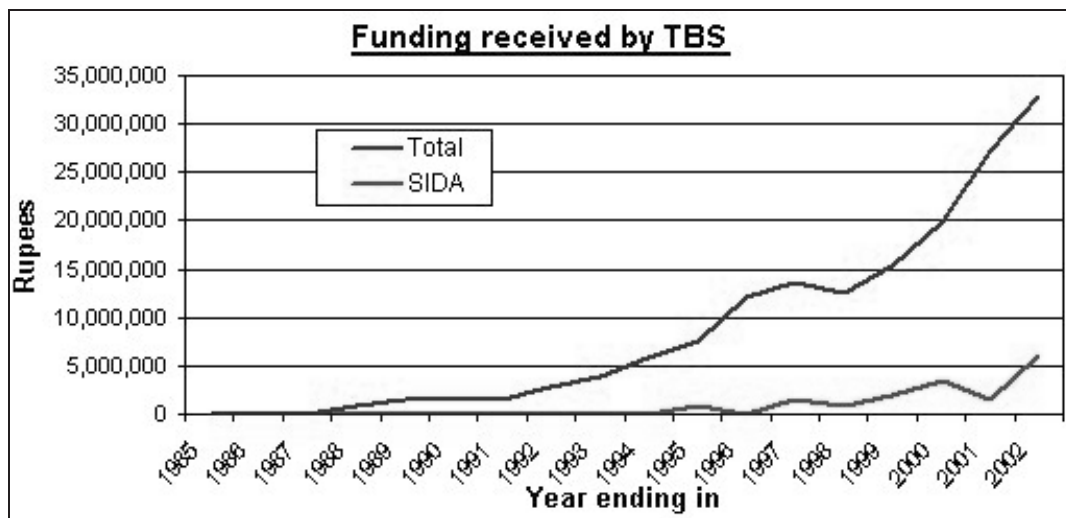
Sida's support to TBS started in year 1994–95 with the following objectives:

- To build low cost Johads.
- To strengthen village gram sabhas to take responsibility for management of Johads.
- Involve women in overall implementation & decision-making in the project activities.

The expected results of the project were:

- Increased Groundwater availability
- Increased irrigation facilities for agriculture and fodder
- Organised village institutions around the issue of water management

Until 2003, Sida has disbursed Rs. 16,286,692 to TBS. The extent of funding support by Sida (as percentage of total funding in a year) to the project has varied over the years from a minimum of 9% in 1997–98 to 77% in 2001–02. (See Graphs below).

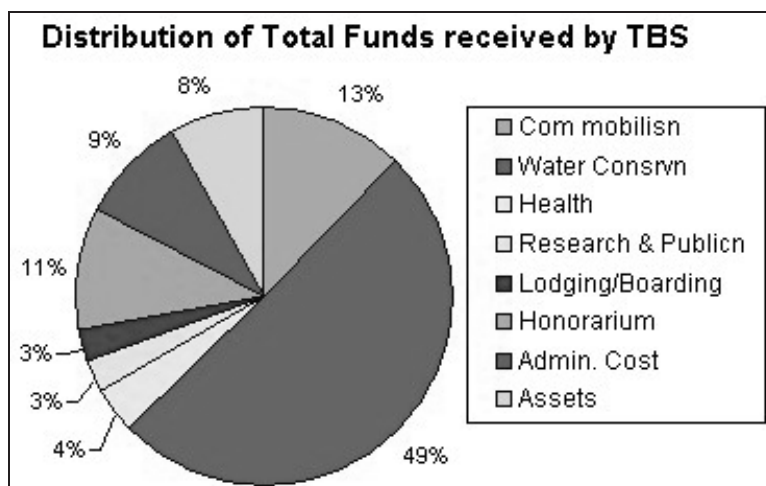


D. Overview of Work done under the project

The details of the project from various angles are given in graphs and tables in following pages. The following prominent aspects about the project stand out:

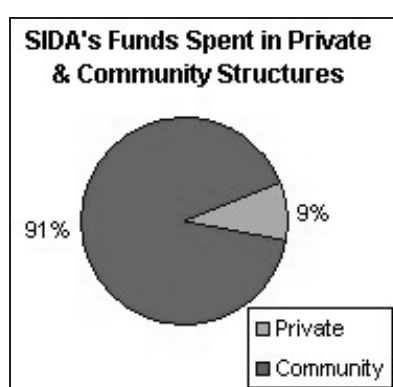
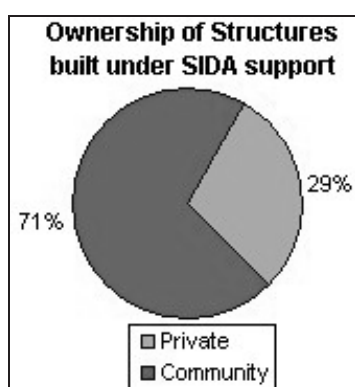
1. Focus on water harvesting

The major focus of TBS has been on water harvesting, especially since 1986. As much as 62% of the total funds received by TBS have been spent directly on building water harvesting structures and on mobilising communities (See figure). Since 1994-95, Sida has provided TBS an assistance of INR 16,287,000



2. Community versus Private

TBS has built a total of 576 structures with Sida's support in 292 villages falling in 15 districts of Rajasthan. Of these 168 (29%) have been private structures while 408 (71%) have been community structures. However, in terms of budget spent, as much as 91% of the total budget has been spent on community structures while only 9% has been spent on private structures.



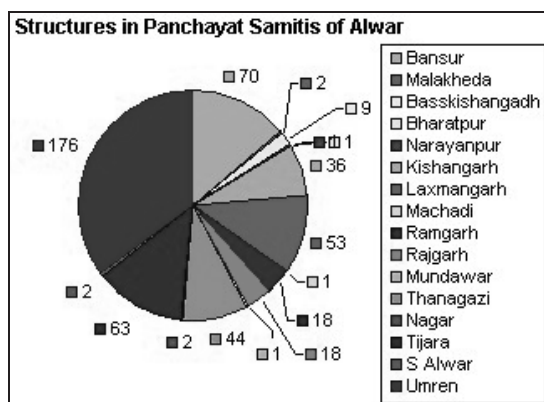
3. District-wise distribution: Of the 576 structures built, as many as 497 (86%) have been built in Alwar district while only 79 (14%) have been built in 14 other districts of Rajasthan. (See Table below). Spreading to other districts with help of Sida support has taken place only after 1999, after widespread recognition of work of TBS at a national and international level. However, it must be emphasised that this spread has been more in terms of responding to specific requests rather than as part of a concrete strategy of expansion to other districts. This is evident from the fact that except for Alwar, very few structures have been built in other districts.

Breakup of structures built in various districts of Rajasthan

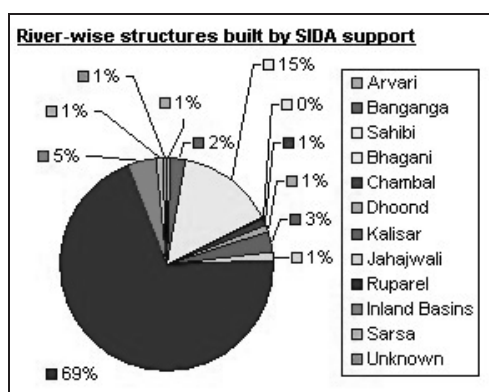
Alwar	497	Jodhpur	5
Ajmer	1	Karoli	6
Barmer	2	Nagaur	1
Bikaner	16	Paali	2
Dausa	7	Rajsamand	1
Jaipur	11	Sawai Madhopur	18
Jaisalmer	1	Tonk	7
Jalore	1	Total	576

4. Panchayat Samitis in Alwar: Within Alwar itself, TBS has focused on the following Panchayat Samitis for construction of water harvesting structures (in order of number of structures built):

- Umren
- Bansur
- Tijara
- Laxmangarh
- Thanagazi
- Kishangarh
- Ramgarh
- Rajga



5. River Catchments: In terms of river catchments, almost 70% of structures supported by Sidafall in Ruparel catchment followed by Sahibi (15%). 26 structures have also been built in Inland Basins¹ in Jodhpur, Jaisalmer and Barmer districts. These do not form part of any open river catchment.

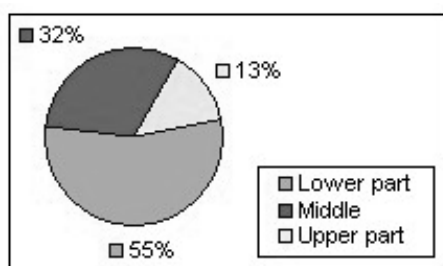


Catchment	No. of structures	%
Ruparel	401	69.6
Sahibi	84	14.6
Inland Basins	26	4.5
Kalisar	18	3.1
Banganga	13	2.3
Dhoond	7	1.2
Chambal	6	1.0
Jahajwali	6	1.0
Arvari	5	0.9
Sarsa	4	0.7
Unknown	4	0.7
Bhagani	2	0.3
Total	576	100

¹ Inland Basins are those where there is negligible unutilised water that flows out of the basin.

6. Position of water harvesting structures in river catchment

Leaving aside structures built in Inland basins and those where river catchment is unknown, more than half of all structures built fall in the lower part of the river catchments.

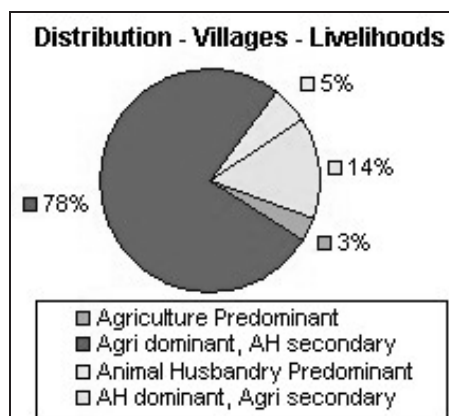


Position in catchment	Number	%
Lower part	293	54
Middle	176	32
Upper part	73	13
Total	542	100
Inland Basin	30	
Unknown	4	
Total structures	576	

7. Livelihood pattern in villages where water harvesting structures have been built

Of the 292 villages where water harvesting structures have been built by TBS under Sida's support, a vast majority of villages (224 forming 78%) are those where agriculture is a predominant occupation and animal husbandry a secondary occupation. The second largest category (42 villages forming 14%) consists of those villages where animal husbandry is a primary occupation and agriculture a secondary occupation. These two types of livelihood patterns are the main ones found in the project area.

Livelihood pattern	No.	%
Agriculture Predominant	10	3
Agriculture dominant, AH secondary	224	78
Animal Husbandry Predominant	16	5
AH dominant, Agriculture secondary	42	14
Total	292	100

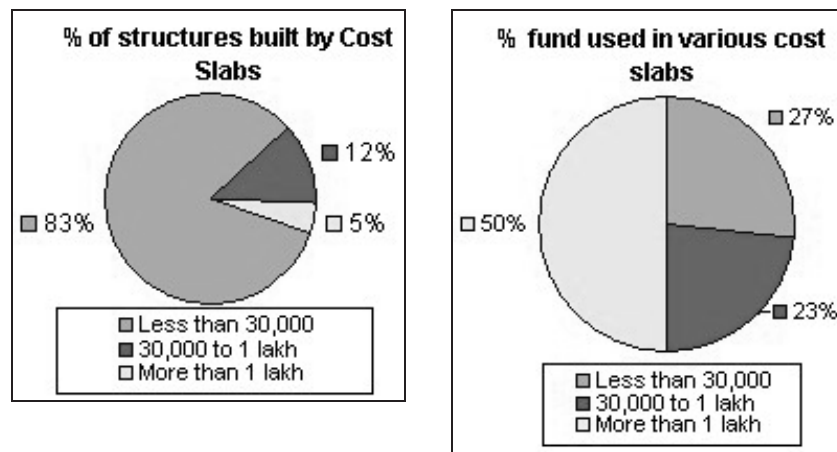


Thus a very large majority of structures have been built in villages where the predominant occupation is that of agriculture and immediate benefits in terms of increase in Groundwater in wells has taken place. This has translated into obvious immediate benefits for farmers.

8. Cost break-up of water harvesting structures

An analysis of the costs of the various structures shows that the structures fall into the following cost slabs:

- Structures costing less than Rs. 30,000
- Structures costing between Rs. 30,000 to 1 lakh
- Structures costing more than Rs. 1 lakh



The breakup of number of structures in terms of cost range shows that as many as 478 of the total 576 structures (83%) fall in the cost range of less than Rs. 30,000. This shows that the emphasis of TBS and village communities has been on low-cost and smaller structures rather than towards higher cost and larger structures.

However, the 5 large structures (costing more than Rs. 1 lakh) built under Sida support have consumed as much as 50% of the total expenditure on water harvesting structures. The size of the structure depends on site considerations and the willingness of village people to contribute their one-third towards the cost. However, the above has important lessons for programme implementation. Various studies have shown that a large number of smaller water harvesting structures covering the entire catchment are more efficient in improving surface and Groundwater situation than a small number of very large structures (Agarwal, Anil, Sunita Narain, Indira Khurana , 2001, Sharma, Abhishek, 2002).

9. “Stand-alone” Structures: An indication of the lack of a coordinated approach to water conservation is the number of single structures built in a village. In our opinion, such a structure (unless it is very large) serves no purpose other than demonstrating that water can indeed be harvested. In as many as 199 (35%) villages, only one structure (and sometimes only one field bund) has been made. We discuss the implications of spreading resources too thin in this manner in later sections.

10. Nomenclature of Structures: A final word about the nomenclature of water harvesting structures presented in various reports sent by TBS to Sida. There is a tendency to call all structures by the generic name of Johad. However, in local taxonomy, water harvesting structures are called by various names depending on their function, size and shape. We give below a brief description of the prevalent local names and differences between various structures in the project area:

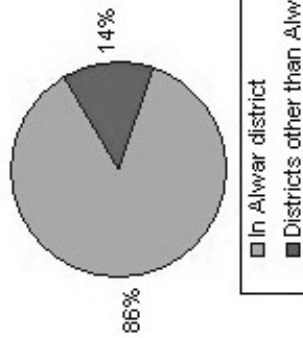
Local names and functions of water harvesting structures in the project area

Name	Function
Anicut	A cement concrete structure plugging a drain or a waste weir of a bund or embankment.
Bandh	Large community or private structure impounding water generally with a straight embankment.
Bawdi	A stepped well.
Dhav	A small depression (natural or man-made) used for collecting rainwater for animals.
Johad	Large community structure for harvesting rainwater generally with a curved embankment.
Johadi	A small community or private Johad.
Khadda	A pit downstream of a private farm to conserve excess runoff for later use (generally in clayey soils).
Khet talai	A structure with a depression and a small embankment built on private fields for increasing moisture availability for crops.
Kuan	Open well generally of diameter of about 7 Haath.
Kuin	Small well with diameter about 1 metre.
Kund	A structure in form of a tank for storing water for drinking and irrigation.
Medbandi	A field bund.
Talai	A very small lake.
Talav	A large man-made or natural lake.
Talavadi	A small lake smaller than a Talav but larger than a Talai.
Tanka	A pakka structure for collecting rainwater to be used in later months mainly for drinking of humans and animals.

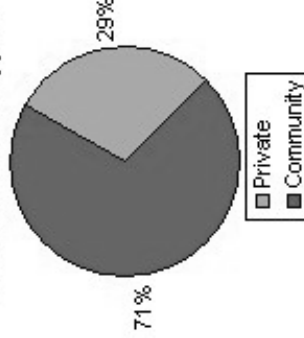
E. Details of Work done by TBS with SIDA's support

Total number of structures built - 576
In Alwar - 497, Other than Alwar - 79

District-wise structures built



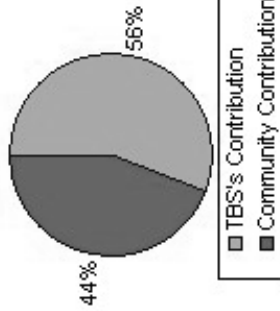
Ownership of Structures built under SIDA support



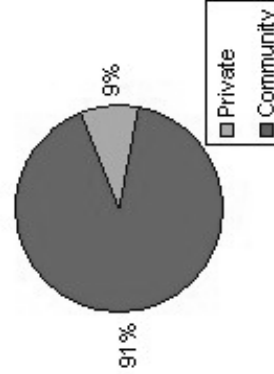
Contribution by TBS & Community in Common Structures



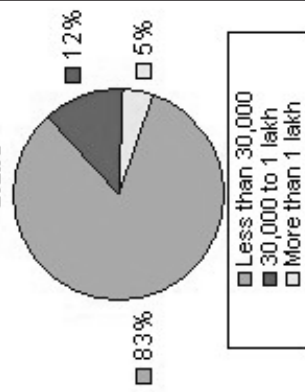
Contribution by TBS and Farmers in Private Structures



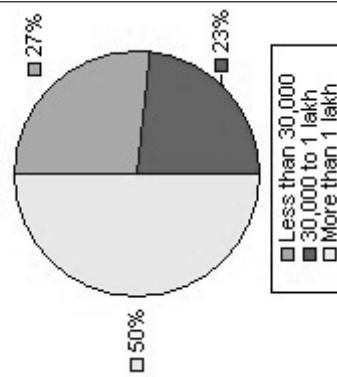
SIDA's Funds Spent in Private & Community Structures



