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Flow – River Rejuvenation in India

Impact of Tarun Bharat Sangh's work

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The views and interpretations expressed in this report are the authors' and do not necessarily reflect those of the Swedish International Development Cooperation Agency, Sida.

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Abbreviations

BCM	Billion Cubic Meters
CBO	Community Based Organisation
CPR	Common Property Resources
EC	Electric Conductivity
FDG	Focused Group Discussion
GCM	General Circulation Model
KII	Key Informants' Interview
M & E	Monitoring and Evaluation
MDG	Millennium Development Goal
MSEK	Million Swedish Krona (Swedish currency)
NCIWRD	National Commission for Integrated Water Resources Development
NGRBA	National Ganga River Basin Authority
NRM	Natural Resources Management
OBC	Other Backward Caste
PHC	Primary Health Centre
Rep	Recharge Potential
RJB	Rashtriya Jal Biradari
RWHS	Rain Water Harvesting Structure
SC	Scheduled Caste
SME	Small and Medium Enterprise
ST	Scheduled Tribe
TBS	Tarun Bharat Sangh
VC	Village Development Council
VET	Vocational and Educational Training

A Word by Documentation Team

India has been one of the largest recipients of Swedish Development cooperation starting already in 1953. The character of the cooperation has changed over the years. Environment, natural resource management and climate change have all been important parts. 2013 will be the last year of bilateral development cooperation between Sweden and India.

The history of partnership with Tarun Bharat Sangh (TBS) started in 1994 and will continue till 2013. The focus of the work is to enable local communities to develop self-reliance in integrated water resource management. The Embassy of Sweden contracted a three members' team to document the impact of the work carried out by TBS and make it available to all interested, nationally and globally.

The documentation team, comprising one team leader (Mr. Jitendra Sinha), one documentation expert (Mr. Umesh Rao Adapa) and one rural sociologist (Mr. Manoj Kumar Sinha) started their assignment with a review. Secondary information was reviewed from the project reports, proposals, progress reports and other related documents available at the Embassy and TBS. The team undertook a field study during January-February, 2013. Briefing meeting with the TBS Chairperson, Executive Director and core team members was conducted. Visits to 15 selected villages were made to collect primary information from the local communities. Interviews with key stakeholders including research institutions, concerned persons from Embassy of Sweden, related NGOs and TBS Executive Committee were conducted. Consequently, data collection, synthesis and analysis were completed to prepare the impact assessment study report. The team included findings of Dr. G.D. Agarwal, Dr. Claire Jean Glendenning and Dr. M. S. Rathod who had conducted scientific study of the TBS project area earlier and validated their findings during the team visit.

The team interacted with various stakeholders during course of their visit, and will remain indebted for their valuable inputs, insights and support. In particular we would like to acknowledge excellent hospitality and support from villagers in Kraska, Bhaonta, Koylala, Hamirpur, and many other villages. TBS team members namely: Mr. Maulik Sisodia, Mr. Abhinav Agrawal, Mr. Kanhaiyalal, Mr. Gopal Singh, Mr. Suresh Raikwar, Vaidhji were like our extended family. We also wish to thank Dr. Claire Jean Glendenning for granting her permission to reproduce texts from her Ph.D. thesis.

We would like to express our heartfelt thank to Embassy of Sweden for providing us with such an excellent opportunity to document TBS impact and at the same time learn from its chairperson Mr. Rajendra Singh *aka* Waterman of India. Special thanks to Ms. Åsa Heijne and Mr. Ravi Shankar Behera for their outstanding support and facilitation. We tried our best to meet the expectation of TBS and Embassy of Sweden in documenting this mammoth quantum of work and its impact. The views expressed in the report are those of the documentation team and do not necessarily reflect those of the Embassy of

Sweden or Tarun Bharat Sangh. Though we tried to eliminate all errors, we take responsibility for any, if committed.

Jitendra Kumar Sinha
Umesh Rao Adapa
Manoj Kumar Sinha

30th August, 2013

1 Prologue

Conflict on Fishing Rights in the drought stricken state of Rajasthan seems to be a flight into the realms of imagination, but this is true and it happened at Hamirpur village in Aravali region in 1996. The Aravali region was known for its dead rivers and rivulets and was plagued by constantly recurring droughts with scanty and erratic rainfall. One would naturally wonder as to how fish were found in large quantities for a private contractor to think of economically exploiting the situation by paying considerable amount of money to the Department of Fisheries, Government of Rajasthan to obtain fishing rights. The villagers were up in arms to stop this venture stating that as a community that had played a flagship role in conserving rainwater and slowly bringing back the dead rivulets to life. Therefore, they had the rights over the water and its inherent resources. This was a very strong motivating factor that spurred the urge to delve into the depth of these rare and incredible phenomena.