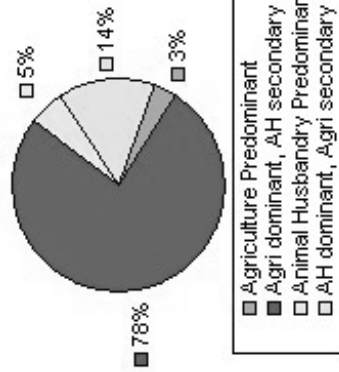
% of structures built by Cost Slabs



% fund used in various cost slabs



Distribution - Villages - Livelihoods



E. Details of Work done by TBS with SIDA's support

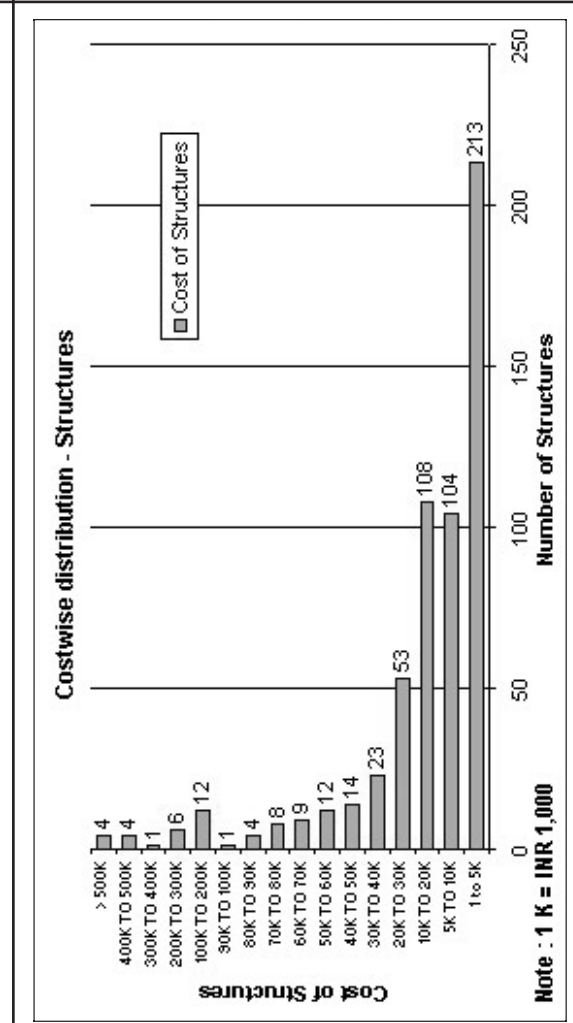
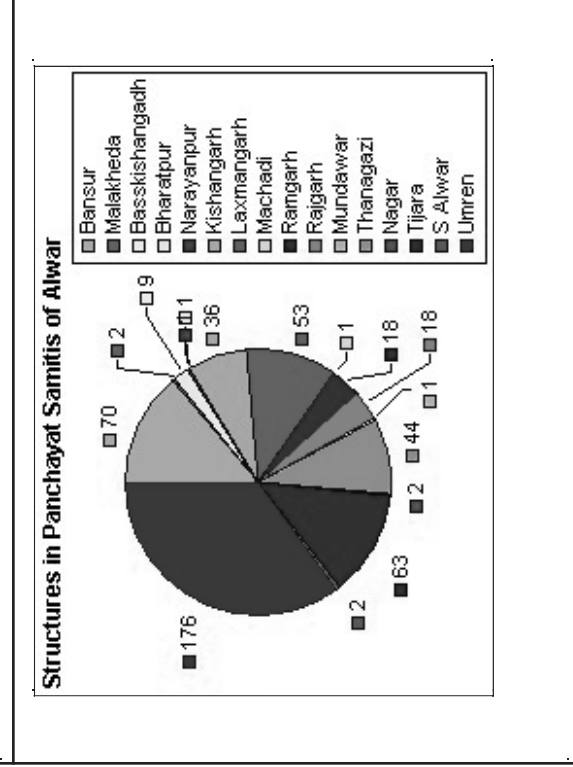
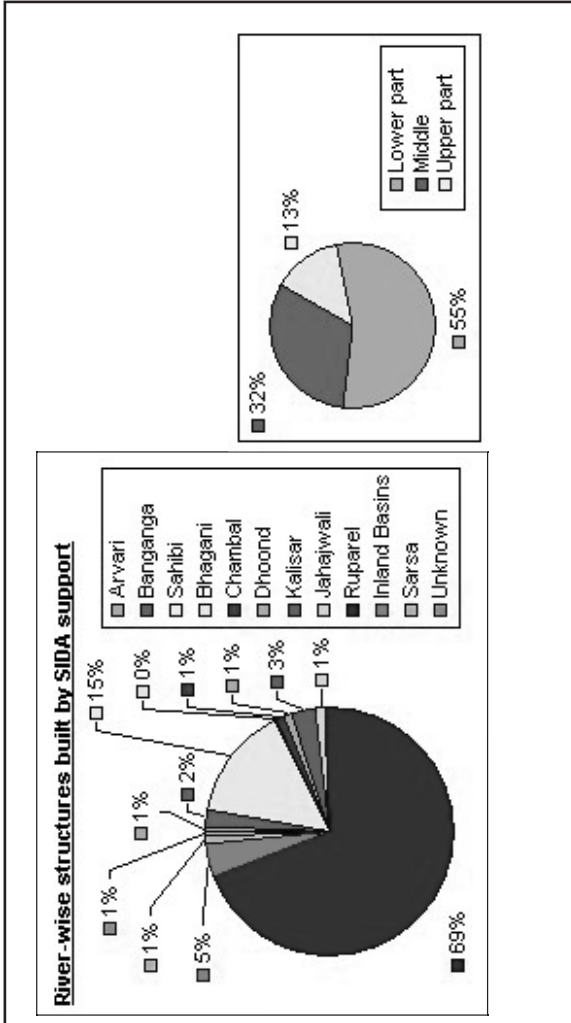
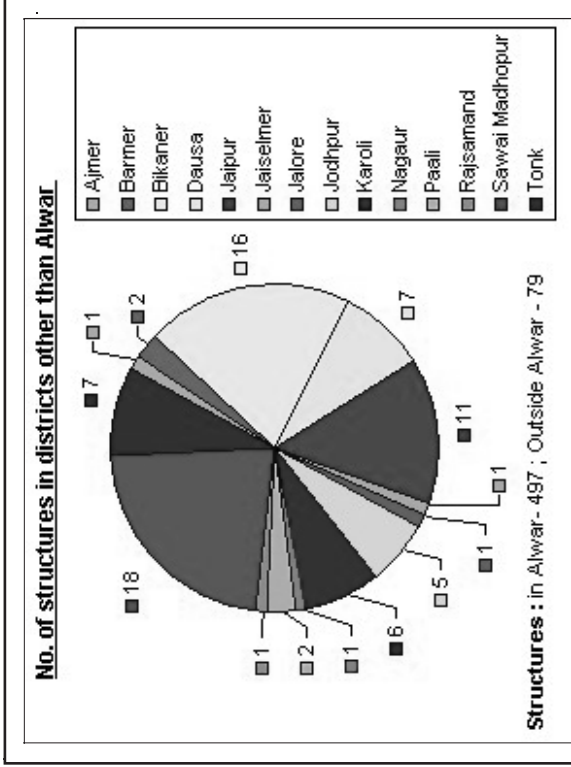


Table A : Details of Structures built under SIDA's support

<p>Number of Structures built since 1994-95 to February 2003</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Number</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Private</td> <td>168</td> <td>29</td> </tr> <tr> <td>Community</td> <td>408</td> <td>71</td> </tr> <tr> <td>Total</td> <td>576</td> <td>100</td> </tr> </tbody> </table>	Type	Number	%	Private	168	29	Community	408	71	Total	576	100	<p>Break-up of SIDA's funds in INR spent in community versus private structures</p> <table border="1"> <thead> <tr> <th>Details</th> <th>TBS</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Private</td> <td>995,840</td> <td>9</td> </tr> <tr> <td>Community</td> <td>10,288,793</td> <td>91</td> </tr> <tr> <td>Total</td> <td>11,284,633</td> <td>100</td> </tr> </tbody> </table>	Details	TBS	%	Private	995,840	9	Community	10,288,793	91	Total	11,284,633	100																																										
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Break-up of structures built according to their cost			Structures sorted by size and cost		
Cost	Number	Amount spent	Cost	Number	Amount Spent
1 to 5K	213	478,682	> 500K	4	2,464,720
5K TO 10K	104	737,069	400K TO 500K	4	1,808,005
10K TO 20K	108	1,547,822	100K TO 200K	12	1,610,679
20K TO 30K	53	1,266,226	10K TO 20K	108	1,547,822
30K TO 40K	23	774,836	200K TO 300K	6	1,384,210
40K TO 50K	14	640,698	20K TO 30K	53	1,266,226
50K TO 60K	12	645,943	30K TO 40K	23	774,836
60K TO 70K	9	512,897	5K TO 10K	104	737,069
70K TO 80K	8	442,772	50K TO 60K	12	645,943
80K TO 90K	4	335,523	40K TO 50K	14	640,698
90K TO 100K	1	99,560	60K TO 70K	9	512,897
100K TO 200K	12	1,610,679	1 to 5K	213	478,682
200K TO 300K	6	1,384,210	70K TO 80K	8	442,772
300K TO 400K	1	331,070	80K TO 90K	4	335,523
400K TO 500K	4	1,808,005	300K TO 400K	1	331,070
> 500K	4	2,464,720	90K TO 100K	1	99,560
Total	576	15,080,712	Total	576	15,080,712

Distribution of Structures based on cost		% funds consumed by different cost slabs	
Cost Slab	% of structures built	Cost Slab	% of fund consumed
Less than 30,000	83	Less than 30,000	27
30,000 to 1 lakh	12	30,000 to 1 lakh	23
More than 1 lakh	5	More than 1 lakh	50
Total	100	Total	100

Details of funds received by TBS since 1984-85

Year Ending	Indian	Foreign	Total funds	Funds from SIDA	% share of SIDA in foreign funds	% Share of SIDA to total funds
1985		6100	6,100			
1986	16,658		16,658			
1987	48,842		48,842			
1988	100,131	663,817	763,948			
1989	1,161,596	438,397	1,599,993			
1990	1,096,201	338,569	1,434,770			
1991	880,784	708,809	1,589,593			
1992	1,543,675	1,269,159	2,812,834			
1993	2,273,555	1,697,034	3,970,589			
1994	1,271,515	4,532,844	5,804,359			
1995	1,858,262	4,934,316	6,792,578	805,692	16%	12%
1996	2,566,443	9,524,385	12,090,828			
1997	4,861,431	7,275,454	12,136,885	1,575,000	22%	13%
1998	2,049,748	9,584,494	11,634,242	856,000	9%	7%
1999	3,358,098	10,021,800	13,379,898	2,000,000	20%	15%
2000	9,110,640	7,258,431	16,369,071	3,500,000	48%	21%
2001	7,771,159	17,992,115	25,763,274	1,500,000	8%	6%
2002	18,779,111	7,903,679	26,682,790	6,050,000	77%	23%
Total	58,747,849	84,149,403	142,897,252	16,286,692	19%	11%

Evaluation Methodology

A. Overview of Methods used

The methodology used for evaluation was based on a mix of the following methods :

- Review of some of the vast amount of published and unpublished material available on TBS and its works as well as on Rajasthan, water harvesting and drought. (See References).
- Intensive discussions with Rajendra Singh, Governing body members of TBS, field staff of TBS, village people and various experts (See Annex 1).
- Field research in selected villages and locations using Rapid and Participatory Rural Appraisal-tools.
- A three-day Logical Framework Approach workshop with TBS staff.

B. Details of steps followed in evaluation

The following were the major steps followed by us in the evaluation:

1. Review of Secondary Literature

Study of secondary literature related to Rajasthan, drought, traditional water harvesting systems and TBS from TBS library, CSE Library and on the Internet. The major issues related to the project and project area were listed.

Also studied were TBS' correspondence with SIDA, Annual reports of TBS since 1984 and reports of evaluation of TBS by other agencies. A detailed analysis of changes in the funding pattern and programme strategy of TBS over the years was done.

2. Preliminary discussions with TBS staff

As the authors had evaluated the project in 1998, a day was spent in understanding whether the conclusions and recommendations that we had suggested in the last report had been understood and implemented. We found that many recommendations had not reached the lower level of TBS workers probably because the report could not be translated into Hindi. Some recommendations had been implemented at field level by those TBS staff who had been with us during the last evaluation. However, most of the recommendations proposed by us and accepted by TBS had not been implemented. (Annexe 2 for recommendations proposed in 1998).

We also found that the strategy and method of implementation of works had not changed substantially since 1998 except for the fact that private field bunding had been almost completely discontinued and there were attempts to restrict the spread of work in the Ruparel catchment under SIDA-funded activities.

3. Analysis of structures built

TBS staff were asked to provide data about each structure built since 1994-95 with help of SIDA funding from the following angles:

- Year of construction
- Ownership- Community or Private
- District and Panchayat Samiti in which the structure falls
- Name of village where the structure was built
- Contributions by TBS and the village community/individual in each structure.
- The river catchment in which it falls and position of the structure in the catchment.
- The livelihood pattern of the village where the structure was built.

An analysis of the tabulation of structures built was done and is presented in Section 2 of this document.

4. Discussions regarding changing role of TBS

Discussions regarding the changing role of TBS were held with Rajendra Singh, Governing body members the core-team of TBS as well as visitors to TBS. The following visitors exchanged notes about TBS with us during our stay:

- Mr. Daniel Gustafson, Mr. Gopi Ghosh, FAO, New Delhi
- Wildlife Department, Government of Uttaranchal.
- Students and Professors of Aravalli Institute of Management, Jodhpur.
- Students and teachers, Primary and Middle School, Gopalpura.

5. Listing of “best” villages

It was decided that since this was a drought year, the impact of TBS’ work in the best villages would give a good idea regarding the sustainability of interventions made by TBS. Accordingly, the TBS core team was involved in a preliminary listing of 24 villages which they considered to be their “most successful” villages. The list of villages that emerged is as follows:

– Bhaonta-Kolyala	– Hamirpur	– Neemi
– Bijoli	– Haripura	– Nyaana
– Dagota	– Jayasthika	– Raada
– Darulai	– Karaska	– Raibeli
– Devitala	– Khajura	– Rajaheda
– Devri	– Lava ka bas	– Samra
– Gopalpura	– Leelya	– Suratgarh
– Gujaron ka Loshal	– Mandalvas	– Viramka

6. Impact Ranking of villages

A tool called Impact ranking was used to categorise these villages. Based on various criteria such as the activeness of the village institution, involvement of men and women, extent of voluntary work done by village people, impact of works done in village in preparing people against drought, impact on groundwater, livelihood pattern in village, involvement of sadhus, voluntary repair of old structures by village communities, protection of catchments and forests and so on. The impact classes that emerged were as follows:

Class A	Neemi, Samra, Mandalvas, Bhaonta-Kolyala
Class B	Karaska, Lava ka bas, Devri, Devitala, Bijoli
Class C	Khajura, Viramka, Raibeli, Devitala, Raada
Class D	Nyaana, Goplapura, Suratgarh, Rajaheda, Leelya
Class E	Dagota, Haripura, Gajaron ka loshal, Jayasthika
Class F	Hamirpur

TBS staff were then asked to select the very best villages from among these. They decided to drop Classes E and F. We were thus left with 19 “star” villages. These 19 villages were then subjected to a tool called Matrix Scoring against a number of impact criteria. These criteria were evolved in a participatory manner. (Annex 3 for results of Matrix Scoring exercise).

Based on the results, the 19 “star” villages were classified according to livelihood pattern and scores earned by the village in Matrix Scoring into 12 sub-groups.

Livelihood pattern	Score: 90 to 130	Score: 131 to 150	Score: >150
Mainly Agriculture	Nyaana	-	-
Agriculture dominant, Animal husbandry secondary	Samra, Lava ka bas, Bishuni, Devitala, Rajaheda	Gopalpura, Nimmi, Suratgarh	Bhaonta-Kolyala
Animal husbandry dominant, Agriculture secondary	Darulai, Khajura, Viramka, Raibeli, Rada	Devri	Mandalvas
Animal husbandry dominant	Karaska	-	-

7. Finalisation of villages for intensive field work

At this stage, the villages for intensive field work were finalised based on the results of the Matrix Scoring exercise and the following additional criteria:

- A visit to sites visited in 1998 would be taken up to evaluate progress on stabilisation of embankments and impact of structures on agriculture and animal husbandry.
- The field study should give a good overview of the impact of TBS' work in various livelihood classes.

On the basis of the above analysis, detailed village studies were taken up in the following villages :

- Lava ka bas
- Karaska
- Rada
- Mundiya
- Bilandi ka bas
- Kushalpura
- Kalikhol
- Bishuni
- Bhaonta-Kolyala

The evaluation team also wanted to take up an intensive study to understand the impact of TBS' work on preparing village people against drought. For this, two villages Mandalvas and Gopalpura were identified, which exhibited respectively a livestock-dominant and agriculture-dominant livelihood strategy. TBS has taken up intensive water harvesting works in both these villages and has also invested considerable energy in developing village institutions. According to TBS, these also fall in their "Star" village category. Also identified were two control villages similar in socio-economic conditions and topography to Gopalpura and Mandalvas and where TBS has not done any work. For this villages Bhal and Kanhavas respectively were identified. However, this study could not be taken up due to lack of time.

8. Methods used during field work

Apart from using participatory tools such as resource mapping, ranking, semi-structured interviews, etc., intensive discussions were held with the core group of TBS accompanying us. Discussions with village people, farmers, sadhus, TBS field workers were also held during all field visits and during our stay at TBS campus. Photographic documentation was also undertaken.

9. Documentation of findings

The findings of the evaluation were then documented. A review of secondary literature was done again to fill gaps or answer questions that had arisen during the field visit. The major learnings and an emerging picture of the project needs were discussed with the core group again.

10. Logical Framework Approach Workshop

A 3-day LFA workshop was organised with all senior field staff. 22 persons from various field groups attended the workshop. The objective of the workshop was two-fold. One was to confirm our findings with field staff. The second was to do the groundwork for preparation of the project proposal for the

next phase of work. Detailed exercises on problem identification, objective formulation, listing of activities, inputs, outputs and indicators were undertaken in these 3 days. A Log Frame was developed at the end of the workshop and potential activities and approach were listed for the coming phase of support from SIDA.

11. Final presentation of findings and proposed project proposal

The findings and activities identified in the new phase were presented to the core group of TBS in presence of Rajendra Singh and other Governing Body members. Barring a few minor modifications and additions, almost all findings and recommendations were accepted by TBS.

Findings

1. Scale of Work

As mentioned in sections above, the exceptional aspect of TBS' work has been the scale at which water harvesting structures have been built. This scale of work done is truly staggering. The total number of water harvesting structures built by TBS since 1986 is about 3200.

In Rajasthan itself, TBS is now working in 15 districts, although the extent of spread in districts other than Alwar is very small. With the help of SIDA's assistance, TBS has built 576 structures in Rajasthan, of which 497 (86%) have been built in Alwar while 79 (14%) have been built in other districts. The work spans many Panchayat Samitis and at least 5 river valleys. TBS has also built some structures in closed basins of western Rajasthan in Jodhpur, Jaisalmer and Barmer districts. (Section 2 for details).

The scale of work itself makes any in-depth analysis very difficult. Although TBS has encouraged extensive documentation of its work, most consultants and researchers are constrained by time available to them. As a result, the numerous studies done on the work of TBS capture only bits and pieces of the whole picture.

Scale has both its positives and negatives. On the positive side, TBS has shown that rejuvenation of traditional water harvesting structures on a wide scale is indeed possible. Recognition to works done by TBS has forced both State and National Governments to incorporate water harvesting into their works. In relief operations, GOR has also been forced to shift from preparing airstrips under drought relief to construction and repair of traditional water harvesting structures. Recognition at national and international level has also been a positive fallout of the scale of work done. Thus more than 50,000 visitors from various parts of the country are reported to have visited TBS in the past one year. Most of these visitors have been enthused by TBS' work and some have gone back to initiate similar efforts in their own place.

On the negative side, the need of expanding traditional water harvesting structures to a large scale has distracted TBS from intensive and integrated work done as in its initial years. This has affected the health of village institutions. The staff of TBS has also not been able to find time to upgrade their skills due to intense work pressure. TBS now desperately needs to limit its scale so as to build models of excellence in integrated water resource management in Alwar district itself. An efficient management structure for monitoring the numerous structures built is also urgently needed.

2. TBS' Method of Working

a. Organising communities for water resource management

TBS began by organising village people for construction of traditional water harvesting structures as a means of drought relief and drought proofing. In the initial periods, TBS had to face opposition from

Government departments for building Johads, which TBS was successfully able to withstand. The initial years of work done in villages Gopalpura, Devri, Mandalvas, Bhuriyavas and other villages established the credentials of both TBS and the traditional technology of water harvesting in the region.

This initial work later led TBS to take a stand against marble quarrying in Sariska National Park in 1992. In this case also, TBS staff was able to fight against very large vested interests and to lead village people successfully in agitating against the Government. A Public Interest Litigation filed in the Supreme Court on the issue was won. Thus time and again (most recently in village Lava ka bas), protracted struggles between TBS and village people versus Government departments have taken place over issues of safety and site selection of such structures.

In almost all such cases where people and TBS have been pitted against the Government, village people's attachment to Johads built by them and their stand on the water harvesting issue have been vindicated. These occasions and victories have created a strong bond between TBS staff and village people in many villages and have given TBS a commendable grassroots level credibility in the project region.

b. Methods of expansion

The method followed by TBS in organising the village community has been described in much detail in our evaluation report of 1998 and is not repeated here (Kumar, Pankaj and B M Kandpal, 1998). Over years, TBS has evolved certain methods for spread of their work.

i. Kinship networks: A major plank of TBS' method of expansion has been the use of kinship networks. Thus knowledge about TBS' work has spread through word of mouth between relatives.

ii. Padyatras: A major tool used by TBS for increasing the pull factor for its work from villages is that of three padyatras in a year. Details of these padyatras are as follows:

Name of padyatra	Month
"Ped lago, Pani bachao" ("Plant trees, save water")	Ashad
"Johad bano, Pani bachao" ("Make Johads, save water")	Kartik after kharif harvest
"Gram Swavalamban" ("Towards village self-sufficiency")	?

These padyatras are so planned that new villages are contacted, the need for water harvesting, protection of forests, plantation, etc. is discussed with village people. It is during these padyatras that new sites are identified and evaluated. The readiness of village communities to contribute part of the expenses for Johad building is also assessed.

iii. Sadhus : Religious leaders such as sadhus have a key role in the social structure of the project area. TBS has also taken support of these sadhus in spreading their work. In many cases, sadhus have approached TBS workers with requests for building one such structure in the village where they are based.

As a matter of principle, TBS has decided that work is taken up only when there is a demand from a village. This has ensured that the programme remains demand-driven and not supply-driven.

However, there is a flip side to the "demand-from-village" approach. In villages where the Gram Sabha has been able to demand support from TBS workers, more work has been done. Thus in a majority of the 19 "star" villages, the extent of integrated water resource management has been intensive because the Gram Sabha has been very active in seeking support from TBS in a diverse range of activities. In such villages (such as Bhaonta-Kolyala), the integrated water resource works have shown quick and very positive results.