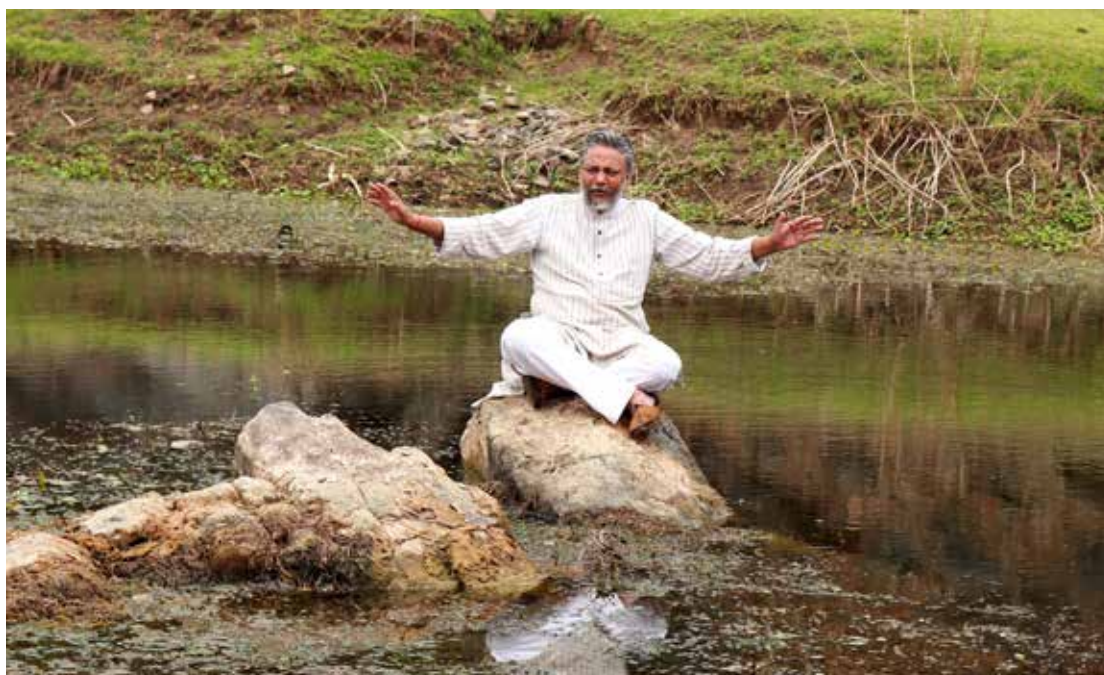
Mr. Rudhamal Meena, a village elder of about 60 *summers* in the village of Hamirpur, shared several interesting facts. One that Prince Charles of the United Kingdom (U.K.) had paid a visit to this remote village on 3rd November 2003 to see for himself the Community-driven work and their struggles/fights for rights over their natural resources. Further, on the upstream of this rivulet a Village Development Committee (informal *Gram Sabha*) of Bhaonta-Koylala was awarded the Presidential Award on the 28th March 2000 for their iconic efforts at conserving *Jal, Jamin and Jungle* (water, land and forests). These were indeed incredible achievements of these villagers who garnered national and international recognition.

BOX 1: FISHING TRAUMA

Tarun Bharat Sangh (TBS), together with the people of the villages around Arvari River in Alwar district, Rajasthan, has launched '**Jalchar Bachao Andolan**' (Save the Aquatic Life Organisms Campaign) in protest against the government move to give contract to private parties to fish in the river.

On November 21 **last year** (1996), when Latif Khan, a private contractor, got the contract to fish in the river near Hamirpur village, people opposed and prevented him. When he insisted, the children, women and men gathered to protest, seeing which Khan had to leave the place. The event was repeated the next day when Khan reached Samara village. The villagers tried to explain that it was by their own efforts that they had been successful in preventing the river from becoming dry. The native people over the last 11 years had built some 161 dams over the river. Other villages of the area like Bhaunta, Bhuriavas, Lalpura, Plasana, Savatsar, Khadata, Khatala, Dumolim Chausala, Nagel, Chava ka vaas and Jaganathpura have also put in efforts to bring back water into the otherwise dry river. The locals appealed to the State Fisheries Department that the contracts should be given for fishing in the river only after consulting or informing them. When the contractor complained to the Fisheries Department, the department wrote to TBS that if any obstacle is created in allowing the contractor to fish in the river, necessary legal action will be taken against them. The police too threatened to arrest the villagers in case of any opposition by them.

Source: Down to Earth Magazine, by Centre for Science and Environment, New Delhi, Issue date 31/1/1997 at <http://www.downtoearth.org.in/node/23068>



Mr. Rajendra Singh, also called "Waterman of India".

On probing deeper and in the course of documentation team's discussions with Mr. Rudhamal and Mr. Dhannaram Gurjar of Koylala village, it was learnt that these water conservation works were initiated by the voluntary Social service organisation, "**Tarun Bharat Sangh**" (TBS) under the leadership of Mr. Rajendra Singh who mentored the dedicated project implementing staff and inspired the community to take up Rain Water Harvesting Structures (RWHS) without expecting the Government to assist them. This herculean task came to fruition with the concerted efforts of the TBS and the community.

TBS efforts for conservation of water which resulted in the revival of the flow of the rivulets had a very unpretentious beginning at a village named Gopalpura. Way back on 25th November, 1984 a small team of one young man who was a qualified *Ayurvedic* Doctor and three like-minded friends landed up at Kishori village in Alwar district, Rajasthan which was the last stop of the bus that they were travelling in. These people had started their journey with the commitment to devote themselves in rural development work. They had a very cold reception as the villagers were suspicious of their antecedents and their motive in coming to this remote village. This was because at that time (1984, November) militancy in Northern India was rampant. They had to spend night in a small temple. Later some village elders took pity on these travellers and provided them accommodation in nearby Bhikampura village. Mr. Rajendra Singh together with his friends planned to teach the children of adjoining Gopalpura village but found that the children were too busy helping their mothers in fetching water and other chores to find time to attend to school. With a lot of free time on his hands Mr. Singh befriended a village elder Mangubaba, who saw the dedication writ on the face of this young man, had many a discussion between them about what needed to be done in the village to attract children to the school.

Mr. Rajendra Singh was harping on education to children opening new horizons to them. However, Mangubaba was sceptical and shared a pearl from his wisdom saying that, *"If water is provided all other things will inevitably follow; other things are available in the market but not*

the water". This touched a chord in Mr. Singh's heart and his objectives became clearer to him. Under the guidance of Mangubaba, he discussed about the flow of runoff rain water in the village and a location was decided upon. Mr. Singh followed Mangubaba advice to construct a *Johad* – a small earthen RWHS. It was a daunting task because none of the inhabitants, who were left behind (older people, women and children), had either the time or the inclination to help excavating soil for the construction. Mr. Singh was not a man to give up. He worked alone from morning to evening for almost 2 years before the *Johad* was completed. Fortune favoured him as there were good rains in the very next season. Eventually, water was harvested to the brim in the *Johad* and the news spread like wildfire to all the villagers in the vicinity and further away who had ties/relationships with this village.

An impromptu celebration took place which was attended by relatives from 50 different villages. After much procrastination it was finally decided that they would whole heartedly support Mr. Singh in his efforts to spread this work to their villages. Before long it became a community driven movement under the leadership of Mr. Rajendra Singh and the rest is history. He is called as the, "**Waterman of India**".