The “demand-from-village” approach has also restricted TBS from following a river catchment or microwatershed approach in expansion. Thus while new Johads are being built as far and wide as Pokharan and Jaiselmer, huge areas in the catchments of Arvari, Ruparel and Sahibi rivers lie uncovered. In recent years, demands from groups outside Alwar has intensified. TBS has therefore not been able to consolidate its work in river valleys within Alwar and has had to respond to demands from other districts and states.

c. Village Institutions

Gram Sabhas are informal institutions built by TBS before implementing the work on Johads. In a large number of cases, these Gram Sabhas were found to have remained in a dormant state after TBS withdrew from the village after construction of the Johad. However, in some villages, village people galvanised themselves and the Gram Sabha has taken up further activities. Examples of four types of Gram Sabhas are given below :

Type	Details
Defunct	In <i>Lava ka bas</i> , the Gram Sabha has become more or less defunct after the dam has been constructed 2 years back.
Partially Defunct	In <i>Mundy</i> , the Gram Sabha was formed in 1994 when the Johad was constructed. The main purpose of the village people in constructing the Johad was to prevent a farmer from a neighbouring village from encroaching into Mundy's common lands. Boundary disputes were settled by the village with their neighbouring village in the presence of the <i>Tehsildar</i> . However, after this, the Gram Sabha has not met to discuss or act upon the issue of repair of their Johad.
Effective but functioning informally	In <i>Bishuni</i> , the Gram Sabha was formed 1995. The Gram Sabha contributed labour and cash for constructing a Johad. After TBS workers left the village, the Gram Sabha sowed local mustard variety in the tank bed and put the money earned into a common fund. They also collected money by social fencing of their grazing lands and by charging a small fee for cutting grass. In this manner they were able to collect 31,000. This money was used to build a school in the village. Even now, the Gram Sabha employs a <i>chowkidar</i> to protect common lands in the village and charges a fixed rate per <i>Daraanti</i> (sickle) for cutting grass. The Gram Sabha is also collaborating with the Forest Department as a Van Suraksha Samiti for regeneration of CPRs.
Very effective, functioning formally.	In <i>Bhaonta Kolyala</i> , the Gram Sabha consists of representatives from 2 villages. The Gram Sabha collects 5 kg of grain from every household and sells it off. The money earned is kept in an account in the nearest bank (50,000 at time of our visit) and is used to deepen the Johads in the village. The Gram Sabha has imposed a ban on green felling in the catchment of the two main Johads in the village and has declared these as people's sanctuaries.

In all the above 4 types of Gram Sabhas, support from TBS was found to be dependant on the amount of support that the Gram Sabha could extract from TBS. There was little evidence of an organised strategy on the part of TBS to monitor and strengthen these Gram Sabhas.

d. Capacity-building of women

A number of TBS' publications have documented how the women in many villages have supported the work of building Johads. Also documented are examples of how drudgery of women has been reduced significantly after building of Johads. The learnings from such examples are being implemented by TBS in a project funded by UNDP, where education, health and natural resource management activities are being undertaken with village women.

3. Project Gains

The following gains from the work done by TBS on water harvesting stand out clearly:

a. Release of Social energy

The process of social mobilisation followed by TBS in the process of building water harvesting structures described above has facilitated a release of social capital in the project area. A demonstrable

increase in water availability has also motivated villages to form village institutions around water. In some villages, these village institutions have moved towards protecting forests, building schools and other developmental works.

b. Increased water availability

The work done by TBS has also had a positive impact on water availability in the region. Increased water availability should be seen in the context of the dominant livelihood patterns in the area:

- Predominantly animal husbandry based (in villages such as Karaska).
- Predominantly agriculture-based.
- Primary agriculture and secondary animal husbandry.
- Primary animal husbandry and agriculture.

In all above types of livelihood patterns in the project area, very significant impacts due to increased water availability can be seen.

c. Impact on agriculture

- In agriculture-dominated villages, the change in surface water and groundwater availability, especially in winter, has increased significantly. Since the Rabi crop is the main cash crop in this region, this has translated into significant economic gains.
- In villages where a significant proportion of village lands have been treated (such as Gopalpura and Bhaonta-Kolyala), most households have been able to protect themselves against the ill-effects of drought for 3 to 4 years. In such villages, there is also a marked reduction in distress migration.
- Soil erosion on agriculture fields has been reduced significantly by voluntary field bunding on farmers' fields. Here an increase in the productivity of agriculture has come about due to prevention of erosion and an increase in soil moisture.
- In some villages, farmers have diversified into crops such as onion, vegetables and flowers (in some cases) due to assured water availability. This has led to an increase in agricultural income.
- In some villages, reports of wastelands (in some cases Gowchers) being converted into agriculture lands are also reported.

d. Impact on animal husbandry

- In villages dominated by animal husbandry as an occupation (such as Kalikhol), the increased water availability has caused a significant shift in livestock composition towards more milch cattle, translating into increased income from animal husbandry.
- Construction of water harvesting structures on grazing plateaux (called malas) has increased significantly since 1998. This has led to an increase in water as well as fodder availability for communities such as Gujars whose main occupation is that of animal husbandry.
- The availability of drinking water for livestock in a drought year in grazing lands is itself a significant achievement of the project.

e. Other positive spin-offs of TBS' work

The work of water harvesting has had many spin-offs in villages where intensive work has been done by TBS:

- The process of building Johads has resurrected village institutions in many villages.
- In some villages, Johad building has led to protection of forests in catchments.
- TBS' work has significantly reduced drudgery of women in fetching water, fuel wood and fodder. The exact amount of drudgery reduction could not be quantified.
- In a few cases, village women's groups have also been motivated to fight against social evils such as alcoholism, child marriage, etc.
- Positive reports on the impact of TBS' work on education of girls and health are also reported.

- The better quality of structures built by TBS has forced Government departments to also raise the quality of their work.
- Due to increased well levels, farmers report a reduction in diesel consumption in pumping water. Time is also saved in irrigation as a larger discharge is available in lesser time now.
- As a demonstration effect of Johads built by TBS, in some cases village people have started building Johads on their own.

4. Reasons for Success

TBS' work on water harvesting has been successful because of the following factors:

- Traditional and simple water harvesting structures have been built requiring little or no capacity building of village people.
- Considered a work of religious merit in local worldview¹. TBS has further built on this religious worldview through various strategies such as involving sadhus in building water harvesting structures, incorporation of local sacred tree and sacred grove traditions, etc.
- Quick demonstration effect of TBS' work in terms of large water body in a parched land in a matter of months.
- The cost of structures built has been low in most cases, thus allowing village communities to be able to mobilise the contributions demanded by TBS.
- In comparison with structures built under Government programmes, TBS has built better quality structures at a significantly lower cost in much lesser time.
- The dedicated local workers of TBS have ensured that problems at community level are sorted amicably.
- Financial operations of TBS have been very transparent and clean.
- TBS has ensured involvement of all sections of local population.
- TBS has strategically used kinship networks for spread of its work. This has ensured that transmission of information about TBS' work has been far and wide.

In most cases, the a water harvesting structures built by TBS has a demonstration effect within a short period of 3 to 6 months as a large water body accumulates in the pond, wells get recharged and there is a vast reduction in drudgery of women. This has created a very good reputation for TBS within the villages. Thus even though village people have to part with one-third of the cost of structures, people prefer to build water harvesting structures through TBS rather than through Government departments. The above demonstrates the goodwill that TBS has generated in villages in Alwar district.

An analysis of the “star” villages reveals that such excellent impact can be seen in villages which possess the following characteristics (Annex 3):

- Villages situated near the ridge or at the upper end of river valleys. This implies that these villages were in dire need for assistance in water conservation, as almost all water falling here drained away to lower reaches.
- A small number of very large water bodies or a large number of small water bodies have been made in these villages. In addition, field bunding and other measures have also been taken up. The percentage of land treated under such villages is comparatively very high.
- In almost all these villages, forest conservation has been a priority. This has implied a good protection of the catchment. Products available from the forests as well as overall water regime has increased in these villages.
- Village level institutions formed in these villages have been very strong as these villages were part of the earlier consolidated work strategy of TBS. Such strong institutions have been the backbone for integrated work in these villages.

³ A local saying goes : *Tarvar Sarvar Sant Jan Chautho barse Meh, Parmarth ke karane Chaaro Dhaare Deh* meaning - Trees, Ponds, Saints and Rain- all four are born to benefit other living beings.

- TBS has been in regular touch with these villages through visits of field staff and when they were taking visitors to these villages.

In all these villages, due to the integrated nature and a sufficient scale of work done, the all-round impact of TBS' work has been very good.

5. Extensive documentation of work done by TBS

TBS has promoted extensive documentation of its works through strategic alliances with journalists, research and educational institutions and interested individuals at State and national levels. Some of the diverse aspects that have been captured by various writers are as follows:

- Engineering and technical documentation of TBS' work.
- Impact of work done through Remote sensing studies in Ruparel and Arvari catchments.
- Documentation of social impacts on villages and on specific sections such as women, girl children, etc.
- Impact of TBS' work on agriculture and animal husbandry.
- Impact of social mobilisation by TBS for constructive work (such as Johads) or for agitational work (such as marble quarrying, Lava ka bas).
- Analysis of environmental degradation due to man-made (mining) or natural calamities (such as floods in Bharatpur).
- Documentation of traditional systems of conservation such as Dharadi (sacred trees) and sacred groves.

6. Impact of TBS on National and State Water Policies

The following impacts of TBS on State and National level water policies can be seen:

- The most recent initiative by TBS is that of a national water network called Rashtriya Jal Biradari (National Water Brotherhood). Rajendra Singh is the President of this network. This network is mobilising people from various cross-sections in the country on issues of community-ownership of water, fighting against privatisation of water resources and for making state and national water policies more people-oriented. TBS has also convened groups for drafting alternative State and National Water Policies (See Annex 9 and 10 for State and National Water Policies respectively).
- Many workshops, padyatras and other events organised by TBS have been targeted at village people, grassroots, state and national level NGOs, activists, Government departments and officers, State and National level bureaucracy, media, research institutes, students, Bilateral and multilateral donor agency staff, etc. These workshops have served to spread the message of water harvesting at various levels.
- Through its excellent work, TBS has shown that it is possible for village people of Rajasthan to successfully design and implement water harvesting structures. Much against "technical" opposition from Government departments, these structures have proved time and again to be technically sound (Agrawal, Dr. G D, 1996).
- Due to the quality of TBS' work, there is an intense pressure on concerned departments of GOR to enhance the quality of water harvesting structures built under their programmes. This in our opinion is a major change. It is probably due to such quality and time pressures on the GOR departments that TBS has had repeated confrontations with the above departments (for example in Lava ka bas, Gopalpura, etc.).
- TBS has been able to influence state level drought relief works and to ensure that more budget is spent on water harvesting structures rather than on air strips and roads (the earlier practice), which are not directly relevant to drought proofing village resources in the long run.
- In a state level watershed development programme called PAWDI (People's Action for Watershed Development Initiatives), TBS played a major role in ensuring that corrupt officers be punished and that benefits reach the really needy.

- In 1996, the State Irrigation Department asked for help from TBS for involving repair of dams built by them, which were damaged by floods.
- In Sariska Tiger Reserve, TBS has undertaken many initiatives to ensure that illegal mining be stopped. TBS also mobilised village people and hunters for prevention of poaching. The Forest Department was in direct confrontation with TBS in the early 1990s on the mining issue. In this period, TBS filed a Public Interest Litigation against mining in Sariska in the Supreme Court and was able to get illegal mines removed from the region. Currently, TBS organises a sensitisation programme for schoolteachers and children within Sariska every year. The Wildlife department is today collaborating with TBS in various activities for conservation of wildlife in Sariska.
- TBS has also built water-harvesting structures in villages inside Sariska to ensure that both village people and wildlife could get water. Such water harvesting structures are now part of the Park's soil and water conservation works.
- In recent years, a large number of visitors especially from other states have been visiting TBS. The work done by TBS and the importance of people-oriented water management is being spread far and wide. International and national awards have only enhanced this process.
- Recently, CAPART asked TBS to evaluate proposals by various organisations in water harvesting after CAPART's technical experts had given their clearance. CAPART also asked TBS to design and implement a programme on demonstration of water harvesting structures in various districts of Rajasthan as a means of drought proofing.
- A prominent strength of TBS has been that in spite of being against the Government on many issues, they have never closed communication channels with Government departments. In fact, they have been able to cultivate well-meaning officers within Government to give them support. TBS has also responded well to any requests from the Government for collaborations. To maintain a pressure on the Government, TBS has developed very strong strategic alliances in various levels and fields.

7. Developing Strategic Alliances

TBS has been able to accomplish its excellent work due to strategic alliances forged at various levels and with various sections and maintained through thick and thin. Some examples of such strategic alliances are as follows:

National Government	Prime Minister's Office, Ministry of Water Resources, Ministry of Rural Development, CAPART, Ministry of Environment and Forests, Department of Science and Technology, Planning Commission, Ministry Of Youth Affairs And Sports.
State Administration	Forest Department, Irrigation Dept., Education, Soil Conservation, Rajasthan Energy Development Agency, Wildlife Department.
Donors	Sida, ICCO, Ford Foundation, UNDP, Swiss Development Cooperation, Intercooperation, Oxfam.
Other States	Water Conservation Mission, Government of Andhra Pradesh.
Corporate Sector	FICCI, Confederation of Indian Industries, UCO Bank, United India Assurance.
Private donors	Sadanand Trust, PHD Delhi, numerous private businessmen.
National NGOs	Centre for Science and Environment, Gandhi Peace Foundation, Society for Participatory research in Asia, Voluntary Action Network of India, World Wide Fund for Nature, Indian Social Institute, Indian Institute of Public Administration, Actionaid India, Centre for Environment Education.
Media	India Today, Week, Dainik Bhaskar, Indian Express, Hindustan Times.
Research Institutions	Institute for Development Studies Jaipur, Institute for Environmental Studies, Jaipur.
Academic Institutions	Jamia Millia Islamia University, National Council for Educational Research and Training, University of California and Los Angeles.
Individuals/ consultants/ advisors	Bittu Sehgal, Valmik Thapar, Bharat Jhunjunwala, Anil Agarwal, Sunita Narain, G D Agarwal, Siddharaj Dhadda, Medha Patkar, NC Saxena, M S Swaminathan, M S Rathore.

8. Changing Demand from TBS in recent years

Since 1998, when Rajendra Singh received the Week Man of the Year award, the public profile of TBS has gone up significantly. The visit by the President of India to Bhaonta-Kolyala in 2000 and the Ramon Magsaysay award to Rajendra Singh in 2002 has further boosted this profile.

Due to the above, the number of visitors to TBS has shot up. In 2002, as many as 50,000 visitors are reported to have come to the agency. On the other hand, there has been a net decrease in the staff of TBS in recent years. This has had an obvious impact on the time available to staff of TBS for contemplation, for closer interaction with village people and for enhancing the quality of work in their own project area.

Due to above exposure and publicity, Rajendra Singh and other TBS workers have been called to provide inputs by agencies such as FAO, UNDP, CSE, CAPART, Jal Biradari, Wild Life Department, Govt. officials, NGOs and activists of other states such as Andhra Pradesh, Karnataka, Kerala and Chhatisgarh.

The role of TBS is thus fast changing from a grassroots implementing agency to an intermediary support level agency which has to deliver the following functions:

- Training staff of NGOs in Rajasthan in water harvesting.
- To establish the credibility of traditional water harvesting structures and TBS' approach in academic circles.
- To help various organisations in activities related to public advocacy and for fighting against repressive Acts of the Government (such as privatisation of water rights).
- To act as mediators between Government interests and civil society, due to the credibility TBS now enjoys nationally and internationally.
- To play an active role at a global, national and state level for influencing policies related to water harvesting and distribution.

Such external demands are being currently handled on an as-is-where-is basis. This needs to be changed. In earlier years, Rajendra Singh was responsible for strategic planning of TBS. With increased demands on Rajendra Singh's time now, the core team needs to be trained to take over functions being handled by Rajendra Singh earlier so that strategic and other matters may not suffer in future.

9. Areas for urgent gap-filling by TBS

The primary criticism of TBS' work has been that in recent years, constructing Johads has become an overarching priority with TBS and an end in itself. We concur with this criticism. This is amply demonstrated by the following facts:

a. Urgency to increase scale without proper strategic planning and a well-thought out expansion strategy

The scale of work that TBS pursues is a drug by itself. Every year, more than 1500 demands for constructing new Johads come to TBS and TBS is able to respond "only" to 500. TBS workers have now got into a habit of responding to these demands in a routine manner.

In TBS, choice of all new sites is based on demand from village people and their ability and willingness to mobilise contribution for building the Johad. Expansion takes place by demonstration and through kinship networks from village to village and from district to district. However, kinship networks span many districts. TBS is not able to refuse demands for new water harvesting structures even if these demands are from a totally different district.

A bizarre example of an over-exaggerated dependence on kinship networks came to our notice. A bank manager who belonged to Alwar was posted to Pokharan (near the nuclear test site). He requested TBS

to build a Johad in Pokharan. TBS responded to this demand and the Indian Army also assisted in providing machinery to construct the embankment.

As more and more of such remote demands are met and more and more Johads are put under the belt, the financial and human resources of TBS are spread very thin. In recent years, as work has increased, the time available with TBS workers for integrated and multi-dimensional work has progressively declined. This is illustrated by the fact that in a large majority of cases, only one structure has been built in some villages, in some cases a single field bund. There is still not a significant move to treat the catchment of any major river, to support claims that regeneration of rivers has been due to TBS' work.

TBS needs to urgently consolidate, take stock and formulate a clearly-outlined strategy for programme expansion and implementation.

b. Poor maintenance and follow-up of structures built

There is also a lack of a proper monitoring system for keeping track of Johads built by TBS. In earlier years, a record of the volume of water impounded and the area of the catchment was kept. Work pressure has made such record-keeping redundant. This makes any recapitulation, monitoring and follow-up impossible.

Presently, there is a very loose informal system within TBS to get feedback data about the health of Johads based on meeting village people in Annual Meetings or during padyatras. Similarly, there is an informal system for confirming such information and for acting upon it, if need arises. However, such systems are not very effective.

The focus on constructing new Johads has also made support to village institutions for maintenance of structures built earlier a by-issue. In a number of villages, follow-up visits by TBS staff to check on health of structures had not been done for years. TBS' own stand is that once the Johad has been built, it is the duty of village people to maintain it. However, members of village institutions interviewed felt that an occasional follow-up visit by TBS would help immensely in recharging sagging social energy.

For most TBS workers, the process of constructing a Johad itself culminates in measuring earthwork done and making payments. This takes place in most cases in April or May. At the time of monsoons (July-August), TBS does not undertake any follow-up to ensure that embankments of Johads made freshly are planted.

In some villages, Johads have been built under earlier grants and have not been maintained by village people. Such Johads are "built" under a new grant, sometimes by other donors. There is also a demand from village people from TBS workers to provide support for maintenance of Johads built earlier.

Within TBS, separate and conscious mechanisms for incorporating maintenance of water harvesting structures in the working strategy are absent. The following gaps are too stark to be missed:

- The 3 annual padyatras conducted by TBS focus on identification of new villages/ sites for Johads. There is no separate Padyatra for monitoring and maintenance of Johads built earlier.
- No separate staff or team is responsible for maintenance of Johads built earlier.
- No maintenance schedule is available with TBS or is handed over to the village communities for maintenance (See Annex 4 A and 4 B for recommended maintenance procedure and sample maintenance schedule).
- Nursery-raising or seed distribution is almost never done for repair of Johads.
- A conscious effort at building a "Johad repair fund" during construction is absent. For example, the current mode of financial contribution of both TBS and the community is 33% by the community and 66% by TBS. A suggested mechanism (if maintenance of Johad is a priority)

could be 30% by community, 60% by TBS for cost of construction and 5% each from community and TBS for a “Johad repair fund”.

- “Traditional knowledge” in repair of field bunds is not part of TBS’ cognition. Thus local and improved measures for vegetative stabilisation of Johad bunds are not a clear part of the implementation strategy.
- Systematic (and mandatory) treatment of catchments of Johads is not part of the programme, although the need is discussed with village people.
- Reward mechanisms (such as instituting a prize for the 10 best Johads in the district) to induce village people to maintain their Johads are absent.
- TBS appears to be averse to a computerised MIS system for monitoring work done.
- Records of the area submerged, area of catchment, volume of water impounded of Johads are no longer being maintained, although such records were maintained in earlier years. Ideally, such data collection should be done during construction. This will help in quantifying the exact impact of TBS’s work on changing the water balance in the region.

TBS needs to urgently incorporate strategies for maintenance of structures built earlier into its implementation strategy so that it becomes a part of the programme.

c. Inability to channelise social energy for integrated resource management

In the initial years of work, (1985-1990), TBS adopted an integrated approach in all villages. (Singh, Rajendra, 1995). At this time, organising village institutions was part of the water resource development works. Older villages such as Gopalpura, Bhaonta-Kolyala, Devri, Mandalvas, Losal Gujaraan also had almost the entire common and private lands covered by treatment. Such villages where integrated resource development works have been done are the ones which figure in the “best villages list”.