Coming back to the conflict on fishing rights, the police and officials from Department of Fisheries threatened the villagers that they will be put them in prison if the villagers do not allow the contractor to catch the fish, but the villagers did not budge. They started guarding the river and filed petition in the Court. Ultimately, after the expiry of one year fishing contract got automatically cancelled on 31st March, 1997. The villagers also formed first 'river parliament' of the country known as '*Arvari Sansad*' which is represented by one member from each of 70 villages, situated on riverside.

2 Executive Summary

TARUN BHARAT SANGH (TBS) came into existence as a voluntary organisation in the year 1974 to provide relief and succour to the victims of a devastating fire in the campus of the University of Jaipur. Later, it started working on disaster mitigation in rural areas of Rajasthan. Since 1985, TBS focused mainly on water conservation through small Rain Water Harvesting Structures (RWHS) and continued functioning as a voluntary organisation.

Embassy of Sweden has been supporting TBS since 1994 in its efforts in water conservation and water management in different parts of Rajasthan. It will be withdrawing its development cooperation support from India by the end of 2013. In view of this, it was envisaged to conduct an Impact Study of the work carried out by TBS over the years.

The main objectives of the impact study were: to document major impacts of the project in promoting integrated natural resource conservation and management in the project area and impacting the lives of poor people ; to capture project and organizational best practices, challenges & gaps in implementation, major lessons learned and way forward for TBS including organizational sustainability aspects; and to disseminate impact of its work through publication and dissemination among “wider circles” including references communities.

The study covered social, economic, environmental and cultural impact indicators. The methodology followed participatory approach including: review of documents available with the Embassy of Sweden, TBS and other relevant sources; focused group discussions



TBS and community with green results.

and interviews with key project staff and local communities; field visits to selected 15 villages; collection and analysis of primary data and analyses through a rights-based and gender perspective; and workshops with key stakeholders including Government authorities.

The key impacts included:

- Increase in the base flow in the streams of rivulets, increased water levels by 5–15 feet in the open wells, improved discharge from the tube wells.
- Sustained increase in the yields upto 50 % with additional area brought under cultivation and double cropping with assured protective irrigation.
- Increased and more intensive animal husbandry livestock patterns
- More income generated from the sale of increased produce from both agriculture and animal husbandry.
- Increased employment for both unskilled and skilled labour through engagement in agriculture work, etc.
- Better food security and improved nutrition and health and well being of communities especially women and children
- Reduced drudgery for the women and children for gathering drinking water, more time available for productive work in family
- Increased attendance in schools and higher education for both boys and girls. Increase in 30–50 % of school going children in general, and more particular of girl children
- Significant change in attitude towards girl child and marriage issues such as dowry etc., average marriageable age in the area has also increased from 18 years to 22–24 years
- Investments on housing, agricultural machinery and personal transport increased substantially
- Increased fauna both aquatic and terrestrial from remote sensing data over the years
- Reduced distress migration



The study found that concerted efforts of TBS and the community over two and a half decades has significantly improved living conditions of local community in addition to taking a big step to restore ecological balance and revive traditional knowledge systems and practices in the regeneration and management of natural resources. There is a marked awareness on community's rights and responsibilities.

As the foundation has been laid, TBS may popularise *the optimal management in the utilisation of available water through Community owned and managed Natural resource management systems and practices* in following ways:

- Awareness and sensitisation of local communities towards local food processing and direct marketing to suit the customer needs and minimise supply chain;
- Replication of TBS model through short term training courses on: promoting indigenous knowledge systems, community based decentralized management of resources, community-managed NRM, exchange of services of trained field functionaries on short duration basis;
- Strengthen social activism through policy advocacy, creating awareness and instilling the sense of rights and responsibilities of the members of the community in utilising



A woman livestock keeper. TBS work also improves women's socio-economic situation.

and managing natural resources and other stakeholders including Government and civil society actors;

- Establishing mechanisms for vocational guidance and honing youth's abilities to become entrepreneurs, so that energy of educated youth can be better channelized.

BOX 2: LIST OF PROMINENT AWARDS TO TBS AND RAJENDRA SINGH

S. No.	Name of Award	Year	Organisation	Presenter
1	Sanskrit Award	1990	Sanskrit Prathisthan	Mrs. Maneka Gandhi (Then Minister of Environment and Forests, Govt. Of India)
2	Rotary India Award	1994	Rotary International	Mr. K. R. Narayanan (The Then Hon' President of Republic of India)
3	Indira Gandhi Paryavaran Puraskar	1994	Government Of India	Mr. T. R. Balu (The Then Minister of Environment & Forests, Govt. of India)
4	Man of the Year	1998	The week Magazine	
5	Tiger Conservation Award	1999	Tiger Trust India, New Delhi	Mr. Ashok Gehlot (Then Hon' Chief Minister of the state of Rajasthan)
6	Ramon Magsaysay Award	2001	Ramon Magsaysay Foundation	Then Hon' President of Philippines
7	International Thiess River Prize	2004	International Rivers Foundation	
8	Jamana Lal Bajaj Award	2005	Jamana Lal Bajaj Foundation	Nobel Laureates Amartya Sen
9	Rotary Peace Through Service Award	2012	Rotary Club of Pune	
10	Special Award	2012	The South Indian Education Society	Hon' Governor of the state of Maharashtra

3 Introduction

TBS has been working with communities to develop self-reliance in water management and natural resource development for over 27 years. It has built more than 8000 RWHS by supporting the local people in community based decentralized water resources management. A geographical area of 8,600 sq.kms comprising more than 1000 villages has been turned into «white zone» from «Dark zone» over the years. TBS won several awards over the years for this work. One of the villages 'Bhaonta' received an award from the President of India in 2000. Though TBS worked in different geographical regions, including Alwar, Jaipur, Jodhpur, Jaisalmer, Karauli, Pali, Sawai Madhopur, and Tonk, it has consolidated its work in Alwar, Karauli, and Sawai Madhopur districts of late.

Embassy of Sweden has been collaborating with TBS since 1994. As part of its responsible exit strategy, it is working with TBS to harness opportunities to continue its work and in the process generate additional funding to ensure organisational sustainability. Embassy of Sweden engaged a three members' team comprising Mr. Jitendra Sinha, Mr. Umesh Rao Adapa and Mr. Manoj Kumar Sinha to document impact of the work carried out by TBS since the Embassy of Sweden's involvement.

The objectives of this study were:

- i) Document major outputs, outcomes, results and impacts of the project in promoting integrated natural resource conservation and management in the project area and impacting the lives of poor people;



Bumper crop of oilseed in Bhaonta Kolyala.

- ii) Document project and organizational best practices, gaps in implementation, how challenges in implementation were handled, major lessons learned and way forward for TBS including organizational sustainability aspects;
- iii) Document and disseminate outcomes/results/impact of the policy influencing work through publication and wider dissemination among “wider circles” including reference communities

The assessment and documentation followed participatory approach that involved all concerned stakeholders. The secondary reviews of documents were conducted during January, 2013 while the field visits and interviews were completed in January-February, 2013. The synthesis and document preparation stage spread over March and April, 2013 with the publication of final document in May, 2013.

4 Background

India is the seventh-largest country by area, the second-most populous country, and the most populous democracy in the world. It is a federation composed of 28 states and 7 union territories. All states have elected legislatures and governments. Each state or union territory is further divided into administrative districts. The districts in turn are further divided into *tehsils*¹ and ultimately into villages.

Indian climate is strongly influenced by the Himalayas and the **Thar Desert** which plays a crucial role in attracting moisture-laden south-west summer monsoon winds that provide the majority of India's rainfall.

Rajasthan is one of the 28th states of India, largest in terms of size and classified as arid/semi-arid region. It is situated in the western part of India, which faces severe water scarcity and poor rainfall. On the basis of climatic conditions and agricultural practices, Rajasthan has been divided into 10 agro-climatic zones ranging from arid western to flood prone eastern. The forest cover of the state contributes to 4.19 % to the national forest cover. As much as 62,94,000 hectares of land is irrigated in the state, which is 10.45 % of the net irrigated area of India and 38 % of net sown area of the state of Rajasthan². Administratively, the state comprises of 33 districts, 39,753 inhabited villages and 9168 *Gram Panchayats*³.



Rajasthan, India.

¹ A *tehsil* consists of an area of land with a city or town that serves as its headquarters, with usually a number of villages. As an entity of local government, the **tehsil office** exercises certain fiscal and administrative power over the villages and municipalities within its jurisdiction.

² <http://mohfw.nic.in/NRHM/State%20Files/raj.htm>

³ Gram panchayats are local self-governments at the village level in India, and the Sarpanch is in-charge of it.

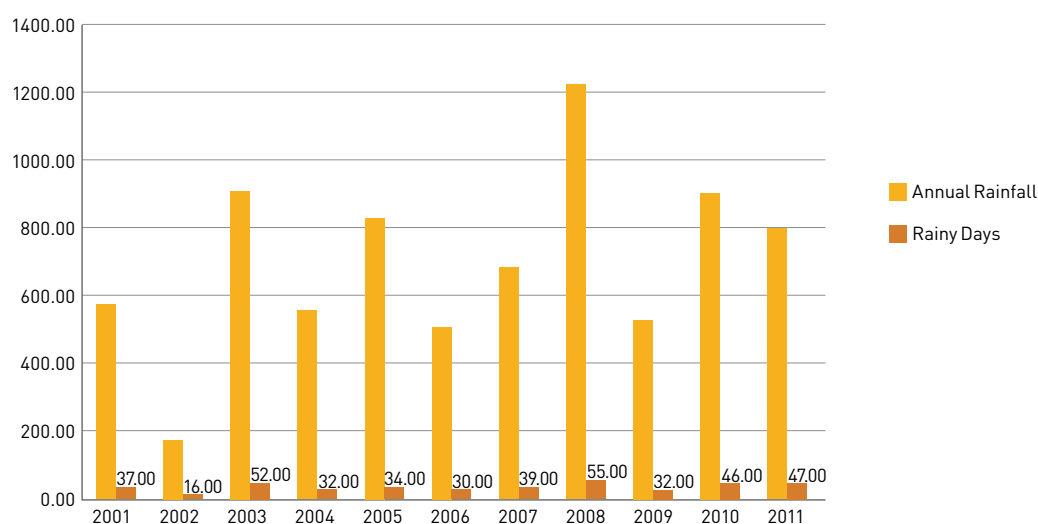
The total population of the state is about 68.6 million, which is 5.6 per cent of India's total population (Census, 2011). The state has a growth rate of about 21 % percent which is the 11th highest growth rate in the country. Sex Ratio in Rajasthan is 926 females, which is below national average of 940 as per census 2011. Most of the population lives in the rural areas and is highly dependent on agriculture and livestock rearing for their livelihood.

There have been 48 drought years of varied intensity in Rajasthan for the period 1901–2002, which means that the chance of occurrence of a meteorological drought in the state is 47 %⁴. The state has the maximum probability of occurrence of droughts in India⁵ (RPCB, 2010).

Alwar district is situated in the north-east of Rajasthan between 27°4' and 28°4' north Latitudes and 76°7' and 77°13' east Longitude. In 2011, Alwar had a population of 3.6 million of which male and female were 1.93 million and 1.73 million respectively. Average literacy rate of Alwar in 2011 were 71.68 compared to 61.74 of 2001. Male and female literacy were 85.08 and 56.78 respectively.

Alwar has an important place in Agriculture production in Rajasthan. Total geographical area of the district is 783,281 hectares which is about 2.5 percent of the State. In the year 2010–2011 the net cultivated area is 507,171 hectares which form about 83 per cent area. The annual average rainfall for the district is 657.3 mm. The pattern for last 10 years is given below. The rainfall distribution in the district is uneven and scattered.

Annual Rainfall and Rainy Days in Thanagazi Block, Alwar



Source: http://waterresources.rajasthan.gov.in/Daily_Rainfall_Data/Rainfall_Index.htm

⁴ Rathore M S (2004), *State level analysis of drought policies and impacts in Rajasthan, India*. Working paper 93, Drought series paper no. 6, International Water Management Institute

⁵ Rajasthan Pollution Control Board, 2010



Migratory birds in one of the RWHSs developed by TBS.