Since 1990s, TBS has touched on almost all aspects of conventional rural development such as health, education, traditional knowledge, composting, renewable energy and so on in a scattered manner in many villages. In very few cases have all these diverse activities been focused in any village.

In recent years, TBS’ emphasis has shifted to large-scale replication of Johads. The pursuit of scale and the consequent lack of time have now made integration of various activities at village level very rare.

Village people also increasingly perceive TBS as *Johadwalas*. Over the years, demands for other inputs from village people have also died out and an all-pervasive image of TBS as single point Johad makers has remained. So much so that during our visit, many village people interviewed were astonished when they were told that TBS also worked in education, health, composting, improved seeds, etc. They admonished TBS workers accompanying us for not telling them of these other programmes of TBS.

This is because in recent years, TBS workers have left the village immediately after building Johads. The process of Johad building is itself an intensive process whereby a tremendous amount of social capital is accumulated. However, no sooner has the Johad been built that there is a drive to move towards the next site. Another reason for the hurry to leave has been TBS’ stand that it does not want to make people dependant on them. TBS thus loses the opportunity to make a lasting impact on village livelihoods.

The net result is that an integrated village resource management plan is not made any more, as in initial years. In fact, the very concept of “Shaamlat Deh” (“Common body or resources”) has been relegated to a secondary position in TBS’ approach. In the current programme mode, many village resources are left undeveloped and no follow-up action is taken in villages where Johads have been built.

The fact that village people need other inputs in addition to constructing Johads are evident from the following examples:

Village Bilandi

Here excellent stabilisation of the Johad has been done by village people. However, they are affected by ill-effects of chemical fertilisers and low input of compost. To increase their compost requirements, capacity-building of village people can be done in NADEP composting. TBS has undertaken composting in their own campus at Bhikampura. Village people were surprised when they were told that TBS could impart training to them in composting.

Village Mundiya

Here village people had not been able to mobilise themselves to repair their embankment. TBS workers had not visited the site since our last visit to the village in 1998. The situation was doubly complicated by the fact that the primary reason for the village in building the Johad was to prevent an Ahir² from a neighbouring village from encroaching into their village common land. The Gram Sabha members expected TBS to come and organise a meeting to initiate the process of repair of embankment.

Village Karaska

This is a livestock and grazing-based village in the core zone of the Sarsika National Park, TBS has done excellent work on building Johads on the plateau for providing water to village people. However, in this drought season, village people desperately require fodder in addition to water. Village people were pleasantly surprised when they came to know that TBS could provide fodder tree saplings. One village person immediately requested TBS workers for 60 Banyan and Pipal saplings.

In the common lands in this village, TBS could take up charagah development works and fodder tree plantations. In some Johads built in Karaska, there was also a need for making a proper stone-pitched waste weir. Examples of such excellent stone pitching could be seen in a neighbouring Johad, where a local Sadhu had forced village people into contributing labour for stone pitching, while the stones had been supplied by TBS.

Village Lava Ka bas

In Lava ka Bas, people and a businessman from Churu district local trader invested Rs. 8 lakhs in constructing the Johad. A prolonged struggle had to be fought to prevent the State irrigation department from demolishing the Johad. Now, village people can see ample water collected in the dam. As a result of the dam, groundwater levels have increased in neighbouring village Bhagdoli while no wells have recharged in Lava ka bas. As a result, 25 farmers from Bhagdoli have installed borewells to depths from 250 to 400 feet of which 20 are drawing ample water. In Lava ka bas itself, no wells have recharged nor have borings up to 615 feet have yielded any water.

At the time of our visit, only 5 resourceful farmers from Lava ka bas and 9 farmers from a neighbouring village Bhagdoli were drawing water directly from the dam. The total investment made by these farmers has already touched Rs. 16.57 lakhs in the first year after the construction of the dam (including costs of diesel engine pumpsets, borings, submersible pumps etc.). This confirms our analysis done in 1998 that the total investment made by TBS in constructing Johads is far less than the money invested by village people in digging or deepening wells, getting new bores done or putting up diesel pump sets.

The net result of the Lava ka bas experience is that the entire community's sacrifice for building and protecting the dam is being reaped by a select and prosperous few. Thus 15 farmers of the two villages are irrigating 50 to 100 bighas³ each while small farmers owning 3 to 20 bighas in both villages are not getting water for irrigating even a single bigha.

² A Scheduled Caste

³ 4 bighas = 1 acre

In Lava ka bas, discussions with the community revealed that TBS could have designed and enforced a participatory Irrigation management scheme to ensure equitable distribution of water among all families of the 2 villages. (See Box 2).

d. Not adequately prepared to respond to changing roles

As discussed above, the role of TBS is changing to a support level resource agency for capacity-building and policy advocacy in water. However, as of now, TBS does not seem to have a clearly outlined strategy on how it will play the changing roles. The organisational response to these various demands coming on them is right now on a day-to-day basis. This must be changed if TBS has to play a higher role more effectively.

Take the visit by 50,000 visitors reported last year as an example. Within TBS, no staff member is responsible for handling these visitors and taking them to villages. As of now, the core group member who is available is charged with taking the visitor for a visit. There is also no streamlined process (such as an information packet) that can be disseminated to visitors. TBS needs to set up a team for handling the huge number of visitors of diverse backgrounds.

e. Gaps in cognition of priority areas

TBS needs to develop an organisational response to the following major issues which are gaining prominence at a state and national level :

i. Equitable distribution of water

Due to its policy of not encouraging wells, TBS does not get into the issue of how water, which accrues in wells due to Johad construction, is distributed. However, for the farmer, Johad and wells (dugwells or borewells) are parts of the same water regime. At village level, the resources to dig and own a well rest with the economically and socially better off sections in the village. Thus the more prosperous and enterprising farmers are deepening wells and introducing bores to extract water. In fact, banks in Alwar are providing loans to the farmers for deepening of wells. In such a scenario, closing eyes about use of wells is not a good strategy, as such groundwater extraction is currently benefiting only the rich.

In the interests of equitable distribution of water, TBS has to talk about distribution of the groundwater that accrues as a result of work done by the entire community. Water harvested on surface or as groundwater must be perceived as a common resource.

For this, TBS will have to initiate mechanisms for ensuring that a bare minimum water availability is ensured to all farmers irrespective of their land-holding size or their contribution in constructing the Johad. Ideally, this needs to be done before TBS even begins to look at sites where Johads can be built. Work on participatory Irrigation management schemes could be a good example of work that would ensure equity in water distribution.

ii. Demand-side water management

TBS has made a good beginning in developing a model of demand-side basin level water management model by forming the Arvari Water Parliament. This is a federation of Gram Sabhas of the 70 villages that fall in the catchment of the Arvari catchment. The Parliament has made rules and regulations for sharing of water between upstream and downstream villages and has banned water –intensive crops in the Arvari catchment. However, since wells are under private ownership, it is reported that rules framed by the Parliament are not being followed by most farmers in the catchment. A large number of farmers also seem to be unaware of the existence of the Parliament. TBS must invest more energy at enabling the Parliament to become an effective water-management organisation. (See Box 2).

iii. Role of modern technology

So far in its work, TBS has shied away from incorporating modern technological inputs such as low-

cost drip irrigation, sprinkler irrigation, evaporation retarders and Groundwater mapping in its work. However, these inputs can be suitably adapted in such a manner that the traditional wisdom in the area is enhanced. TBS needs to incorporate such inputs urgently.

iv. Role of Panchayati Raj Institutions in TBS' work

Under the 73rd Amendment, a number of duties related to decentralised management of natural resources will be devolved to Panchayats. In such a case, TBS must develop mechanisms for capacity-building of Panchayats to take up sustainable management of natural resources. Also, the institutional interface of Gram Sabhas that TBS builds with Panchayats needs to be sorted out. TBS may initiate works with selected Panchayats to learn the nature and modalities of collaboration.

v. Role of Gender in TBS' work

In the highly stratified social structure of the project area, talk about gender issues seems clichéd. TBS has been focusing on meeting practical gender needs of women in their project villages by increasing availability of water, fuel wood, fodder. TBS has also worked on schooling of girl children working in the carpet industry and for children of mine workers.

Although the above efforts are commendable, TBS must increase awareness about gender concerns among its staff and later among village people. TBS staff urgently need a gender sensitisation workshop. AKRSP and Sadguru in Gujarat have also experimented with organising women farmers in irrigation. It may be worthwhile for TBS to visit and learn from these.

The number of senior women workers within TBS is limited to one or two, although TBS does have a large number of women village animators. The number and capacity of women staff at coordination level needs to be increased urgently.

10. Organisation health of TBS

The health of TBS as an organisation needs much sprucing up. This is evident from the following :

- TBS does not have a transparent and well-outlined personnel policy in force.
- Mandatory policies such as Provident Fund, Medical, Accident Insurance have also not been implemented by TBS, probably due to insecurity of funding.
- Due to lack of a regular pay scale, some of the already low-paid workers of TBS are forced to pay income tax.
- Due to lack of medical security mechanisms, field workers have had to sometime pool in money to take care of their medical expenses.
- Closure of projects from various donors has resulted in retrenchment of workers in some cases. Given the fact that these workers have spent many years with TBS and have put in their best in times of adversity, such retrenchment is unfortunate. However, there seems to be no safety net for such workers.
- There is no training need assessment and capacity building programme for TBS staff. Thus the capacity levels of core group of TBS have remained stagnant for many years.
- Although extensive documentation has been done of TBS' work, research & documentation skills of TBS workers themselves have remained poor due to poor capacity building efforts.
- The dependence of TBS on foreign funds for its activities is very high. TBS needs to also increase funding resources from Indian and corporate donors.
- TBS does not have sustainability mechanisms such as corpus in place.
- In spite of the fact that the profile of TBS is very high right now, TBS has not tapped its strategic alliances for building a corpus to bring in organisational stability.

The above situation must be urgently rectified if TBS has to grow as a leading organisation.

Conclusions and Recommendations

The above sections described both the positives and the gaps in the work done by TBS. Annex 5 presents a detailed SWOT analysis of TBS. Given below are our major conclusions and recommendations in relation to the agency and works done by it.

1. Scale of Work Done

Following are our conclusions regarding the scale of work done:

- The earlier strategy for expansion using kinship networks and demand-driven approach has resulted in a diffusion of human and financial resources.
- Scale has made maintenance of structures built earlier difficult, if not impossible.
- The scale of operation is now leading to less time for workers, more drudgery, lesser time for maintenance, lesser sensitivity to other needs of village people. The work pressure also leaves no time for capacity building of TBS workers or village people.
- However, the scale of work has given TBS an excellent reputation in the State. This reputation can be used to develop integrated water resource models in clusters of villages incorporating development of land, forest and water-based Common Property Resources.
- This reputation can also be utilised to work on issues that require a minimum scale of operation—such as formation and strengthening of farmers’ cooperatives for agriculture, dairy and other produce.

Recommendations

- Expansion of the work into new districts outside Alwar by TBS makes no sense (especially where one structure is built in one district) unless TBS decides to expand in that district as a matter of strategy. We suggest that spreading to other districts should be limited to districts which adjoin Alwar and which share river catchments or micro watersheds with Alwar. The purpose of expansion must be saturating river catchments and micro watersheds in which TBS already has a sizable presence.
- In such river catchments and micro watersheds, TBS should identify clusters of villages for further work. The method of selection for such clusters has been listed in Annex 6. In such clusters, intensive discussions and motivation exercises can be taken up by TBS to understand why some villages have not come forward for water harvesting in spite of good examples in their vicinity. All new expansion can thus be part of integrated water management strategy for treatment of a cluster of villages sharing a catchment. Examples of such clusters are - Rada/Nadu villages, Bishuni, Karaska, Lava ka bas, Kalikhhol.
- For expansion within Alwar or to adjoining districts, a proper planning and monitoring structure should be set up within TBS.

2. Shifting to an Integrated approach again in selected clusters

In the initial years of work, TBS has developed integrated models of water and natural resources development in villages such as Bhaonta-Kolyala, Mandalvas and Gopalpura. Somewhere down the line, this approach was superseded by the “build Johads” approach. We think that the scale achieved by TBS should now be capitalised upon to build models of integrated resource management in selected clusters.

Clusters where TBS already have a strong presence (including the “star” villages) are the best grounds for building integrated models, as the amount of effort required here would be miniscule compared to a new cluster. The social capital generated by TBS’ earlier efforts can be channelised to initiate a cluster and then a district level movement on integrated management of land, water and forest resources. This would be the next achievable target for TBS and would be a unique model in itself.

Adequate steps could also be taken to guard against the fear of TBS that following a cluster-based approach would make village people dependent on TBS. In our opinion, creation of vibrant village institutions and building grounds for working with Panchayats could obviate such dependence.

In the final analysis, although water is a very important resource for village community, it has other needs such as a well-developed agriculture, livestock, a healthy forest area, non-exploitative linkages with the market and so on. TBS can be an excellent facilitator for initiating such works in villages.

Recommendation

In the coming phase of the project, TBS should select clusters where it already has a presence. In such clusters (about 10), including the “star” villages, a demonstration programme should be taken up for intensive and integrated development of natural resources. Such villages have a good rapport with TBS workers, good village institutions and a large coverage of water harvesting works. The specific activities that can be taken up in such villages could be identified after an open-ended Microplanning exercise. Some examples are:

- Preparation of integrated village resource management plans.
- Interventions on agriculture, animal husbandry, fodder, soil and water conservation.
- Gram Kosh, social programme integrating health, education,
- Fodder and charagah development, composting
- Management of Common Property Resources such as forests, charagah, water.
- Processing and marketing of local produce
- Formation of farmers’ and milk-producers’ groups
- Support for taking up higher-value crops such as vegetables, flowers, horticulture, etc.
- Capacity building, exposure visits of farmers’ group

What is being advocated here is an intensive village ecosystem-based approach of programme implementation as against an extensive Johad building based approach. It must be emphasised that such integrated plans must be approached with an open mind and an open budget slab must be kept for the same. If these villages are approached with a pre-conceived set of ideas, true integration may fail.

3. Consolidation of water harvesting works done earlier

As stated in the last chapter, there is a very loose informal system within TBS to get feedback about the health of Johads constructed. Such systems are not very effective. In a number of villages, follow-up visits by TBS staff have not been done for years. This needs to be changed and village people must be supported to get into the habit of maintaining these structures again. The following activities are proposed towards this purpose:

Recommendations

TBS should ensure that maintenance of all structures built takes place through:

- Ensuring community mechanisms (such as a maintenance schedule, Johad fund, etc.)
- Support to village institutions for vegetative and structural conservation measures (such as for stone pitching and plantation of shrubs on embankments, protection of catchments, repair of waste weirs, etc.).
- Documentation of traditional methods of vegetative and structural stabilisation of bunds based on agro-ecological specificities within the project area.
- Documentation of ALL 3200 old and all new Johads should be undertaken with immediate effect. A system of folios is proposed, with one page per Johad. (See Annex 7 for sample folio). Basic data regarding the Johad such as date of completion, cost, TBS’ and village contribution, area of catchment of Johad, location of Johad in river valley, area submerged, volume of water impounded, photographs of embankment, waste weir and catchment at time of construction and up to 2 years after construction should be maintained. Such data could be fed to local teams

for monitoring the health of the Johad. Data collection on all new structures built should be done during construction.

- Separate padyatras should be initiated to incorporate monitoring and maintenance of Johads built earlier, especially during monsoons. Seeds, saplings and shramdan could be part of this entire exercise.
- The job of monitoring and ensuring health of structures built should be allocated to a separate team responsible specifically for this purpose.
- Prepare and hand over a maintenance schedule to every Gram Sabha for maintenance depending on the soil type and other local specificities. (See Annex 4 B for a sample maintenance schedule). Such a schedule could also be wall-painted in the village.
- Document and incorporate “traditional knowledge” in repair of field bunds available with farmers for stabilisation of Johad embankment. Local and improved measures for vegetative stabilisation of Johad bunds should be identified and incorporated.
- Systematic (and mandatory) treatment of catchments should be part of the programme.
- A computerised MIS system for monitoring Johads constructed should be set up.
- TBS should henceforth discourage repair of Johads which have been damaged due to neglect by village people but repair Johads damaged due to natural calamities. TBS should provide support to all village institutions in the form of technical support, seeds, saplings, etc.
- Reward mechanisms (such as instituting a prize for the 10 best Johads in the district) should be introduced to induce village people to maintain their Johads.

4. Ensure equitable distribution of benefits of TBS' work within villages

As stated in the last chapter, the work of TBS has ensured that large water bodies are created in areas parched for water. Regenerated common resources such as gowchers and forests are in most cases being used in an equitable manner. However, in case of water, while the Johad is built through community action, the utilisation of water is almost always done privately. TBS has not been able to ensure that this water is available to all sections in an equitable manner. It is only in villages where good Gram Sabhas are active, as in Bhaonta Kolyala and Gopalpura, that distribution of water resources is fairly equitable.

We feel that TBS must now work towards developing models of equitable water distribution. The only way this can be done is by discussing issues of equitable distribution with village institutions before any work is started. Enforcement of rules for equitable distribution of water can be only done through strong and vibrant Gram Sabhas.

Recommendations

- TBS should invest more time in evolving rules and regulations with village institutions for equitable distribution and management of water resources.
- TBS may also take up programmes for increasing awareness about sustainable and equitable practices of water use through awareness campaigns, street plays, shivirs, padyatras and exposure visits.
- At village level, promotion of improved composting methods and improved and indigenous seed varieties is another step towards ensuring water conservation.
- **Experiment with Participatory Irrigation Management Schemes**

TBS should also, where possible (as in village Lava ka bas) assist village communities both financially and technically for setting up participatory irrigation management schemes. This will ensure the following benefits:

- a. The cost of accessing irrigation will be reduced and irrigation will be available to all sections of the farming population.
- b. The money wasted by individual farmers in trying borewells, deepening shared wells will be saved.

- c. Water will be used a common resource and restrictions can be imposed on unchecked exploitation of water.

For this, TBS should make a preliminary assessment of the existing water use pattern and should discuss how this water can be best distributed equitably. The following situations may arise at village level:

Situation	Possible Action points
All farmers have access to land and wells. (especially in drought years)	Water distribution system established before water harvesting structures are built so that water is equitably distributed to all farmers. Crops to be taken decided so that water reaches all farmers.
All farmers have land, some farmers own wells but they sell water to others	Water distribution system established. Rates of sale of water decided and it is ensured that all farmers get water.
Water not sufficient to be distributed to all, only the resourceful have access to water.	Community Participatory Irrigation Management introduced. Rules for water distribution and crops established.
Some landless families present in village	Water distribution system established before water harvesting structures are built. Landless given exclusive rights to collect produce from protected catchments, in embankments or fish ⁴ .

We realise that it is not very easy to implement the above successfully due to the inequitable nature of ownership of resource base (wells and land) in TBS' project area. However, it is the only possible way to ensure equitable use of Groundwater resources enhanced due to building of Johads. Therefore it deserves an honest attempt. Such experiments will also enrich State and National Water Policies.

To learn the intricacies of designing and implementing participatory irrigation management schemes, TBS staff can visit projects such as AKRSP, PRADAN, MYRADA, Sadguru foundation and other areas in south India.

TBS staff could also document the rich traditions available in the project area for equitable water distribution from wells. This knowledge could be used to facilitate the process of development of equitable structures of water distribution.

5. Demand-side water management at river catchment level

As discussed above, in almost all cases, the responsibility of utilising water enhanced due to construction of Johad rests with the farmer. At a river catchment level, issues of equity between villages become important and must be resolved. TBS has made a good beginning in developing a model of demand-side basin level water management model by forming the Arvari Sansad (Water Parliament). (See Box 1 on Arvari Sansad)

This is a federation of Gram Sabhas of the 70 villages that fall in the catchment of the Arvari river. The Parliament has made rules and regulations for sharing of water between upstream and down-stream villages and has banned water –intensive crops in the Arvari catchment. However, since wells are under private ownership, it is reported that rules framed by the Parliament are not being followed by most farmers in the catchment. A large number of farmers also seem to be unaware of the existence of the Parliament. TBS must invest more energy at enabling the Parliament to become an effective water-management organisation.

⁴In Sevabrat, Purulia, West Bengal, landless have been given rights over fish from tanks built by Sevabrat.

Recommendation

TBS may further enhance capacity of Arvari Parliament in demand-side water management through :

- Documentation of traditional practices of equitable water distribution
- Collection of rainfall data through schools in Arvari Catchment.
- Meetings with Arvari Sansad and Gram Sabhas for awareness raising about demand-side water efficiency.
- Support to negotiations between downstream and upstream village institutions for enforcement of water management rules devised earlier.