5 Water Context

Water is life, in all forms and shapes. In the past 100 years the world population tripled, but water use for human purposes multiplied by six fold. By 2025 an estimated 4 billion people, or more than half the world population, will live in countries where more than 40 % of renewable resources are withdrawn for human uses⁶.

Dr. Malin Falkenmark of the Stockholm International Water Institute and Dr. Johan Rockström of the Stockholm Environment Institute have pointed out that visible ‘blue water’ (please see box) flow represents only around one third of the total precipitation over the earth’s landmass. The rest is green water – the invisible water cycling through soils and vegetation and, in the form of vapour, the atmosphere⁷. As per their estimate the expansion of ‘blue water’ can only account for around a sixth of needed water. The rest of water must come from ‘green water’ – that is, from increasing productivity of rain-fed farming.

India with 2.4 % of the world’s total area and 16 % of the world’s population has only 4 % of the total available fresh water⁸. The Central Water and Power Commission⁹, New Delhi, India has estimated that of the total annual precipitation amounting to 800,000 million cubic meters seeps into the ground, about 1,700,000 million cubic meters flows into the rivers and the remaining amount of about 1,200,000 million cubic meters evaporates back into the atmosphere.

BOX 3: WATER – RENEWABLE AND USABLE

1. **Green water** – the rainfall that is stored in the soil and evaporates from it – is the main source of water for natural ecosystems and for rainfed agriculture, which produces 60% of the world’s food.
2. **Blue water** – renewable surface water runoff and groundwater recharge – is the main source for human withdrawals and the traditional focus of water resource management.

The blue water totals to about 40,000 cubic kilometres a year. Of this, an estimated 3,800 cubic kilometres, roughly 10%, were withdrawn (diverted or pumped) for human uses in 1995.

Of the water withdrawn, more than 2,000 cubic kilometres are consumed. The remainder is returned, usually with significant reductions in quality.

Source: World Water Vision, Earthscan Publication Limited, London, UK, 2000. pp. 20

⁶ ‘World Water Vision’, Earthscan Publication Limited, London, UK, 2000. pp. 21

⁷ “Spreading the Water Wealth: Making Water Infrastructure Work for the Poor,” IRN Dams, Rivers and People Report 2006, International Rivers Network, Berkeley, CA. USA, pp. 4

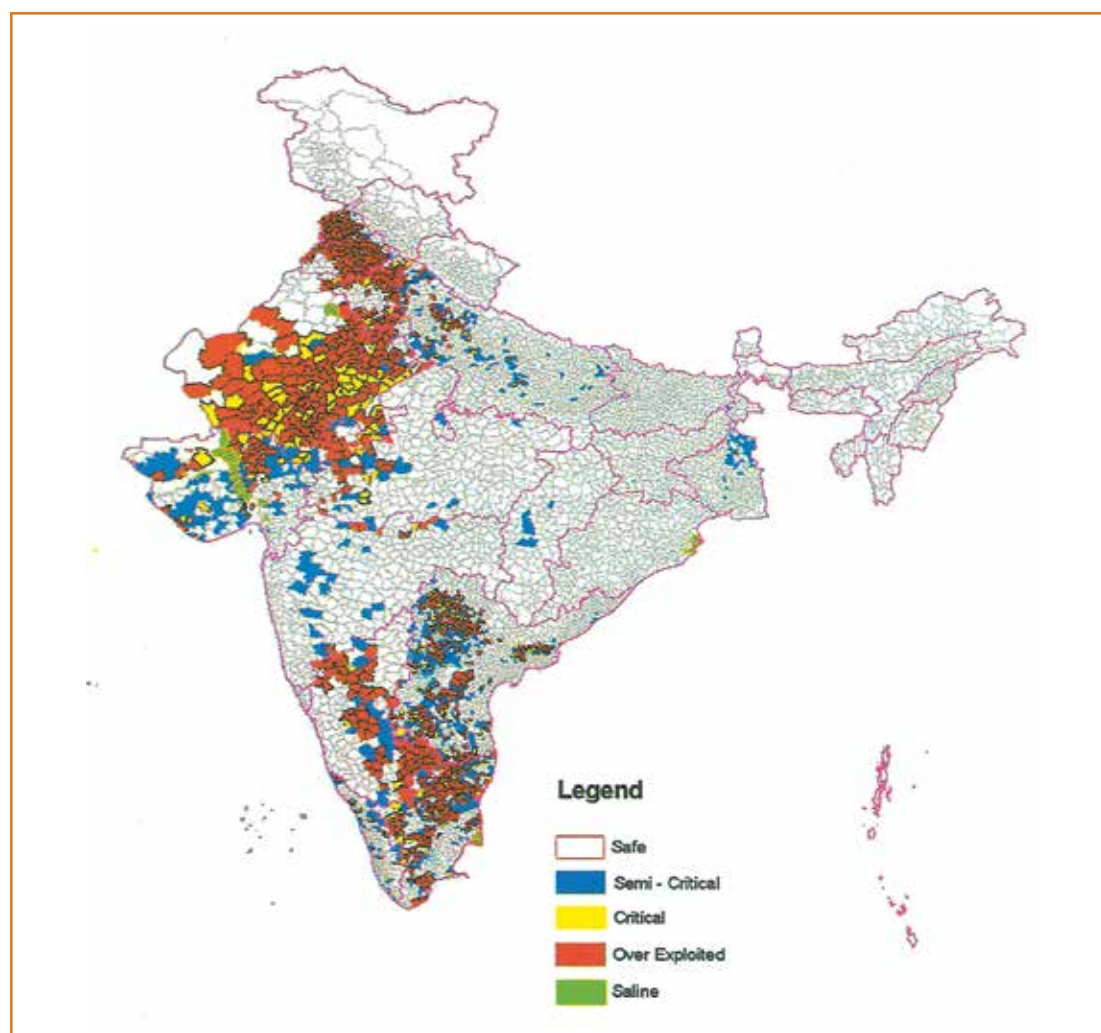
⁸ ‘Report of Steering Committee on Water Resources for 11th Five Year Plan, Planning Commission, Government of India, 2007, pp. 3

⁹ ‘Reassessment of Water Resources Potential of India’, Central Water Commission, Government of India, 1999

Of the annual surface flow of 1,700,000 million cubic meters, only 39 % can be utilized for the purpose of irrigation owing to the physiographical limitations. Of the 800,000 million cubic meters of rain-water that seeps into the ground annually, about 53 % is absorbed by the surface layers of the earth's crust and, thus, can be utilized directly by the vegetation. The remaining 47 % percolates deep into the porous strata of the earth's crust, representing the gross annual enrichment of the underground water.

The “*National Commission for Integrated Water Resources Development (NCIWRD)*” has assessed that about 83 % of water is used for irrigation and remaining for domestic, industrial and other purposes. The demand for water for various purposes is increasing due to various reasons, including population growth, urbanization and industrialization. About 15 % of the Blocks / *Talukas* / *Mandals* in the country are presently in the category of over-exploited blocks, as highlighted in following map.

Categorization of Blocks / Mandals / Talukas as on March, 2004



Source: Report of Steering Committee on Water Resources for 11th Five Year Plan, Planning Commission, Government of India, 2007, pp. 5

Like all other countries, water is central to two very serious challenges in India, namely food security and impact of climate change. The threat of climate change is now considered an established fact¹⁰. General Circulation Models (GCM) simulate the behavior of the atmosphere and paint “what if” scenarios for various levels of Green House Gases emissions. Using these models the weather experts have predicted that global warming will intensify the hydrologic cycle; more intense rainfall will occur in fewer spells; floods and droughts both will become more intense; the floods will be more frequent; the rainfall will shift towards winter; and there may be a significant reduction in the mass of glaciers, resulting in increased flows in the initial few decades but substantially reduced flows thereafter. An increase in mean temperatures would increase the energy flux for evapo-transpiration. The increased potential evapo-transpiration in the forests could trigger major changes in the environment, and in the farms it would result in an increased crop water requirement. The changes in seasonal temperatures could change the crop seasons. Enough data is now available to paint “what if” scenarios for different possibilities, and to formulate some tentative plans to respond to these possibilities¹¹.



Clinching the thirst. TBS efforts not only helped in water for irrigation but also for drinking.

¹⁰ Background Notes for Consultation Meeting with Policy Makers on Review of National Water Policy’, Ministry of Water Resources, Government of India, 2011, pp. 5

¹¹ Report of Steering Committee on Water Resources for 11th Five Year Plan, Planning Commission, Government of India, 2007, pp. 5–6

6 Relevance of Water Context for Impact Study

Dr. Patrick McCully, Executive Director of International Rivers Network mentioned that *“...there is no chance of reaching the Millennium Development Goal (MDG) of halving the number of people in extreme poverty without a major redirecting of water infrastructure investments away from centralized mega-projects and towards low-cost, decentralized and community based schemes. ...While most agricultural investments in developing countries have gone into major irrigation projects; 60–70 % of the world’s food is still produced from the 80 % of crop lands that is rain-fed”*¹².

The majority of lands are owned by small-marginal farmers who rely on rain-fed farming, and need methods to trap rain when it falls on their farms, to recharge and pump groundwater when it is needed. The water harvesting by RWHS provide crucial supplementary irrigation during dry periods. In most cases, the main purpose of RWHS is not to make water available in ponds or storage tanks, but to allow water to percolate down into the ground. Groundwater does not evaporate, is well protected from biological contamination, is geographically dispersed, and can be accessed whenever needed.

Dr. McCully’s suggestions are very relevant to the scenario in Rajasthan. Though major Irrigation projects brought many hectares of land under irrigation, they have also brought in many concomitant problems such as loss of green cover, displacement of population and wild life, salinity/alkalinity, huge losses through evaporation etc. In situ moisture conservation in such lands addresses a burning need to make these lands more productive. Further, recharging of underground water counter-acts the losses due to evaporation both from surface storage and during channel irrigation. Ground water could thus be tapped to overcome moisture stress during periods of lean precipitation and during critical periods of crop growth.

Keeping these issues in mind TBS projects focused on water conservation mainly through RWHS which are cost effective. The multiple impacts could be examined not only on change in water availability, increased ground water table and revival of flow of the rivulets but also intended and un-intended changes in food security, climate change adaptation, social and economic status of the population it worked with. The basic prerequisite of this approach is the voluntary participation of the communities populating these areas.

¹² Spreading the Water Wealth: Making Water Infrastructure Work for the Poor,” IRN Dams, Rivers and People Report 2006, International Rivers Network, Berkeley, CA. USA, pp. 4



Water body during summer time.

7 Study Limitations

- The water conservation works were carried over a span of 27 years and earlier record of works were mainly on hard copy. Some of the records were either misplaced/lost during transit or shifting of the office. This became a limitation in the review and selection of some works carried out in the earlier period of operations of TBS.
- The works were carried out in more than 1000 villages and more than 8000 RWHS executed were spread over a vast geographical area. The distance for commuting could be time consuming with the logistics costs being prohibitively expensive to visit all the villages or a bigger sample size. As the time frame allocated was short for the study, this acted as a limitation in the selection of a larger and extensive sample size. Hence, 15 villages falling under three geographically and topographically distinctly different areas were selected. The time for the field visits and interaction with the farmers/beneficiaries was limited to only 25 days. This being so it placed a limitation on the selection of samples. Hence to cater to the needs of heterogeneity the samples were taken over three time zones i.e.
 - a) The early years,
 - b) The mid years and
 - c) the most recent years.

Further, three distinctly different areas were selected i.e.