6. Improving quality and productivity of CPRs, especially grazing lands and forests

The health of water harvesting structures is intimately related to the health of the grazing lands and forest areas in the project area of TBS. With the advent of water harvesting structures, the trend of encroachments on grazing lands (gowchers) is on the increase. Such reduction of CPRs can be disastrous for the landless and poor sections in the village whose livelihood and livestock needs are heavily subsidised by CPRs. Thus protection and improving CPRs becomes an urgent priority for TBS. Suggestions given below can strengthen what TBS is already doing for protection and enhancement of CPRs.

Recommendations

a. Awareness Programmes

TBS should take up awareness raising programmes for protection and management of grazing lands and forests through:

- Padyatras and exposure visits to areas where CPRs have been protected and managed well.
- Organising women's groups

b. Strengthen village institutions for protection of CPRs

TBS should incorporate rules and regulations for protection and management of grazing lands and forests into the village institutions it builds. The activities that can be taken up for regeneration of forests and grazing lands can be:

- Building water harvesting structures
- Raising centralised or village nurseries
- Fresh afforestation in grazing lands where there is no root stock
- Promotion of improved grasses

c. Documenting encroachment on Gowchers

- While working in clusters in an integrated manner, TBS should document the extent of encroachment on Gowchers in project villages. Active attempts should also be made to reverse the process of encroachment by organising village communities for the same.
- TBS may also encourage and honour villages where removal of encroachment has been done by community action.

d. Promoting traditional knowledge in conservation of CPRs

TBS must encourage documentation and promotion of traditional knowledge in protection and management of grazing lands and forests through padyatras, shivirs and publications and by studying traditional conservation methods such as Dharadi, Dev Bani, Oranya, Kankad bani, etc. Such practices can be further incorporated into TBS' work.

e. Protection and conservation of medicinal plants

In-situ and ex-situ conservation of medicinal plants seems to be a priority in the project area which has a rich tradition of traditional systems of medicine. TBS may encourage promotion of herbal gardens and involve Gunis and Vaidyas (traditional veterinary and medical practitioners) in such conservation efforts.

f. Collaborating with Forest Department

Large areas of degraded forests in the project area fall under the control of the Forest Department. TBS may initiate discussions with the Forest Department and may undertake protection and management of degraded forest lands works through community involvement in collaboration with the department.

7. Policy Advocacy for Water Management in Rajasthan and India

The reputation and experiences of TBS have now reached a stage where it can play a key role in policy advocacy for water management at state and national level. Rajendra Singh is already undertaking a national yatra on the issue of water management.

Recommendations

TBS could undertake the following activities in the coming five years to consolidate the policy-level work done by them and to more effectively influence water policies:

a. Policy Advocacy for Integrated Water Management in Rajasthan

- TBS should conduct regular capacity building programmes for stakeholders in water management such as village institutions, NGOs, GOs, academicians, scientists, bureaucrats, sadhus, etc. Right now such capacity building takes place in response to specific requests or by TBS staff travelling to the place from where the request has come.
- TBS should also organise State-level workshops on vital issues related to water management and for working towards a more equitable and sustainable State Water Policy.

b. Policy Advocacy for Integrated Water Management at National Level

- At least once every alternate year, TBS may organise National Workshops on issues related to national water policy.
- TBS may also identify exemplary works in various parts of India on water management and set up National Awards for the same.
- TBS should continue to organise regional and national level padyatras for mobilising public opinion in civil society about making water policies more people-oriented.

c. National Resource Centre on Water

TBS could set up a National Resource Centre on Water for the following functions:

- A national resource library on water to collect publications on issues of water management.
- Studies and documentation on key issues on water rights at State and national level.
- Bringing out publications on exemplary works and issues on water management.
- Maintaining postal and electronic mailing lists for information dissemination.
- Organising capacity building of stakeholders in water management.

8. Capacity Building of TBS staff to respond to changing demands

As stated earlier, the role of TBS is fast changing from an implementing agency to a support level agency which has to deliver capacity-building and public advocacy functions at national and state levels. TBS staff therefore urgently needs an intensive capacity-building programme to help them manage earlier works more efficiently and to take up the new challenges before them.

Recommendations

- To begin with, we recommend an intensive Training Needs Assessment exercise with the staff to identify areas where Capacity Building is required and training / resource institutions where such Capacity Building can take place.
- A separate team is required to handle the vast amounts of visitors constantly reaching TBS. Currently, the field team has to take time off to attend to these visitors. Responsibility for handling visitors can also be part of duties of the proposed resource centre.

- Capacity building of TBS staff is also required to take over the functions that were being handled by Rajendra Singh in earlier years so that strategic and other matters may not suffer in future.
- Exposure visits to MYRADA, AKRSP, Sadguru, Sevabrat should be organised. All these organisations have worked on a scale comparable to TBS, also have a large flow of visitors and have taken up participatory water and irrigation management projects on a large scale. TBS team can learn how to plan and monitor their work more efficiently and how integrated natural resources management projects can be better designed and implemented.
- A possible list of workshops, trainings and exposure visits for the TBS staff based on the 3 day LFA workshop is given below:

a. Workshops

- i. Workshop for formulation of Project Strategy of TBS and for setting up an M & E system.
- ii. Workshop for Training Need Assessment in light of project strategy.
- iii. Writing workshop for TBS staff.

b. Trainings

- i. Training of Trainers for capacity building of Gram Sabhas in nursery raising and afforestation.
- ii. Account-keeping.
- iii. Process documentation of TBS' work.
- iv. Training of Trainers for community mobilisation.
- v. Participatory Microplanning and evaluation.
- vi. Sensitisation and mobilisation of village animators.
- vii. Enhancement of presentation skills by slides, OHP and other media.
- viii. Basic computer skills.
- ix. Soil and water conservation in common and private lands.
- x. Charagah Development.
- xi. Composting.
- xii. Gender Sensitisation.
- xiii. Documentation Skills.
- xiv. Library and Document Management.
- xv. Communication Methods such as Street Plays, puppets, etc.
- xvi. Better Project Management Skills.

c. Exposure Visits

- i. GO and NGO integrated resource management projects such as MYRADA, AKRSP, Ralegaon Siddhi, Dhan Foundation, Sevabrat, Sadguru, etc.
- ii. Projects focusing on Participatory Irrigation Management such as Sadguru Foundation, AKRSP, Pradan, etc.

9. Improving Organisational Health of TBS

The ailments affecting TBS as an organisation vis-à-vis its staff policies have been listed in the previous chapter. We realise that providing appropriate social security net to its workers is dependent on TBS' own financial viability. We therefore propose a two-pronged approach to improving organisational health:

Recommendations

a. Personnel Policy

TBS should draw up a personnel policy as soon as possible giving a sympathetic package consisting mandatory (such as Provident Fund, gratuity, etc.) and other facilities such as group medical and accident insurance, field allowances and medical assistance. An intensive session was held with TBS staff to understand their requirements and the results are listed in Annex 8.

Structuring of the salary package in a proper manner will also ensure that workers at lower end of the pay scale do not pay very high Income Tax. TBS may require assistance from their Chartered Accountants and lawyers for drawing up the same. Resource organisations for designing such a compensation package such as Sahbhagi Shikshan Kendra, Society for Participatory Research in Asia may be involved in this exercise. The performance policy should also include a participatory performance appraisal system.

b. Corpus Grant

Considering the long support that SIDA has provided to TBS, it is essential that SIDA does not withdraw from the agency without building TBS' organisational and financial capacity. It is therefore of utmost importance that SIDA provide a sizable corpus grant to TBS. However, such a corpus grant may be made conditional to the following:

- Design and implementation of a regularised pay-scale incorporating all mandatory and non-mandatory requirements such as Provident Fund, Medical and accident insurance.
- Presentation of an investment plan by TBS, which will ensure safe and remunerative returns from the corpus funds.
- TBS' own efforts at raising corpus funds from other donors. SIDA may help in this process by recommending TBS to other donors.

Compiled List of Recommendations

The following is a compilation of all recommendations made in earlier section for easy reference.

1. Scale of Work Done
Limit expansion of work into districts which adjoin Alwar and share river catchments or micro watersheds with Alwar. The aim should be to saturate river catchments and the micro watersheds where TBS already has a sizable presence.
2. Shifting to an Integrated approach again in selected clusters
New expansion should be in clusters where the "star" villages of TBS exist. An intensive programme for integrated resource development should be taken up. The specific activities that can be taken up in such villages could be identified after an open-ended Microplanning exercise.
3. Consolidation of water harvesting works done earlier
Strengthen village institutions for maintenance of all structures built through adequate support. Other activities for ensuring maintenance of Johads built earlier: <ul style="list-style-type: none"> – Ensuring community mechanisms (such as a maintenance schedule, Johad fund, etc.) – Documentation of traditional methods of vegetative and structural stabilisation. – Documentation of ALL old and new Johads built in a folio. – Separate padyatra for maintenance of Johads built earlier – A separate team for monitoring and ensuring health of structures built. – Making maintenance schedules part of the programme. – A computerised MIS system for monitoring Johads constructed. – Rewards for the 10 best-maintained Johads in the district.
4. Ensure equitable distribution of benefits of TBS' work within villages – Make regulations for equitable distribution of water part of village institutions.
<ul style="list-style-type: none"> – Take up awareness programmes about sustainable and equitable water use. – Promote improved composting methods and indigenous seeds for water conservation. – Initiate Participatory Irrigation Management projects in selected villages.
5. Demand-side water management at river catchment level
Enhance the capacity of the Arvari Parliament in demand-side water management by: <ul style="list-style-type: none"> – Documentation and incorporation of traditional practices of equitable water distribution. – Collection of rainfall data through schools in Arvari Catchment.

<ul style="list-style-type: none"> - Regular meetings with Arvari Parliament and Gram Sabhas. - Support negotiations between downstream and upstream village institutions.
<p>6. Improving quality and productivity of CPRs, especially grazing lands and forests</p> <ul style="list-style-type: none"> - Incorporate regulations for protection of CPRs into village institutions. - Awareness Programmes for protection and management of grazing lands and forests. - Take up construction of water harvesting structures in CPRs. - Raising centralised or village nurseries for plantation in CPRs. - Fresh afforestation in grazing lands where there is no root stock. - Promotion of charagah development and improved grasses. - Document extent of encroachment on Gowchers in project villages. - Try reversing encroachments by organising village communities. - Honour villages where removal of encroachment has been done by community action. - Encourage documentation of traditional knowledge in CPR conservation such as Dharadi, Dev Bani, Oranya, Kankad bani, etc. - In-situ and ex-situ conservation of medicinal plants through plantations and herbal gardens. - Increase involvement of Gunis and Vaidyas in conservation efforts. - Collaborate with Forest Department for protection of degraded forest lands.
<p>7. Policy Advocacy for Water Management in Rajasthan and India State level</p> <ul style="list-style-type: none"> - Conduct regular capacity building programmes for stakeholders at State level. - Organise State-level workshops and move towards a more equitable State Water Policy.
<p>National level</p> <ul style="list-style-type: none"> - Organise National Workshops on issues related to national water policy. - Identify and award exemplary works on water management. - Continue regional and national level padyatras for mobilising public opinion.
<p>Set up a National Resource Centre on Water for:</p> <ul style="list-style-type: none"> - A national resource library on water. to collect publications on issues of water management. - Conduct studies and documentation of key issues on water. - Publish Case Studies of exemplary works on water management. - Maintain postal and electronic mailing lists for information dissemination. - Organising capacity building of stakeholders in water management.
<p>8. Capacity Building of TBS staff to respond to changing demands</p> <ul style="list-style-type: none"> - Workshop for formulation of Project Strategy of TBS and setting up an M & E system. - Workshop for Training Need Assessment in light of project strategy. - Writing workshop for TBS staff. - Trainings on various subjects to increase capacities of staff. - Exposure Visits to GO and NGO integrated resource management projects.
<p>9. Improving Organisational Health of TBS</p> <p>Personnel Policy</p> <ul style="list-style-type: none"> - Design and implement a proper and sympathetic Personnel Policy incorporating PF, gratuity, Medical allowance, Life and accident insurance, etc. <p>Build a Corpus</p> <ul style="list-style-type: none"> - Seek funds from donors and build a corpus for financial stability.

Proposed Changes in approach of TBS in next phase

This document proposes a number of changes in strategy for next phase of work at TBS. This new approach is based on extensive discussions with village people, core team and field teams of TBS. A three-day LFA workshop with all field staff and a one-day discussion with Governing Body members were also undertaken. The changed approach has thus evolved after much churning.

TBS recognises that in order to respond to changing circumstances, there is an urgent need to reorient itself. Listed below are shifts in approach of work that will enable TBS to make a smooth transition from a grassroots agency to a frontier position at a state and national level in integrated resource management.

1. Building an integrated approach from the vast but scattered experience of TBS

The project implementation approach since the mid-nineties has become biased in favour of building water-harvesting structures as against the integrated approach followed in initial phase of TBS' work. In the next phase, TBS will attempt to revert back to an integrated approach. It will therefore also identify and work on areas such as agriculture, forestry, composting, institution building, etc. through a participatory Microplanning approach.

2. Emphasis on developing CPRs

In the new phase, regeneration of Common Property Resources such as Forests and Grasslands will be an additional focus along with development of water resources.

3. Expansion Strategy based on clusters, microwatersheds and river valleys

The expansion of work of TBS was earlier based on kinship networks and on readiness of village people to contribute for construction of water harvesting structures. A major change in the next phase would be to identify clusters of villages on basis of microwatersheds or river catchments and to saturate these with work. Kinship networks and willingness of village people to contribute to all works will still be priorities. However, a demand for integrated natural resources management works will be created through mobilisation campaigns and demonstration effect.

4. Setting up a system for better maintenance of works done

Consolidation of older works done by TBS will be another focus in the coming phase. This will ensure the sustainability of structures and institutions built. A monitoring and maintenance plan based on local skills, methods and resources will be set up to monitor the older works done. Public mobilisation for maintenance of older works will be another focus different from earlier years in the new phase.

5. Developing a Demand-side Water Management model at river catchment level

TBS will also now work intensively for developing a working model for demand-side water management by strengthening the Arvari Parliament. Such a model will ensure equitable and sustainable water management in 70 villages of Arvari catchment.

6. Strengthening TBS to take on support and policy advocacy functions

TBS is deluged with progressively increasing demands for playing a support-level function for other stakeholders in water management at the State and National level. TBS is also now expected to take a frontal position in formulation of people-oriented State and National Water Policies. This phase will support TBS and its staff to take up these new challenges.

7. Capacity building of TBS staff

An increase on the capacities of staff of TBS to take on newer roles and to excel in their older roles will form a major investment in the new phase. Such capacity building will aim at building diverse centres of skills within TBS for a variety of activities.

8. Long term sustainability of TBS

The new phase will also enable TBS to ensure its own long-term sustainability by building up a corpus and by implementation of a personnel policy to provide a social security net for its staff.

Killing Factors

1. Training TBS for Intensive Monitoring of Project work

The current proposal has been developed by following the Logical Framework process. Intensive M & E will thus be an essential aspect of all works in the coming phase. The team will need to be trained urgently to follow the new approach. If this does not take place, it could well be a killing factor for project viability.

2. Need for timely inputs for strengthening TBS

Since the current phase will consist of many changes in strategy, style and focus, the core team of TBS will need regular and timely inputs from resource persons for making the transition smoothly. Such resource persons should be able to adapt modern M & E theory with the field and cultural worldview of TBS staff. Failure to identify such resource persons could be another killing factor for project sustainability.

3. Need for Mid-term Review

The approach followed by Sida so far with TBS has been that of providing funds for a three to five-year phase and conducting reviews at the end of the funding phase. This is not sufficient if TBS is to be guided towards a more efficient position. A Mid-term review in the third year is therefore a must to enable mid-term and mid-stream course correction.

Box 1: Arvari Sansad

The Arvari Sansad was born in a conflict, which village people of Hamirpur and Samra had with the Fishery Department. In 1996, after the village people had contributed labour and built a Johad, aquatic life in the pond regenerated. In local worldview, fishes have as much right of life as human beings. In November 1996, the Fishery Department gave fishing rights to a fisherman. Village people opposed the fisherman, seized his boats and equipment and refused to allow him to fish. People felt that the Government had no right to decide how water resources which they (the people) had created would be used. After a series of conflicts and a 2-month long Satyagraha by village people, the Government cancelled the fishing contract in March 1997.

In these meetings, an issue that came up was that of overuse of water by upstream farmers while downstream farmers did not have enough. In subsequent years, during various Padyatras conducted by TBS, TBS discussed the issue in depth with village people.

In December 1998, TBS called all Gram Sabhas of Arvari catchment for a meeting. Here, 110 representatives from 70 villages were unanimously selected to form a catchment level organisation called the Arvari Sansad (Water Parliament). All members of the Arvari Sansad took an oath, agreeing to enforce the following rules for sustainable cropping patterns, agricultural and animal husbandry practices:

- Arvari basin shall not have sugarcane, paddy & chilli. People growing these to be penalised.
- No one shall draw water from the river after Holi (Mar Apr) up to monsoon (July).
- Borewells not be allowed in Arvari catchment.
- Recommended crops - barley, makka, bajra in upper and vegetables in lower reaches.
- No axe can be carried to Bhairodev people's sanctuary, catchment of the source of Arvari.
- Fishing can be done only for food.
- Large-scale trade of foodgrains and vegetables was banned. Local production and consumption to be emphasised.
- Village people to help people from other areas for implementing water harvesting structures.
- Rotational grazing to be followed by farmers in their own pasturelands.
- Industrial units prohibited in 405 sq km of Arvari basin.

The Parliament decided to provide free water to and compensatory lands Rudamal Meena and others who had lost land in regenerating the Arvari waters.

A steering committee of 22 persons was formed for executing decisions of Sansad, which would meet quarterly while the Sansad would meet twice a year. Two more committees were formed to exert social pressure on village people not abiding by the laws. This session also decided to increase strength of Sansad to include more women and to help other districts and states in water harvesting.

However, most village people in Arvari catchment are not aware of these rules. Since water is drawn from wells for irrigation (which are private resources), it is reported that many farmers are not following the above rules.

Sources: *Gandhi Peace Foundation, 1998, Abhishek Sharma, 2002, Discussions with TBS workers, February, 2003.*

Box 2 : Benefits to few from sacrifice of many ? Case Study of Village Lava Ka Bas

In June 2001, TBS got a notice from Irrigation Department, GOR stating that a Johad built in village Lava Ka Bas was technically unsafe and illegal. TBS was asked to remove this embankment in 15 days failing which action would be taken against TBS. After a prolonged struggle in which village people were willing to die but not let the Johad be demolished, TBS was able to get the Chief Minister to withdraw charges.

The Johad had been built in 2001 in the Gowcher of Lava ka bas with small contributions of Rs. 300,000 by people of Lava ka Bas and Bhagdoli villages. An industrialist from Churu district, donated Rs. 500,000 in memory of his mother. 3 farmers who had lost land in the bed of the Johad were allotted land elsewhere, although they maintained the right to cultivate their lands when water level was low. In February 2003, the water level in the Johad was quite low due to poor rains.

The location of the Johad is such that to lift water from the bed for irrigation, the water has to be brought to a minor ridge (*Raadi*) after which it can be taken to the main agriculture fields in villages Lava ka Bas and Bhagdoli. The distribution of agriculture land is as follows:

Inside of ridge: Lava ka bas - 50 bighas, Bhagdoli – 40 bighas

Outside of ridge: Lava ka bas - 30 bighas, Bhagdoli – 34 bighas

Only a submersible pump can be used to lift water to cross the ridge. As the village transformer has a limit of 25-horsepower, only three submersible sets (each 7.5 horsepower) are currently being run, belonging to 2 influential persons from Lava ka bas and 1 from Bhagdoli. In addition to these, 8 diesel pumps from Bhagdoli and 3 from Lava ka bas are lifting water from the bed to irrigate lands lying on the inside of the ridge, where it can be lifted with ease without the use of a submersible pump.

The dam has also led to Groundwater recharge. However, all the Groundwater recharge has been towards Bhagdoli. Thus 25 borewells have been sunk in Bhagdoli of which 20 are yielding excellent water at depth of 400 feet. In addition, one farmer in village Lava ka bas got a boring done until 615 feet but could not get any water.

Irrigation by lifting water from the bed has started only this year. The investment in various methods of irrigation in the two villages within this year were as under:

Item	Rate	No.	Total investment
Submersible Pump	65,000	3	1,95,000
Eicher Diesel Pumpset	80,000	1	80,000
Field Marshal Diesel Pumpset	30,000	9	2,70,000
Kirloskar Diesel Pumpset	30,000	1	30,000
Borewell - Bhagdoli	40,000	25	10,00,000
Borewell – Lava ka bas (failed)	82,000	1	82,000
Total investment			16,57,000

The above investment has been made by farmers who have the resources. These are farmers who own more than 50 bighas (4 bighas = 1 acre).

The land distribution in the village Lava ka bas is as follows:

> 50 bighas	- 2 households
30 to 50 bighas	- 3 households
10 to 30 bighas	- 6 households
< 10 bighas	- 30 households

The majority of farmers fall in the range of land less than 10 bighas. However, none of these are getting any benefits of irrigation.

One alternative, which could have helped all concerned, would have been a common lift irrigation scheme. The water could have been lifted up to the ridge and then distributed by gravity to ALL farmers. Village people of Lava ka bas feel that such a scheme could have benefited all concerned and could have ensured equity in water distribution.

Sources: CSE, July 2001, Discussions with village people of Lava ka bas and TBS staff, February 2003.

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Annex 1: List of persons met

Details	Persons met
Village people	Village people of: <ul style="list-style-type: none"> - Lava ka bas - Karaska - Rada - Mundiya - Bilandi ka bas - Kushalpura - Kalikhoh - Bishuni - Bhaonta-Kolyala
TBS Staff	<ul style="list-style-type: none"> - Kajori Devi - Bodhanlal Gurjar - Jagdish Gurjar - Kanhaiyalal Gurjar - Samay Singh Gurjar - Murarilal Jangid - Parvati Jasnyal - Ambuj Kishore - Rajnarayan Maurya - Chhotelal Meena - Siyaram Meena - Suresh Chandra Raikwar - Mahadev Prasad Sharma - Jagdish Sharma - Murarilal Sharma - Shravan Sharma - Narendra Singh - Gopal Singh - Chaman Singh - Sitaram Singh - Sitaram Singh Vaidya - Devyani
Visitors to TBS	<ul style="list-style-type: none"> - Mr. Daniel Gustafson, Mr. Gopi Ghosh, FAO, New Delhi - Team from wildlife Department, Government of Uttaranchal. - Students & Professors, Aravalli Institute of Management, Jodhpur. - Students and teachers, Primary and Middle School, Gopalpura.
Governing body members	<ul style="list-style-type: none"> - Rajendra Singh - Dr. M S Rathore - Gopal Singh - Kanhaiyalal Gurjar - Jagdish Gurjar - Devyani
Donors	<ul style="list-style-type: none"> - Ramesh Mukalla, SIDA - Owe Anderson, SIDA

Annex 2: Recommendations made in 1998

No.	Recommendation
	Physical Work
1.	Screening of applications received so that those falling in catchments where TBS is already working are taken up first. This will ensure that no portion of catchment is left untreated and that people's demand is also met.
2.	Planning of expansion to be done in such a manner that while one catchment is being covered, entry point activities start in another catchment.
3.	Concentrating placement of Johads so that Groundwater recharge takes place more effectively.
4.	Cascading of structures so that water from one overflows into another at sites where possible.
5.	Geo-hydrological study of project area should be done incorporating a detailed study of past and potential placement of structures, traditional methods of Groundwater recharge, recharge zone management, etc.
6.	No more "Stand-alone" structures.
7.	Clarity about objectives of Johad. Should be clear that Johad is for Groundwater recharge or for drinking water for livestock.
8.	Maintenance of records of each Johad built should be kept- area of catchment, submergence area, volume of water impounded.
9.	Hand over a maintenance schedule for annual maintenance to Gram Sabha.
10.	Make stabilisation of embankment a part of construction process.
11.	Institutionalise a monitoring system for each Johad.
12.	Set aside the month of Sawan Bhadon for campaign on maintenance of older structures built.
13.	Incorporate and support traditional wisdom in embankment stabilisation.
14.	Strengthen Gram Sabha for maintenance : Make available seeds, root slips, cuttings for vegetative stabilisation of structures through TBS' network of field workers and village resource persons.
15.	Transfer skills in simple earthwork calculations to village groups.
16.	Hand over a photocopy of bills for all Johads and a copy of the design of large Johads.
17.	Try options other than Johads for preventing encroachment.
18.	Explore technical options for water conservation in sandy, gullied and ravined soils from ICAR and Agricultural Universities.
19.	Seek support for tractors.
20.	Undertake renovation of structures built by TBS only after ensuring that breakdown has not been due to negligence on part of Gram Sabha.
	Animal husbandry
21.	Undertake conservation at malas.
22.	Undertake grassland development at malas and Gowchers.
23.	Strengthen Forest Protection Committees.
24.	Identify and strengthen Dhanda Vaidis.
25.	Provide nursery support for trees on private lands.
26.	Introduce silage of Maize, Jowar, Bajra.
27.	Anticipate and take steps for prevention of degradation of commons.
	Agriculture
28.	Field Bunding: Stop supporting 50% of cost of isolated field bunds. Undertake bunding and levelling in context of an integrated village plan.
29.	Nala Treatment: Ensure that upstream nalas are treated before downstream nalas are taken up. Take less contribution for common nalas and use current system for private nalas.
30.	Support farmers for site selection of wells.
31.	Support Gram Sabhas for information about agriculture inputs and seed support for field bund stabilisation.
32.	Organise farmers for getting a better price of their products.
33.	Tie up with Forest Department for protecting crops in project area against wildlife.
	Village institutions:
34.	Design a system for monitoring status of Gram Sabhas.

35.	Ensure that Gram Sabha meets regularly and discusses points of common interest.
36.	Decide on contribution based on analysis of village economic situation.
37.	Discontinue "Stand-alone" structures.
38.	Incorporate Gram Kosh into overall programme.
39.	Link Gram Sabha with Lead Banks, NABARD, Block, Panchayats.
40.	Build on existing Social Capital.
41.	Make a catchment level organisation.
42.	Hold technical workshops for the following technical knowledge : <ul style="list-style-type: none"> a. Workshop of Gajdhars. b. Methods of Groundwater estimation. c. Methods of fodder management. d. Vegetative & Structural methods for prevention of evaporation.
43.	Prepare for a different socio-religious situation in Tijara where a majority of population is of Muslims.
44.	Initiate income generation activities based on local resources.
45.	Promote equity of water distribution within village.

Annex 3: Results of Matrix Scoring of “Star” Villages of TBS – Part 1

Criteria for Selection	Gopalpura	Neemi	Samra	Mandalbas	Bhaonta	Karaska	Lava ka Bas	Devri	Darulai	Bishuni
Situation in river Basin	U	U	M	U	U	U	U	U	U	U
No. - Water harvesting Structures built	6	3	5	7	6	5	3	6	5	4
Livelihood Strategy	A+L	A+L	A+L	A+L	A+L	A+L	A+L	L+A	L+A	A+L
Extent of Treatment of village WS	6	3	3	5	6	4	2	3	4	3
Impact of Work of TBS on Agriculture	7	8	5	7	7		5	5	4	4
Impact on Animal Husbandry	7	6	5	8	7	7	5	6	5	6
Impact on water use	7	8	5	8	8	6	5	4	5	5
Impact on drought proofing	5	6	4	5	5	3	4	3	3	4
Food Security	5	6	4	5	6	5	5	4	4	5
Impact on forest conservation	7	7	6	7	8	5	4	5	6	7
Impact on reduction of women's drudgery	6	5	6	7	6	8	4	6	5	5
Impact on education	5	4	5	7	7	5	3	4	4	6
Migration before interventions by TBS	8	7	5	4	6	9	4	3	6	3
Impact on migration after interventions	10	10	9	9	10	10	10	9	9	10
Impact on Health	8	8	8	8	9	9	8	7	8	8
Extent of Cooperation & awareness	7	8	7	7.5	8	7	7	8	7	8
Extent of contribution by village	5.5	7	6	6	7	6	5	5.5	6	6
Maintenance of structures built	5	6	5	5	7	4	6	5	7	5
Health of Gram Kosh	5	5	5	5.5	8	4	3	4	3	6
Relationship with Gram Panchayats	5	5	5	8	8	4	4	6	4	7
Activeness of Gram Sabha	5	7	7	6	8	5	5	5	6	5
Work by Govt. in village before TBS' work				2						
Work by Govt. in village after TBS' work	2					2		5		
Struggle against Govt. by village	4				4	5	8	8		
Support to community by Government	6	7	6	6	5	2	4	4	3	5
Awards etc. received by village	5	5	5	5	9	5	5	5	5	5
Number of Exposure Visits by visitors	5	7	6	7	8	5	5	5	5	5
Research & Documentation on village	8	7	4	8	8	4	8	7	3	3

Annex 3: Results of Matrix Scoring of “Star” Villages of TBS – Part 2

Criteria for Selection	Khajura	Viramka	Raibeli	Devitala	Raada	Nyaana	Suratgarh	Rajaheda	Leelya
Situation in river Basin	U	U	U	U	M	M	U	M	L
No. - Water harvesting Structures built	4	4	4	3	4	5	8	5	4
Livelihood Strategy	L+A	L+A	L+A	A+L	L+A	A	L+A	L+A	L+A
Extent of Treatment of village WS	5	4	7	3	2	4	6	4	4
Impact of Work of TBS on Agriculture	6	6	6	3	3	6	7	4	3
Impact on Animal Husbandry	5	4	4	4	5	5	5	4	4
Impact on water use	7	7	7	4	4	5	7	5	3
Impact on drought proofing	5	4	5	3	4	5	5	4	2
Food Security	6	6	6	4	4	7	6	5	4
Impact on forest conservation	4	4	4	5	6	4	7	4	3
Impact on reduction of women's drudgery	6	6	6	4	6	4	5	4	3
Impact on education	3	2	3	4	8	3	6	4	3
Migration before interventions by TBS	4	4	4	5	5	2	3	2	2
Impact on migration after interventions	9	9	9	9	10		10	9	9
Impact on Health	7	6	5	7	8	6	8	7	7
Extent of Cooperation & awareness	6	6	6	5	7	6	7	6	7
Extent of contribution by village	6	6	6	5	6.5	5.5	6	5.5	6
Maintenance of structures built	6	6	6	5	6	5	6	5	5
Health of Gram Kosh	4	4	4	6	6	2	7	5	5
Relationship with Gram Panchayats	7	7	7	6	8	7	6	6	5
Activeness of Gram Sabha	5	5	5	6	6	4	6	4	5
Work by Govt. in village before TBS' work		1	1	1		3		2	
Work by Govt. in village after TBS' work	6	6	6			2			
Struggle against Govt. by village					4				
Support to community by Government	6	6	6	5	7	6	7	4	5
Awards etc. received by village					5		4		
Number of Exposure Visits by visitors	1	1	1		2	1	5	-	6
Research & Documentation on village	1	1	1	1	3	2	8	1	1

Annex 4 A: Recommended Maintenance Procedure for Johads

The following are general points regarding maintenance:

Immediately after construction

- After construction, compaction of the embankment should be done.
- If necessary, allow soil to settle down after first year. Then do compaction.
- In general, siting of Aparaa should be in a place where there is minimum likelihood of erosion- as on a natural rock.
- In tanks where the flow is large, stone pitching of Aparaa must be done.
- Stone pitching in Aparaa should be at least one foot thick.
- Stones should be kept at right angle to the soil surface.
- In very large Johads, Aparaa must be RCC.
- Stone pitching of outer slope of embankment should also be done, if possible.

At time of first rains

Structural

- As soon as first rain occurs after construction, people should be at the site with shovels, even if it is at night.
- Especially check for any damage at stone-mud joints.
- Check if the level of water is not rising due to blockage at Aparaa by tree or any other thing. If so clear the blockage in the Aparaa.
- Check if water collected is not so much that water reaches up to only 1 to 2 metres below the Paal. If so, manually cut the Aparaa so that excess water starts flowing out.
- In large Johads, two Aparaa are given so that if one is not sufficient, the depth of the other is manually decreased to protect the embankment.
- If there are any signs of erosion on the embankment, repair these.
- If there are signs of a rat hole, plug the embankment from upstream side. Later, when water level is down, dig the embankment till the tunnel is reached. Seal the tunnel and refill the embankment with compaction.

Vegetative

- Plant grass seeds, root slips, shrubs such as Munja, thor, etc. on the outer slope of embankment in the first monsoon.
- Put a thorny fence to prevent animals from climbing the embankment.
- Plant saplings of trees such as Kikar below the embankment. When these trees grow up, they can be sold to raise income for repair.

At time of second and third monsoon

- At first rains in monsoon, inspect the embankment for signs of rat holes, water erosion, damage to Aparaa, etc..
- Gap filling of grasses and shrub plantation on outer embankment in the 2nd and 3rd year.

General rules

- Every monsoons inspect the embankment for signs of rat holes, water erosion.
- Clear the tank bed once in a year at time when water is minimum.
- Use the removed soil to repair the level and fill gaps in the embankment.
- Taking soil from embankment is prohibited. Taking soil from bed is allowed.
- Animals should not climb the embankment.
- Protection and plantation in catchment is a must. Establish a Devata on the ridge. Defecating, urinating not allowed in catchment.

Annex 4 B: Sample Maintenance Schedule

Maintenance Points	Immediately after construction	At time of first rains	In 2 nd and 3 rd monsoon	Every Year
1. Compaction of the embankment after construction done.	+			
2. Stone pitching of Aparaa done or RCC Aparaa made.	+			
3. Stone pitching of outer slope of embankment done.	+			
4. Be at site immediately with shovels on first, even if it is at night.		+		
5. Especially check for any damage at stone-mud joints.		+		
6. Check if the level of water is not rising due to blockage at Aparaa by tree or any other thing. If so clear the blockage in the Aparaa.		+		
7. Check if water collected is not so much that water reaches up to only 1 to 2 metres below the Paal. If so, manually cut the Aparaa so that excess water starts flowing out.		+		
8. In large Johads, decrease the height of the second Aparaa to enable excess water to flow out. If there are any signs of erosion on the embankment, repair these.		+		
If there are signs of a rat hole, plug the embankment from upstream side. Later, when water level is down, dig the embankment till the tunnel is reached. Seal the tunnel and refill the embankment with compaction.		+		
9. Plant grass seeds, root slips, shrubs such as Munja, thor, etc. on the outer slope of embankment in the first monsoon.		+		
10. Put a thorny fence to prevent animals from climbing the embankment.		+		
11. Plant saplings of trees such as Kikar below the embankment. When these trees grow up, they can be sold to raise income for repair.		+		
12. At first rains in monsoon, inspect the embankment for signs of rat holes, water erosion, damage to Aparaa, etc..			+	
13. Gap filling of grasses and shrub plantation on outer embankment in the 2nd and 3rd year.			+	
14. Every monsoons inspect the embankment for signs of rat holes, water erosion.				+
15. Clear the tank bed once in a year at time when water is minimum.				+
16. Use the removed soil to repair the level and fill gaps in the embankment.				+
17. Taking soil from embankment is prohibited. Taking soil from bed is allowed.				+
18. Animals should not climb the embankment.				+
19. Protection and plantation in catchment is a must. Establish a Devata on the ridge.				+
20. Defecating, urinating not allowed in catchment.				+

Annex 5: SWOT Analysis of TBS

No.	Strengths	Weaknesses	Opportunities	Threats
1	Fully dedicated team comprising mainly of local workers who have a very clean reputation at village level.	Poor capacity building of workers. No training need assessment programme.	Need to intensively design and implement a Training Needs Assessment and CB programme.	Workers will not be able to cope with increased and changed demands from them.
2	TBS workers are very hard-working and have always converted adversity into strength. They have therefore never been put down by difficulties. This is mainly due to the excellent leadership, determination and grit provided by Rajendra Singh.	No safety net for workers who have to depend on pooled contributions for emergency expenses. Poorly paid workers having to pay Income Tax due to poorly designed salary structure. Retrenchment of some old workers due to instability of funds.	Introduction of mandatory provisions should be done urgently such as PF, Medical, Accident, Life insurance, House Loans, etc. Steps for regularising salary structure should be enforced immediately to ensure that Tax liabilities of workers are minimum.	Loss of face for TBS. Legal liability for not having implemented mandatory requirements. Poor motivation among workers.
3	TBS team has a fairly comprehensive vision about the direction of development in their region. Has worked in a fairly integrated manner in villages initially.	Scale and lack of time has made integration of various activities at village level very rare. Over time, image has also become of single point Jihad makers.	Bring about integration in activities again.	“Branding” of TBS as Johad-walas will intensify. All-round development of villages will suffer.
4	Core group consists of local people with long years of dedicated work behind them. Fairly democratic decision-making.	Capacity levels of core group have remained stagnant for many years.	CB of Core group urgently required to take up better organisational management and integrated natural resources development.	In the absence of Rajendra Singh, the working of TBS may suffer if core group is not able to take on roles required by them efficiently.
5	Informal process of decision-making and implementation.	Formulation of Strategy for programme implementation not very well outlined.	CB of staff through exposure visits (to AKRSP, MYRADA, etc.) to understand how decision-making can be done in field implementation of large-scale integrated water management projects.	TBS staff will not be able to cope with increased scale and changing roles.
6	TBS feels that people can change their conditions, given the right support. TBS waits for demand to arise in village and then responds to these demands.	Vast number of activities have been done in various villages. However, in very few cases have all activities been done in one villages. Thus gaps exist in village level implementation.	Potential for taking up integrated village development in selected villages (to begin with) to demonstrate all-round development.	TBS workers have become used to implementation of Johads. May not be willing to take on integrated works.

No.	Strengths	Weaknesses	Opportunities	Threats
7	TBS is cautious about not making village people dependent on them.	TBS has not been able to build upon release of social energy, as it is over-cautious about not making people dependant on it. It therefore loses the opportunity to make a lasting impact on village livelihoods.	TBS should evolve a method of taking its work forward to a logical end without making village people dependant on them. This can be done by creating vibrant VLIs and evolving a policy of working with PRIs.	If capacities of VLIs and PRIs are not built, TBS' work may remain single point and will not be able to achieve multi-dimensionality.
8	Have created vibrant VLIs in some villages.	Not working with Panchayats	In coming years, the functions of natural resources management may be devolved to PRIs. Experiments must be initiated with Panchayats.	If experiments with Panchayats are not initiated, TBS will not be able to dovetail with Panchayats in times to come, which may prevent TBS from evolving sustainable natural resources management models in the area.
9	Excellent reputation and rapport with village people due to the long years of work and joint struggles.	Village people perceive TBS as Johadwalas. Over the years, demands for other inputs from TBS has died out.	The ground for taking on a multiple number of works has now made. TBS can make it known again that it can provide more inputs than Johadbuilding.	“Branding” of TBS as Johadwalas will intensify. All-round development of villages will suffer.
10	Have mobilised people as effectively for agitations as for constructive work. Have been able to form strong and effective groups for both activities.	In recent years, the emphasis has shifted from integrated works to large-scale replication of Johads. Have not focused on converting people's energy into sustainable institutions for overall development in a large number of cases.	The ground for taking on a multiple number of works has now made. This should be built upon.	Fruits of works done for many years will not materialise into benefits for village people. Social capital will dissipate.
11	Ability to involve almost all sections of population in their works. Considerable social capital generated during implementation of various works.		Social capital generated can be utilised to initiate a district level movement on integrated management of land, water and forest resources. This will be unique model in itself.	Other GO and NGO organisations will come in to fill gaps but may not fill these gaps as well as TBS could have done.
12	Have been able to involve women on a large scale in various activities.	Number of women workers within TBS is very small. Needs to be increased.	Increase in number of women workers can strengthen gender empowerment related works by TBS.	Male bias may creep in.