- a) the hilly and heavily undulating topography in the plateaus on the hills, the foot hills and the beginning of the plains.
 - b) The *Daang* area with lesser slopes and with totally different soil and vegetation and
 - c) The Mewath area of Tijara having flat lands with very light soils and susceptible to sheet erosion.
- Lack of baseline data and chronological documentation hampered the study as the team could not take up any scientific quantitative analysis to actually quantify the amount of soil erosion prevented, rise in the water table or the increase in the time of flow in the rivulets. The team had to rely mainly on secondary information and on qualitative analysis based on the information gathered during interaction with the farmers/beneficiaries.
 - The same was true in the case of yields of crops in the area of work as there was no baseline data on the yields of the various crops grown prior to the taking up of water conservation works. The team had to depend on the information gathered from the farmers during interaction with the team members.
 - Scientific instruments or surveys could not be used for the study owing to the culmination of the limitations enumerated above.
 - The prevailing social customs did not allow sufficient interaction with the women folk and as such the study of the impacts may be skewed more towards the male opinions.



A woman farmer guarding her crop.



Happy villagers in water body.

8 Study Methodology

The documentation followed participatory approach that involves concerned stakeholders. The methodology includes the following:

- Secondary documentation review available with the Embassy of Sweden, TBS and other relevant sources;
- Focused Group Discussion (FGDs) and interviews with key project staff and local communities;
- Primary field visits to 15 villages to collect primary data through participatory methods and through a rights-based and gender perspective
- Workshops with key stakeholders.

For the purpose of this study, primary and secondary information was accessed through various sources. The field study was carried out over a period of one month of which approx three weeks were spent on collection of primary data, interaction with local communities, and understanding the grassroots scenario.

The participatory methods include a combination of tools, listed below:

8.1 IN-DEPTH INDIVIDUAL INTERVIEWS

Semi-structured interviews using a flexible interview guide were conducted with randomly selected 60 households to assess level of income and livelihoods improvement taking into account the support provided by TBS. The team also physically verified the assets/structure created through project support in the area.



Documentation team leader interviewing a community leader.

8.2 KEY INFORMANT INTERVIEWS

It was conducted with 10 concerned stakeholders who were interviewed on key aspects of the project components, approach and insights gathered through the interventions. Challenges faced were captured for future learning. The major focus was on the level of sustainability of achievements and on impact of the project interventions.



Documentation team interviewing Mr. Rajendra Singh and Mr. Maulik Sisodia, TBS functionaries.

8.3 FOCUSED GROUP DISCUSSION

This tool was used with 15 community based organizations (CBOs) formed under the project. In particular, information on sustainable livelihoods promotion, water conservation, environment protection and climate change adaptation were collected.



Conducting interview with villager.

8.4 HISTORICAL TIMELINE ANALYSIS

This tool was used to learn and highlight processes followed with target communities in 15 villages. This tool also helped in capturing the change in people's life and impact of Embassy of Sweden-TBS work on the environment.



Participatory assessment exercise in Gadh Basai village.

8.5 PARTICIPATORY SHARING WORKSHOP

This workshop was conducted with TBS staff to share their experience on TBS work in the community as well as to gather evidences towards those impacts.

8.6 ACTIVE OBSERVATION

While carrying out impact assessment study, the team recorded observations by taking descriptive notes.

The documentation process involved assessment of tangible, semi-tangible and in-tangible intended and unintended consequences, both positive and negative of project interventions. The following parameters were adopted for the villages' selection.

- Villages with Embassy of Sweden supported project interventions
- Different phases of TBS involvement (1985–95; 1996–2005; 2006 till present)
- Social, cultural, economic and geographical diversity
- Upstream and downstream villages in river basin areas



Rural youth returning back to village and taking care of land and animals.

Table 1: List of Selected Villages

S. NO.	NAME OF VILLAGES	S. NO.	NAME OF VILLAGES
Arvari River Basis		Bhagani-Tildeh River Basin	
1	Bhanwta-Kolyala	9	Mandalwas
2	Hamirpur	10	Rajour
Sarsa River Basin		Jahajwali River Basin	
3	Gopalpura	11	Devari
4	Lilya-Gharoda	12	Losal Gujraan
Saabi River Basin		Maheswara River Basin (Karauli)	
5	Gadh-basai	13	Khijoura
6	Buja	14	Raibeli
7	Nyaana (Tijara)	15	Bandhan ka Pura
Ruparel River Basin			
8	Kraska		

9 Impact Indicators

Following impact indicators were identified and covered in the study:

9.1 SOCIAL

- Women's emancipation from drudgery; changing roles;
- Rights and responsibilities;
- Empowerment & ownership;
- Control and management of community property resources (CPR);
- Leadership;
- Self- Governance;
- Initiation of social movements;
- Education & vocational guidance;
- Health and wellbeing

9.2 ECONOMIC

- Change in productivity/income/ well being;
- Change in saving pattern;
- Investment in household/land/ education/medical;
- Change in food and nutrition;
- Change in migration pattern

9.3 CULTURAL

- Change in the customs, norms and values;
- Change in aspiration;
- Change in Relationship

9.4 ENVIRONMENTAL

- Flora and Fauna;
- Climate Change Adaptation;
- Disaster Mitigation (drought/flood)
- Revival of traditional knowledge on ecological/environmental management

Annexure 1 highlights key changes observed in the villages regarding above impact indicators.



A happy and satisfied villager. TBS brought smiles to many such faces.

10 Study Findings

10.1 IMPACT ON GROUNDWATER RECHARGE

During her research work for Ph.D. thesis Ms. (Dr.) Claire Jean Glendenning¹³ observed following recharge efficiency in four RWHS of the TBS field in Arvari River.

Table 2: Recharge efficiency of RWH structures in 2007 and 2008

RWH STRUCTURE	RECHARGE EFFICIENCY %	
	2007	2008
Sankara Bandh	6.0	8.2
Beruji Bandh	16.4	14.1
Jhiri Johad	2.1	1.3
Lalpura Johad	3.4	4.1

She observed that the larger structures, the *Bandhs*, could store more water than the *Johads* and thus recharge potential increased. However, she also pointed out that the larger is the structure, the more is the evaporation loss. In her study area, the most efficient RWHS was Beruji *Bandh*. More of the water stored in this structure became potential recharge than in any other structure, which could be because it had the shortest storage time and therefore less evaporative losses.



Increased water levels are observed in wells.