No.	Strengths	Weaknesses	Opportunities	Threats
13	TBS continues to maintain dialogue with groups/ Government departments even after disagreement on issues.	None	Push people oriented water or NRM policy at state level.	None
14	Has relied on simple, traditional, wide-spread technology for water harvesting and has created a pressure on Govt to cut costs and increase quality.	Have shied away from modern technological inputs such as low-cost drip, sprinkler, evaporation retarders and GW studies in water harvesting.	Improved technology could help	Have also antagonised Govt. departments due to their high quality work.
15	Emphasis on Johads as entry point activity. Very successful in building Johads in various kinds of agroclimatic situations in Alwar district.	Leave the village after building of Johads. Social energy accumulated is lost. Village ecosystem planning approach is not taken. Thus many village resources are left undeveloped.	Potential for taking up integrated village development in selected villages (to begin with) to demonstrate all-round development.	TBS workers have become used to implementation of Johads. May not be willing to take on integrated works.
16	Many a times, TBS has implemented numerous activities at a very large scale. Thus scale is an important characteristic of their work.	Scale of work has made recapitulation and monitoring of works done very difficult. For example, a large number of Johads built by TBS lie unmaintained.	Need to design a well-monitored system for recapitulating old works done by TBS. Scale has given TBS an excellent reputation. This can now be built for integration. TBS can take up activities such as formation and strengthening of farmer's coops.	Unless a monitoring system is designed, Johads will not be sustained and will decay, as has happened in past 2 centuries. Unless the scale built is utilised, social capital generated will be frittered away.
17	Very large number of water bodies created in Alwar district.	No emphasis on equitable distribution of water or for demand-side water management.	Need to learn and implement PIM and Demand-side water management in selected villages. Visit agencies already working on such issues for CB of staff.	Equity and demand-side water management are an integral part of water management. Inability to address these important issues is a serious gap in TBS' work strategy.
18	Expansion is based on demand from villages and on kinship networks. Therefore work is largely taken up when need from the village is high, leading to better involvement of community.	Kinship networks span many districts. Thus very thin spreading of human and financial resources has resulted over the years. Need for limiting spread of scale.	Limiting of spread of scale will help TBS in consolidating their work in Alwar districts and in clusters where they already have a presence.	Unless limiting of spread is done, resources will be too thinly spread to make a lasting impact.

No.	Strengths	Weaknesses	Opportunities	Threats
19	Although ideologically leaning towards Gandhism, TBS has maintained links with non-Gandhian groups such as RSS, Leftist groups, Environmentalists, etc.	None	Continue to foster links.	Threat of becoming irrelevant if links are not sustained.
20	Very widespread recognition of works. Many persons in various states in India impressed by TBS works.	More than 70,000 visitors reported in a year. No procedure within TBS to handle such a large number of visitors. No streamlined process for information dissemination to visitors.	Set up a Resource centre to meet demands of visitors and GO/ NGO asking for support. Resource Centre could speed up dissemination of TBS' learnings on national level if backed by a mailing list, magazine, and other such media.	If system for handling visitors is not set up, demands on time of TBS workers will increase, leading to a drastic decrease in time available for intensive work in TBS' own project area.
21	Reached a state where demands for state and national level support to other GO and NGO are being made.	No clearly outlined strategy on how changing roles are to be met. Responding on day-to-day basis right now.	Design and implement a state level demonstration programme in various agro-eco zones of Rajasthan. Set up a Resource Centre and a team to meet demands for CB from other agencies. CB of staff for playing a support level function.	TBS staff will not be able to cope with changing roles.
22	Good reputation among foreign donors, hence able to obtain large amount of foreign funds for its works.	Dependence on foreign funds is very high. No sustainability mechanisms such as corpus implemented.	Need to tap Indian, corporate and Government funds. Need to build a corpus.	Will become increasingly difficult for TBS to take up issue-based agitational issues in future.
23	Have encouraged extensive documentation and research of their works.	Research & Documentation skills of TBS workers themselves have remained poor due to minimal CB efforts.	CB of workers for documentation needs to be done. Continue to encourage documentation by outsiders. Proposed Resource Centre can play an effective role in documentation of TBS and other success stories in water management.	TBS workers will get increasingly alienated from documentation. Dependence on others for documentation may increase.

No.	Strengths	Weaknesses	Opportunities	Threats
24	<p>TBS invests considerable energy in building up and maintaining Strategic Alliances at various levels- individual, village, state, national, international. TBS therefore has many friends in both high and low places.</p>	<p>TBS has not made efforts for corpus building in spite of its strategic alliances.</p>	<p>Strategic Alliances built by TBS at various levels can be tapped to ensure long-term self-sufficiency through building up of corpus and other means. Push people oriented water and natural resources management policy at national and state level.</p>	<p>Lack of a corpus may lead to a drastic exodus or dissatisfaction among old committed workers. Ability of TBS to take issue-based agitational and constructive works may also be significantly compromised if they do not have a corpus.</p>

Annex 6: Suggested Method for Selection of Clusters and Future Activities

1. Process for selection of clusters and microwatersheds and identification of future activities

The TBS team defined their project area for the coming five years as (defined primarily as Alwar district and villages of neighbouring districts such as Dausa, Jaipur, Karoli, Sawai Madhopur which share microwatersheds with Alwar district and falling in river valleys in above districts where TBS is already working.

The steps for selection of clusters of villages and microwatersheds and identification of future activities could be as follows:

Step	Details
Year 1	
Step 1	Preparation Annual Action Plan for year 1 for components A to D. Allocation of human and financial resources for each component.
Step 2	Exposure Visits to selected projects to understand how large-scale integrated natural resources management projects are run.
Step 2	Collection of secondary literature about proposed project area such as: <ul style="list-style-type: none"> – Toposheets – Demarcation of river catchments and microwatersheds – Secondary statistics regarding landuse, forest, agriculture, Gowchers, etc. – Demographic details about villages in project area – Infrastructure, services and opportunities – Government programmes and structure – Details of institutional structure such as PRIs, traditional organisations, other NGOs, etc. – Constraints and opportunities in project area.
Step 3	Mapping of areas where work has already been done in project area.
Step 4	A rough prioritisation of likely clusters where integrated natural resources management work should be taken up based on following criteria: <ul style="list-style-type: none"> – High concentration of target groups (small and marginal farmers, livestock raisers, wage labourers, women and children). – Higher Incidence of poverty, social evils. – Greater degradation of forest, water and land resources. – A mix of villages where work has been done by TBS and where work has not been done. – Poor outreach and quality of Government and Non-government works. – Clusters with special problems such as saline water. – Clusters which have possibility for a larger demonstration effect.
Step 5	Preliminary reconnaissance of likely clusters and assessment of these based on above criteria. Preliminary Identification of clusters where detailed studies will be done based on learnings of reconnaissance.
Step 6	Training cum pilot study of one selected cluster for: <ul style="list-style-type: none"> – Learning PRA and Microplanning skills – For understanding how to identify development needs of cluster. – Understanding how to conduct baseline study. – Identification which Farming System linkages need to be strengthened. – Identifying activities that need to be taken up for regeneration of CPRs, agriculture, livestock, etc. – Analysis and collation of Pilot Study. – Confirmation of this study by presentations before village communities. – Identifying and initiate entry point activities in pilot cluster. – Beginning of implementation based on Microplan prepared as an output of Pilot study.
Step 7	Setting up teams to study all clusters identified in Step 4 above.

Step	Details
Year 1	
Step 8	Simultaneous studies in all clusters identified in Step 4 above as done in pilot cluster. Each team to collate learnings in a standardised form to facilitate comparison.
Step 9	Workshop for sharing of learnings. <ul style="list-style-type: none"> – Learnings to lead to Project Strategy Formulation. – Decisions that should emerge : – Setting up teams for each cluster. – Identification of __ number of clusters where entry point activities can be started. – Preparation of Cluster level Microplans. – Budgetary allocation for entry point activities for each cluster.
Step 10	Workshop for Collation of Results of Year 1 <ul style="list-style-type: none"> – Analysis of results of entry point activities. – Drop clusters where response has not been good. – Final Selection of Clusters for work. – Budgetary allocations between various clusters. – Training Needs Assessment and setting up a Training Calendar for next 4 years.
Year 2 onwards	Implementation of works in selected clusters based on Cluster level Microplans. Trainings, exposure visits, workshops and other activities as planned in Step 8.

2. Meetings required for M & E

The following is suggested for better M & E of the programme:

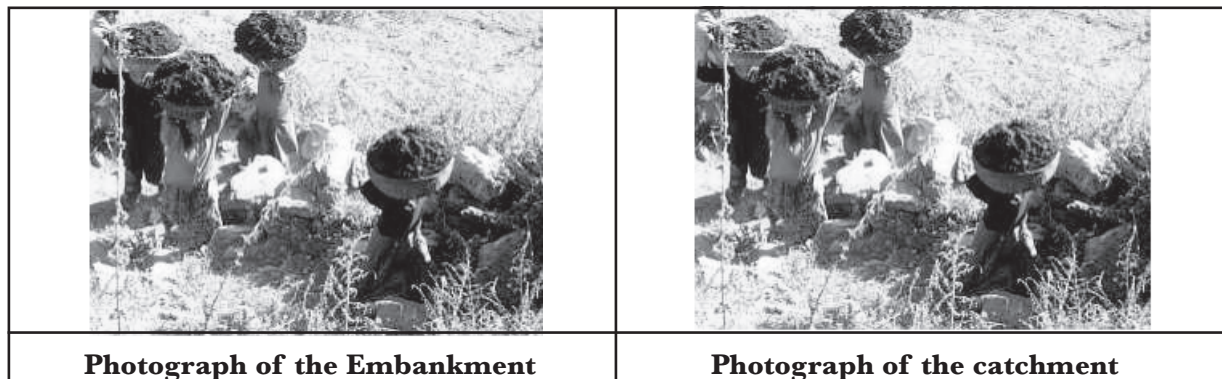
- Monthly meetings at cluster level.
- Quarterly meetings of all cluster teams.
- Half yearly workshop for course correction and assessing progress on indicators.
- Annual review and planning workshop.

ANNEX 7: A SAMPLE FOLIO

Name of Structure: Mewalon wala Bandh Village: Chauntara
Panchayat Samiti: Thanagazi **District:** Alwar
Type of Structure: Bandh **River catchment:** Arvari
Date of start of work: 20/2/1986 **Date of completion:** 20/4/86

Technical details

Embankment Length: 300 metres **Max. height - embankment:** 20 metres
Storage volume: 184 X 10⁶ litres **Submerged area:** 8 ha **Catchment area:** 200 ha
Mandays of labour : 500 **Days of tractor:** 25
TBS' Contribution in structure: Rs. 90,542 **Village Contribution in structure:** Rs. 32,560
TBS' contribution in Johad fund: Rs. 10,424 **Village Contribution in Johad fund:** Rs. 10,424



Social Details

Total households in village: 35 **Major Social Groups :** Bairwa Gujar, Meena
Date of Gram Sabha formation : 20/2/86 **Members in Gram Sabha:** 15
Type of Livelihood System: Animal husbandry + Agriculture

Maintenance Details

Waste weir stone pitched on: 25/4/86 **Shrubs planted (embankment) on:** 15/7/86
Protection of Catchment started on: 15/6/86
Embankment repaired on: 30/4/87 **Tank bed deepened on:** 10/5/90

Other Details

Annex 8: Compensation requirements listed by field staff

Personnel Policy

- Design and implement a sympathetic and transparent personnel policy.
- Provide higher salaries than current levels.
- Make a medical allowance part of compensation package.
- Ensure Provident Fund deductions.
- Salary should be structured in such a manner that Income tax payable is least.
- Put into place Group Accident Insurance and Group Medical Insurance.
- Provide gratuity to workers who leave after a minimum number of years.

Other Facilities that can be provided to staff en masse

- Make facility of insurance and saving agent available at TBS so that staff can open individual recurring and insurance accounts with their own money for social security. Such instalments may also be deducted directly from salaries and paid to agent.
- Provide legal Assistance in case of accidents.

Facilities for enhancing work quality

- Provide a daily allowance for food and stay during tour.
- Ensure adequate vehicles for work.
- A regular capacity building programme through trainings, workshops, exposure visits
- Provide required tools such as measuring tape, dumpy levels and training for using these.
- Provide stationery (diary, etc.), Field Kit, etc.

Annex 9: RAJASTHAN STATE WATER POLICY

1. The Need for a State Water Policy

Water is a prime natural resource, a basic human need and a precious asset of the State. Planning, development, operation and maintenance of all water resources to support the growth of the state economy and the well being of the population, in response to the growing need for drinking water, agricultural products, industrial production and electricity, a general improvement of living conditions and employment is of utmost importance. Planning and development of water resources need to be governed by the state's perspectives. The requirement of utilising all available water resources, surface and ground, in a judicious and equitable, as well as sound economic manner needs a well defined **State Water Policy**.

The State of Rajasthan is the second largest state in the country covering an area of 34.271 Million ha which is more than 10% of the total geographical area of the country. About 5% of the total population of the country resides in the state and it has more than 15.7 million ha of land suitable for agriculture. The State of Rajasthan is one of the driest states of the country and the total surface water resources in the state are only about 1% of the total surface water resources of the country. The rivers of the state are rainfed and identified by 14 major basins divided into 59 sub-basins. The surface water resources in the state are mainly confined to south and south-eastern parts of the State. There is a large area in western part of the state which does not have any defined drainage basin. Thus the water resources in the state are not only scarce but have highly uneven distribution both in time and space.

The ground water also plays an important role especially in agriculture and drinking water supply. The situation of ground water exploitation is also not satisfactory as in areas where surface irrigation is provided there is a tendency of not using ground water for agriculture which creates problem of water table rise and even water logging. On the contrary, in large areas of the State, ground water is being over exploited and the water table in some areas is going down even at the rate of 3 metre per year.

This background leads to the formulation of the following water resources development and management objectives:

- a. Development of all utilisable water resources to the maximum possible extent, including surface water - local and imported - groundwater and waste water, for optimal economic development and social well-being.
- b. Assuring an integrated and multi-disciplinary approach to planning, evaluation, approval and implementation of irrigation and drainage projects, including river basin management, of surface and ground water.
- c. Optimisation of water resources exploitation and raising the level of reliability of supplies through conjunctive use of surface and ground water.
- d. Judicious and economically sound allocation of water resources to different sectors, with drinking water supply as a first priority.
- e. Optimum utilisation of water resources to maximise production in all user sectors.
- f. Providing flood protection and drainage facilities, as well as assuring minimal supplies during drought periods.
- g. Maintenance of water quality at acceptable standards and reduction of water resources' pollution by urban and industrial sewage.
- h. Ensuring proper functioning of existing structures, conveyance systems and other assets through adequate maintenance and operation.
- i. Minimising adverse impacts of water resources development on the natural environment and on population affected by project implementation works.

- j. Promoting beneficiaries' participation in all aspects of water planning and management, with particular emphasis on Water User Associations intended to manage and maintain irrigation systems, both physically and financially.
- k. Motivating and encouraging water conservation through appropriate and socially acceptable water rates, introduction of water-saving devices and practices in all sectors, and educational campaigns.
- l. Advancing the technological and scientific level of all the staff in the water sector through intensification of applied research, technology transfer, training and education.
- m. Ensuring well coordinated and efficient decision making, planning, design, execution and operation and maintenance activities among all GOR agencies.
- n. Facilitating private initiative in development, operation and management of water projects.
- o. Emphasis to be given for recharge of ground water aquifers to mitigate the crisis of drinking water supply and demand of drinking water supply and for industrial and other purposes.

2. Information System

The prime requisite for resources planning is a well developed information system. There should be free exchange of data among the various agencies and duplication in data collection should be avoided. Timely availability of reliable information, conveniently accessible to all users, is necessary as a tool for integrated planning of new projects, and for following up the performance of existing systems and the status of water resources. Following actions shall be taken in this regard:

- a. Setting up of a central information center for the entire water sector of Rajasthan.
- b. Clear definition of duties and responsibilities of those charged with data collection.
- c. Detailing of main reports to be generated.

3. Maximizing Water Availability

Due to the high variability of hydrometeorological phenomena not all the potentially available resources can be harnessed and made utilisable. The overwhelming interest of the State is to bring, by physical and managerial measures, as much of the potentially available resources into beneficial utilisation as is physically and economically feasible.

The resources shall be conserved and the availability for use augmented by measures for maximising retention and minimising losses. Following actions shall be taken for maximising water availability:

- a. Comprehensive and integrated water resource planning shall be done for the State on the basis of hydrological units i.e. basin or a sub-basin.
- b. Water resources potentials, both surface and ground, shall be assessed.
- c. Basin-wise and State-level water resources development and environmental plans shall be prepared.
- d. Water resources development projects shall be prioritised on economic, social and financial criteria to aid in budget allocation.
- e. Waste water reclamation shall be considered in all basin plans.
- f. Efficient water application and utilisation practices shall be encouraged.
- g. A **Central Planning Authority** for policy related issues for integrated water resources development and management shall be created.
- h. Traditional water harvesting practices shall be preserved and encouraged.
- i. Projects for artificial recharge of ground water shall be prepared.
- j. Inter basin transfer projects shall be prepared based on a State-wide perspective, after taking into account the requirements within the basins.
- k. The case for full utilisation of State's share in Ganga waters shall be pursued.

4. Project Planning

Water resources development planning shall aim at assuring accelerated growth by contributing to the State's economic and social advancement, and improving the general social and economic conditions

of the population, while keeping the environmental and ecological balance. The State Water Policy shall be reflected in all plans recommended for implementation. Special attention shall be given to the non-structural elements of this policy, aimed at achieving the objectives of reduction of poverty, basic food self-sufficiency, overall economic growth, environmental well-being, progress of weaker sections of the population, etc.

Water resource development projects shall as far as possible be planned and developed as comprehensive and multi-purpose projects. All present and predictable future demands, including irrigation, domestic and livestock demand, industries, thermal and hydroelectric power stations, pisciculture and recreation, and all sources of natural water as well as reclaimed wastewater must be considered. Provision for drinking water shall be a primary consideration. The study of the impact of a project, during its construction period as well as during its operational life, on human lives, settlements, occupations, economic and other social aspects, shall be an essential component of project planning.

Time and cost overruns and deficient realisation of benefits characterising most irrigation projects shall be overcome by upgrading the quality of project preparation and management. The under-funding of projects shall be obviated by an optimal allocation of resources, having regard to the early completion of ongoing projects as well as the need to reduce regional imbalances.

The following institutional and procedural reforms and manpower development in projects shall be carried out:

Institutional Reforms:

- a. integrated long and short term planning of water resources development.
- b. economic analysis and feasibility studies of projects.
- c. monitoring and evaluation of existing projects.
- d. drafting annual and multi-annual expenditure programmes for the entire water sector and obtaining approval.
- e. encourage private initiative in water sector.

Human Resources Development:

- a. Introduce training courses and professional career incentives, and foster professional dedication, with emphasis on client management.

Procedural Reforms:

- a. Improvement in process of project planning, sanctioning, bidding, etc.
- b. Define accountability and authority.
- c. Define information flow routes and access to data.
- d. Establish guidelines for priority in public spending in water sector.

5. Maintenance and Modernisation

For maintaining the existing structures and systems in satisfactory condition and timely modernisation, the following actions shall be taken:

- a. Adequate budget for maintenance, repair, modernisation of existing structures and systems shall be allocated.
- b. Water rates shall be increased and collections shall be improved.
- c. Orders and instructions for inspections / reporting of maintenance, repair and replacement works shall be issued.
- d. Maintenance oriented training programmes shall be undertaken.
- e. Water User Associations shall be encouraged to undertake maintenance, repairs and modernisation of works.

6. Safety of Structures

The Dam Safety Organisation shall be reinforced and supported, at State level, for ensuring the trained staff in improved inspection, analysis and evaluation techniques of dams and other structures. Guidelines issued by State authorities on the subject shall be kept under constant review and periodically updated and re-formulated

Dam Safety Legislation may be enacted to ensure proper inspection, maintenance and surveillance of existing dams and also to ensure proper planning, investigation, design and construction for safety of new dams.

7. Groundwater Development

Exploitation of groundwater resources should be so regulated as not to exceed recharging possibilities, and also to ensure social equity. There should be a periodical reassessment on a scientific basis of groundwater potentials, taking into consideration the quality of the water available and economic viability.

Following steps shall be taken in this regard:

- Legal: Existing laws shall be amended/new legislation shall be enacted.
- Organisational: Organisational structures and procedures shall be changed. Attempt to control deep drilling through licensing and control on private operators shall be made.
- Social: Public awareness for self-control in ground water exploitation from WUAs shall be fostered.
- Educational: Sense of water scarcity and need to conserve shall be developed.
- Technological: Data collection shall be improved, conjunctive use of ground and surface water shall be planned, mathematical modeling of aquifer shall be done and artificial recharge of ground water shall be planned.
- Environmental: The detrimental environmental consequences of over exploitation of ground water need to be effectively prevented.

8. Water Allocation Priorities

In the planning and operation of systems, water allocation priorities shall be to Drinking water, Irrigation, Power generation and Industrial and other uses in that order. However, these priorities might be modified if necessary in particular regions with reference to area specific considerations, and they may be different in the context of allocating water to existing consumers than in the context of planning the development of water resources for new consumers.

A detailed methodology for multi-priority analysis shall be developed for decision making in the Central Planning Authority to enable prioritisation in water resources planning and management.

The demands of drinking water, irrigation, power generation, industrial and other uses shall be studied scientifically for appropriate development and allocation of funds.

9. Drinking Water

Adequate drinking water facilities shall be provided to the entire population both in urban and in rural areas. Future irrigation and multi-purpose projects shall invariably include a drinking water component wherever there is no dependable alternative source of drinking water. Drinking water needs of human beings and animals shall be the first charge on any available water and following actions shall be taken to fulfill this need:

- a. Increased budget shall be allocated for upgrading urban and rural domestic and livestock water supply.

- b. Water rates shall be gradually increased to self-support the operation of urban and rural piped schemes.
- c. Finance of rural water supply schemes shall be continued.
- d. Water quality standards shall be ensured.
- e. Strict control over activities which endanger sources such as hazardous wastes and sewage shall be exercised.
- f. Privatisation in urban water supply especially for meter reading, billing etc. can be contracted out.

10. Irrigation Water

Irrigation planning, either in an individual project or in a basin as a whole, should take into account the irrigability of land, cost-effective irrigation options possible from all available sources of water, and appropriate irrigation and drainage techniques. The irrigation intensity should be such as to extend the benefits of irrigation to as large as number of farm families as possible, keeping in view the need to maximise production.

Following measures shall be taken to ensure that the irrigation potential created is fully utilised, the gap between the potential created and its utilisation is removed, water allocation in an irrigation system is done with due regard to equity and social justice, disparities in the availability of water between head-reach and tail-end farms and between large and small farms should be obviated by adoption of a rotational water distribution system, supply of water on a volumetric basis subject to certain ceilings is introduced and there is close integration of water-use and land-use policies.

To achieve these objectives a multidisciplinary and integrated approach will be followed under C.A.D. programme.

- a. It shall be ensured that the Government regulations are adhered to by law and persuasion.
- b. Farmers shall be encouraged to adopt high efficiency water equipments and practices and use of ground water in conjunction with surface water.
- c. Water charges shall be reviewed and realistic water rates shall be introduced.
- d. Reclamation of waterlogged/saline affected land by scientific methods should form a part of command area development programme.

11. Water Rates

Water rates shall be so decided that it conveys the scarcity value of water to users and foster the motivation for economy in water usage. Rates shall be gradually increased to cover the annual maintenance and operation charges and part of the fixed costs to assure undisturbed and timely supply of irrigation water. Water rates shall be rationalised with due regard to the interests of small and marginal farmers. It shall be accompanied by volumetric measurement of water consumption in all sectors.

12. Participation of Water Users

Farmers shall be involved in various aspects of management of irrigation systems, particularly in water distribution and collection of water charges through following measures:

- a. Evaluating results of on-going pilot projects where farmers' participation has been introduced.
- b. Introducing changes in legislation for fostering user participation in irrigation.
- c. Giving priority of funds for rehabilitation and modernisation of irrigation projects to those projects where farmers are willing to organise into WUAs.
- d. Assistance of voluntary agencies shall be taken in educating the farmers in efficient water use and water management.

13. Water Quality Monitoring

Both surface water and ground water as well as soil quality shall be regularly monitored for quality and a phased program shall be undertaken for improvements in water quality. Government shall issue

orders to routinely enter future water and soil quality figures in the water resources database and publish groundwater statistics and maps for River Basins. Proposals for contracting the work of water sampling and analysis to private operators will be studied.

Effluents should be treated to acceptable levels and standards before discharging them in natural streams.

Minimum flow should be ensured in the perennial streams for maintaining ecology and social considerations.

14. Water Zoning

15. Water Conservation and Efficiency of Utilization.

The efficiency of utilisation in all the diverse uses of water should be improved and an awareness of water as a scarce resource should be fostered. Conservation consciousness shall be promoted through education, regulation, incentives and disincentives by taking following actions:

A. Domestic Sector:

- Introduction of domestic water saving devices
- Water meters on all consumers.
- Progressive water tariff structure.
- Auditing of water balance from distribution systems. etc...

B. Industrial sector:

- Progressive water tariff.
- Water recycling facilities.
- Treated urban sewage water for cooling and other processes.

C. Agriculture Sector:

- Water rates on volumetric basis should be kept sufficient for maintenance.
- Treated sewage water for non-edible crops.
- Saline water for tolerant crops.
- Improvement in irrigation practices and reduction of water losses.
- Pressure irrigation systems to be introduced

D. Watershed management for each basin:

- Afforestation, soil conservation.
- Livestock management.
- Treatment and disposal of sewage.

Every drop of water needs to be conserved and optimally utilised for which detailed scheme shall be framed ensuring its time bound implementation.

16. Flood Control and Drainage Management

Sound watershed management through extensive soil conservation, catchment area treatment, preservation of forests and increasing the forest area and construction of check dams shall be promoted to reduce the intensity of floods. Adequate flood cushion shall be provided in water storage projects whenever feasible to facilitate better flood management. An extensive network for flood forecasting shall be established for timely warning to the settlements in the flood plains, along with the introduction of regulation for settlements and economic activity in the flood-prone zones to minimise loss of life and property caused by floods. Master plan for flood control and management for each flood prone basin/ area shall be got prepared. Due consideration to provide proper drainage shall also be given to build up capabilities to tackle water logging and salinity problems.

17. Drought Management

Drought prone areas shall be made less vulnerable to drought associated problems through measures listed below. In planning water resource development projects, the needs of drought prone areas should be given priority. Relief works undertaken for providing employment to drought stricken populations should preferably be for drought proofing;

- a. Continue efforts to assure water supply and livelihood to population and care for livestock.
- b. Employment and direct provision of basic needs to population in times of crisis.
- c. Drought-proofing of the area in measures such as plantation, dry farming.
- d. Development of training and skills to enable population to supplement the earnings from agriculture.
- e. Development of the ground water potential including recharging and the transfer of surface water from surplus areas wherever feasible and appropriate.

18. Training and Education.

Standardised training shall be a part of water resources management and should cover all its aspects and all personnel involved in it, including farmers. The State shall also encourage education of the public at large. Scholarships, study tours, incentives etc. shall be provided by the State to encourage and support training. Technology transfer shall be made obligatory on all technical assistance and consulting services. Emphasis on research on all matters related to water management shall also be given.

19. Legislation and Regulation

After a critical examination of rules, regulations, ordinances, legal and legislative measures related to the State's water sector has been made, with a view to improve and streamline their scope and cover in the legal framework all aspects pertaining to water resources management, protection of water quality, flood protection, drought proofing, abstraction licensing, water rights, etc. the Government shall introduce the following measures:

- a. Enact the necessary amendments and additions to existing Act, rules, regulations, orders, decisions, etc.;
- b. Ensure that the responsibilities and powers of Governmental agencies and the rights and obligations of individuals be clearly spelled-out in the relevant laws and regulations;
- c. Ensure that the legislation would allow for easy implementation of policy decisions while protecting the interests of individuals and taking into account the administrative capacity to implement them;
- d. Empower the appropriate agencies to carry out their obligations and responsibilities as implied by the public ownership of water projects, and spell out the administrative procedures necessary for coordinated, equitable and efficient control, as well as the resolution of conflicts which may arise from them;
- e. Provide legal support for the formation of WUAs and handing over to them the distribution of water for irrigation and the maintenance of canals;
- f. Establish rules and regulations for the involvement of the private sector in development and operation of water-related projects;
- g. Provide in the law for an effective participation of farmers in the planning and decision making processes which involve users and public authorities;
- h. Introduce the necessary legislation for a periodic amendment of water rates and tariff structures which would enable the full coverage of O&M expenditures, based, as far as possible on volumetric metering of supplies, while motivating users to economise in the use of water, and catering for the weaker sections of the population;
- i. Establish effective conflict resolution legal entities and procedures.

The entire body of water-related laws and regulations will eventually be amalgamated into a State Water Law, which would, in addition to the above mentioned subjects, establish the State ownership of all the water resources within the State, as well as waters imported from outside the State under various

agreements, and the requirement for any public or private entity or individual to obtain from the Government a permit to abstract surface water or groundwater, to utilise it, to sell or distribute it, or to dispose off after use. Permitting and enforcement rules and regulations will be spelled-out accordingly.

ANNEX 10: NATIONAL WATER POLICY – INDIA

The Need for a National Water Policy

Water is a prime natural resource, a basic human need and a precious national asset. Planning and development of water resources need to be governed by national perspectives.

It has been estimated that out of the total precipitation of around 400 million hectare metres in the country, the surface water availability is about 178 million hectare metres. Out of this about 50 % can be put to beneficial use because of topographical and other constraints. In addition there is a ground water potential of about 42 million hectare metres. The availability of water is highly uneven in both space and time. Precipitation is confined to only about three of four months in the year and varies from 10 cm in the western parts of Rajasthan to over 1000 cm. At Cherrapunji in Meghalaya. Further, water does not respect state boundaries. Not merely rivers but even underground aquifers often cut across state boundaries. Water as a resource is indivisible: rainfall, river waters, surface ponds and lakes and ground water are all part of one system, water is also a part of larger ecological system.

Floods and drought affected vast areas of the country, transcending state boundaries. A third of the country is drought prone. Floods affect an average area of around 9 million hectares per year. According to the National Commission on floods, the area susceptible to floods is around 40 million hectares. The approach to the management of drought and floods has to be coordinated and guided at the national level.

Even the planning and implementation of individual irrigation or multi purpose projects, though done at the state level, involve a number of aspects and issues such as environmental protection, rehabilitation of project-affected people and livestock, public health consequences of water impoundment, dam safety, etc. On these matters common approaches and weaknesses have affected a large number of projects all over the country. There have been substantial time and cost overruns on projects. In some irrigation commands, problems of water-logging and soil salinity have emerged, leading to the degradation of good agricultural land. There are also complex problems of equity and social justice in regard to water distribution. The development and exploitation of the country's groundwater resources also give rise to questions of judicious and scientific resource management and conservation. All these questions need to be tackled on the basis of common policies and strategies.

The growth process and the expansion of economic activities inevitably lead to increasing demands for water for diverse purposes: domestic, industrial, agricultural, hydro-power, navigation, recreation, etc. So far, the principal consumptive use of water has been for irrigation. While the irrigation potential is estimated to have increased from 19.5 million hectares at the time of Independence to about 68 million hectares at the end of Sixth plan, further development of a substantial order is necessary if the food and fiber needs of a growing population are to be met. The country's population which is over 750 million at present is expected to reach a level of around 1000 million by the turn of the century.

The production of foodgrains has increased from around 50 million tonnes in the fifties to about 150 million tonnes at present, but this will have to be raised to around 240 million tonnes by the year 2000 A.D. The drinking water needs of people and livestock have also to be met. In keeping with the objective of the International Drinking Water Supply and Sanitation Decade Programme (1981-1991), adequate drinking water facilities have to be provided to the entire population in both urban and rural areas and sanitation facilities to 80 % of the urban population and 25% of the rural population by the end of the decade. Domestic and industrial water needs have largely been concentrated in or near the principal cities, but the demand from rural society is expected to increase sharply as the development

programme improve economic conditions in the rural areas. The demand for water for hydro and thermal power generation and for other industrializes is also likely to increase substantially. As a result water which is already a scarce resource will become even scarcer in future. This underscores the need for the utmost efficiency in water utilization and a public awareness of the importance of its conservation.

Another important aspect is water quality. Improvements in existing strategies and the innovation of new techniques resting on a strong science and technology base will be needed to eliminate the pollution of surface and ground water resources, to improve water quality and to step up the recycling and re-use of water. Science and technology and training have also important roles to play in water resources development in general.

Water is one of the most crucial elements in developmental planning. As the country prepares itself to enter the 21st century, effect to develop, conserve, utilise and manage this important resource have to be guided by national perspectives. The need for a national water policy is thus abundantly clear : water is a scarce and precious national resource to be planned, developed and conserved as such, and on an integrated and environmentally sound basis, keeping in view the needs of the State concerned.

Information System

The prime requisite for resources planning is a well-developed information system. A standardised national information system should be established with a network of data banks and data bases, integrating and strengthening the existing Central and State level agencies and improving the quality of data and the processing capabilities. There should be free exchange of data among the various agencies and duplication in data collection should be avoided. Apart from the data regarding water availability and actual water use, the system should also include comprehensive and reasonably reliable projections and reasonably reliable projections of future demands for water for diverse purpose.

Maximising availability

The water resource available to the country should be brought within the category of utilizable resources to the maximum possible extent. The resources should be conserved and the availability augmented by measures for maximizing retention and minimising losses.

Resource planning in the case of water has to be done for a hydrological basin as whole, or for a sub-basin. All individual developmental projects and proposals should be formulated by the States and considered within the framework of such an overall plan for a basin or sub-basin, so that the best possible combination of potions can be made.

Appropriate organizations should be established for the planned development and management of a river basin as a whole. Special multi-disciplinary units should be set up in each state to prepare comprehensive plans taking into account not only the needs or irrigation but also harmonising various other water uses, so that the available water resources are determined and put to optimum use having regard to subsisting agreements or awards of tribunals under the relevant laws.

Water should be made available to water short areas by transfers from other areas including transfers from one river basin to another, based on a national perspective, after taking into account the requirements of the areas/basins.

Recycling and re-use of water should be an integral part of water resource development.

Project Planning

Water resource development projects should be far as possible be planned and develop as multipurpose projects. Provision for drinking water should be a primary consideration. The projects should provide

for irrigation, flood mitigation, hydro-electric power generation, navigation, pisciculture and recreation wherever possible.

The study of the impact of a project during construction and later on human lives, settlement, occupations, economic and other aspects should be an essential component of project planning.

In the Planning implementation and operation of projects, the preservation of the quality of environment and the ecological balance should be a primary consideration. The adverse impact, if any, on the environment should be minimised and should be off-set by adequate compensatory measures.

There should be an integrated and multi-disciplinary approach to the planning, formulation, clearance and implementation of projects, including Catchment treatment and management, environmental and ecological aspects, the rehabilitation of effected people and command area development.

Special efforts should be made to investigate and formulate projects either in, or for the benefit of, area inhabited by tribal or other specially disadvantaged groups such as Scheduled Castes and Scheduled Tribes. In other areas also, project planning should pay special attention to the needs of Scheduled Castes and Scheduled Tribes and other weaker sections of society.

The planning of projects in hilly area should take into account the need to provide assured drinking water, possibilities of hydro power development and the proper approach to irrigation in such area, in the context of physical features and constraints such as steep slopes, rapid run-off and the incidence of soil erosion. The economic evaluation of projects in such areas should also take these factors into account.

Time and cost overruns and deficient realization of benefits characterising most irrigation projects should be obviated by an optimal allocation of resources, having regard to the early completion of on-going projects as well as the need to reduce regional imbalances.

Maintenance and modernisation

Structures and systems created through massive investments should be properly maintained in good health. Appropriate annual provisions should be made for this purpose in the budgets.

There should be a regular monitoring of structures and systems and necessary rehabilitation and modernisation programmes should be undertaken.

Safety of structures

There should be proper organisational arrangements at the national and state levels for ensuring the safety of storage dams and other water-related structures. The central guidelines on the subject should be kept under constant review and periodically updated and reformulated. There should be a system of continuous surveillance and regular visits by experts.

Ground water development

There should be a periodical reassessment on a scientific basis of the ground water potential, taking into consideration the quality of the water available and economic viability.

Exploitation of ground water resources should be so regulated as not to exceed the recharging possibilities, as also to ensure social equity. Ground water recharge projects should be developed and implemented for augmenting the available supplies.

Integrated and coordinated development of surface water and ground water and their conjunctive use, should be envisaged right from the project planning stage and should form an essential part of the project.

Over exploitation of ground water should be avoided near the coast prevent ingress of sea water into sweet water aquifers.

Water allocation Priorities

- In the planning and operation of systems, water allocation priorities should be broadly as follows :-
- Drinking water
- Irrigation
- Hydro-Power
- Navigation
- Industrial and other uses.

However, these priorities might be modified if necessary in particular regions with reference to area specific considerations

Drinking water

Adequate drinking water facilities should be provided to the entire population both in urban and in rural areas by 1991. Irrigation and multipurpose projects should invariably include a drinking water component. Wherever there is no alternative source of drinking water. Drinking water needs of human beings and animals should be the first charge on any available water.

Irrigation

Irrigation planning either in an individual project or in a basin as a whole should take into account the irrigability of land cost-effective irrigation options possible from all available sources of water and appropriate irrigation techniques. The irrigation intensity should be such as to extend the benefits of irrigation to as large a number of farm families as possible, keeping in view the need to maximize production.

There should be a close integration of water use and land use policies.

Water allocation in an irrigation system should be done with due regard to equity and social justice. Disparities in the availability of water between head-reach and tail-end farms and between large and small farms should be obviated by adoption of a rotational water distribution system and supply of water on a volumetric basis subject to certain ceilings.

Concerted efforts should be made to ensure that the irrigation potential created is fully utilised and the gap between the potential created and its utilization is removed. For this purpose, the command area development approach should be adopted in all irrigation projects.

Water rates

Water rates should be such as to convey the scarcity value or the resource to the users and to foster the motivation for economy in water-use. They should be adequate to cover the annual maintenance and operation charges and a part of the fixed costs. Efforts should be made to reach this ideal over a period, while ensuring the assured and timely supplies of irrigation water. The water rates for surface water and ground water should be rationalised with due regard to the interests of small and marginal farmers.

Participation of farmers and voluntary agencies

Efforts should be made to involve farmers progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water rates. Assistance of voluntary agencies should be enlisted in educating the farmers in efficient water use and water management

Water Quality

Both surface water and ground water should be regularly monitored for quality. A phased programme should be undertaken for improvements in water quality

Water zoning

Economic development and activities including agricultural, industrial and urban development, should be planned with due regard to the constraints imposed by the configuration of water availability. There should be water zoning of the country and the economic activities should be guided and regulated in accordance with such zoning.

Conservation of water

The efficiency of utilisation in all the diverse uses of water should be improved and an awareness of water as a scarce resource should be fostered. Conservation consciousness should be promoted through education. Regulation, incentives and disincentives.

Flood Control and Management

There should be a master plan for flood control and management for each flood prone basin. Sound watershed management through extensive soil conservation, catchment area treatment, preservation of check-dams should be promoted to reduce the intensity of floods Adequate flood-cushion should be provided in water storage projects wherever feasible to facilitate better flood management An extensive network for flood forecasting should be established for timely warning to the settlements in the flood plains, along with the regulation of settlements and economic activity in the flood plain zones, to minimise the loss of life and property on account of floods while physical flood protection works like embankments and dykes will continue to be necessary the emphasis should be on non-structural measures for the minimization of losses, such as flood forecasting and warning and flood plain zoning, so as to reduce the recurring expenditure on flood relief.

Land erosion by sea or river

The erosion of land, whether by the sea in coastal areas or by river waters inland, should be minimised by suitable cost-effective measures The States and Union territories should also undertake all requisite steps to ensure that indiscriminate occupation and exploitation of coastal strips of and are discouraged and that the location of economic activities in area adjacent to the sea is regulated

Drought Management

Drought prone area should be made less vulnerable to drought associated problems through soil moisture conservation measures, water harvesting practices, the minimisation of evaporation losses, the development of the ground water potential and the transfer of surface water from surplus areas where feasible and appropriate. Pastures, forestry, or other modes of development, which are relatively less water – demanding should be encouraged. In planning water resource development projects, the needs of drought-prone area should be given priority.

Relief works undertaken for providing employment to drought-stricken populations should preferably be for drought proofing.

Science and Technology

For effective and economical management of our water resources, the frontiers of knowledge need to be pushed forward in several directions by intensifying research efforts in various area, including the following:-

- Hydrometeorology
- Assessment of water resources;
- Snow and lake hydrology;
- Ground water hydrology and recharge;
- Prevention of salinity ingress;
- Water- harvesting;

- Evaporation and seepage losses;
- Economical designs for water resource projects;
- Crops and cropping systems;
- Sedimentation of reservoirs;
- The safety and longevity of water related structures;
- Rivermorphology and hydraulics;
- Soil and materials research;
- Better water management practices and improvements in operational technology
- Recycling and re-use;
- Use of sea water resources;

Training

A perspective plan for standardised training should be an integral part of water resources development.. it should cover training in information systems, sectoral planning, projects planning and formulation, project management , operation of projects and their physical structures and systems and the management of the water distribution systems. The training should extend to all the categories of personnel involved in these activities as also the farmers.

Conclusion

In view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and development activities of all kinds, and considering its increasing scarcity, the planning and management of this resource and its optimal, economical and equitable use has become a matter of the utmost urgency. The success of the national water policy will depend entirely on the development and maintenance of a national consensus and commitments to its underlying principles and objectives.

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