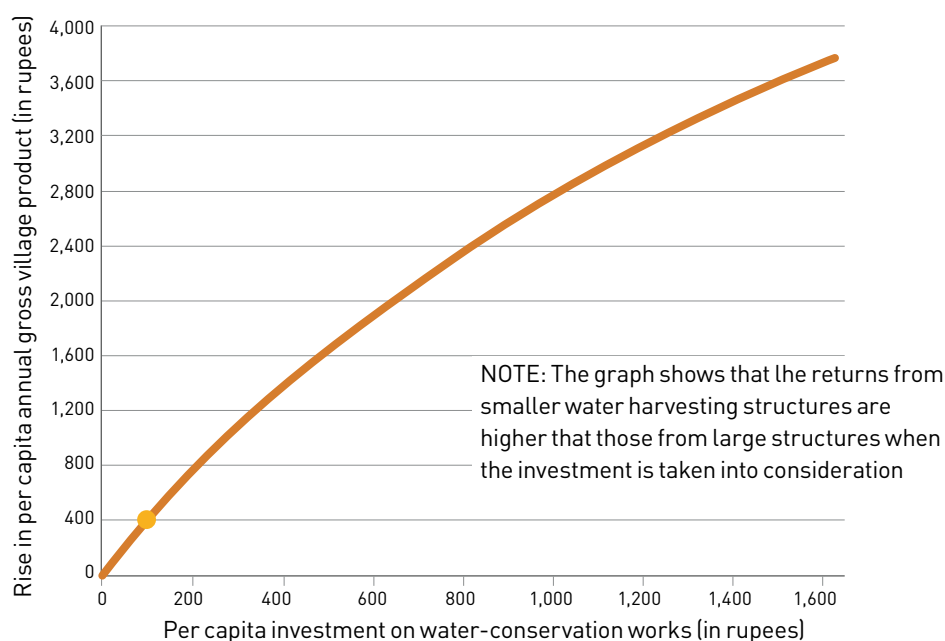
¹³ Glendenning , Claire Jean (2009), “Evaluating Impacts of Rainwater Harvesting (RWH) in a Case Study Catchment: The Arvari River, Rajasthan, India: *A thesis submitted in fulfilment of the requirements of the degree of Doctor of Philosophy*”, Faculty of Agriculture, Food and Natural Resources, The University of Sydney

In all RWHS the higher than average rainfall in 2008 increased the total volume of potential recharge and average daily recharge potential depth. But recharge efficiency was similar between years and structures, which suggest that the **efficiency of RWHS is a function of location, size and shape rather than amount of rainfall received**. This also limits the maximum daily recharge depth of the structure, which would also be related to the saturated hydraulic conductivity of the underlying stratum. Nevertheless high rainfall years influence the amount of runoff and therefore the volume of potential recharge¹⁴ from a RWHS.

Water levels in all monitored wells increased during the monsoon seasons in 2007 and 2008. The rate of increase was different for each well, which could be due to a range of factors including: aquifer properties, number of RWHS nearby, and the amount and intensity of rainfall in the local area. The average daily potential recharge was much greater than average daily actual recharge for wells close to the structures.

Based on the field textures and using the soil texture triangle, field capacity, available water and saturated hydraulic conductivity of the soil, it was found that approximately 30 % of potential recharge is held in the soil, and about 13–32 % is actual recharge. Approximately 30–50 % of the difference could be lateral flow, as groundwater moving down the catchment.

Prof. G.D. Agrawal¹⁵ in his assessment study highlighted that correlation between the depth of ground water table as it existed before the water conservation efforts was taken up in the village and situation after the work through Spearman's Rank-order Coefficient (R) was found as 0.77 or 77 %, which is reasonably high coefficient of correlation, establishing that the rise in water table and work done by TBS are closely related. The correlation might have been higher, as it was not for the difference of geology, terrain and water abstraction rates which do vary from village to village. For all practical purposes, the high value of Correlation Coefficient shows that the groundwater table rise is direct impact of the conservation efforts.



¹⁴ Potential recharge is that water which moves below the root zone, while actual recharge is that water which enters the groundwater table.

¹⁵ 'An Engineer's Evaluation of Water Conservation Efforts of Tarun Bharat Sangh in 36 villages of Alwar District', Prof. G.D. Agrawal, Former Professor and Head of Civil Engineering, IIT Kanpur, 1996

He also calculated per capita investment and return on RWHS. The diagram below shows a direct and almost straight line relationship between increases in economic production per capita against investment on water conservation per capita. An investment of Rs.100/- per capita on RWHS raises the economic production in the village by as much as Rs.400/- per capita per annum. Obviously this becomes the increase in income of the people and brings the affluence so much observed in the villages. The correlation between increase in economic production and level of investment on RWHS is much stronger than that between the RWHS and rise in groundwater table. This is because the rise in groundwater table does not include the gains of soil-conservation, rise in soil moistures and the improvements in forest and grassland vegetation.

Dr. Glendenning remarked in her study that the impact of higher annual rainfall on recharge could be clearly seen in 2008, with higher rainfall resulting in more overall potential recharge. Despite this variation in rainfall the fraction of rainfall that becomes recharge was very similar between the years. Potential recharge from the structures reaches a limiting point with increasing rainfall, which is a factor of the maximum storage capacity in the structure.

However, a difference in potential recharge was found between *Bandhs* and *Johads*, with an average potential recharge of 37.5 mm/day for *Bandhs*, and 17.8 mm/day for *Johads*. This may be related to the fact the observed *Bandhs* were located on more porous material and thus highlights the importance of careful positioning of the structures. Interestingly while potential recharge amounts were higher in 2008, recharge efficiencies were about the same for the two years. Efficiency is a function of infiltration and structure shape and size rather than rainfall amount. These factors also influenced the amount of rainfall that becomes recharge.

The analysis of the well data was difficult because of the amount of pumping, particularly in 2007. But by taking the most unaffected sections of the time series, and assuming a constant specific yield, estimates of groundwater recharge ranged from 7.2 mm/day to 11.3 mm/day. Recharge estimates increased moving down the catchment in elevation. The recharge values from the wells were much lower than the estimates of potential recharge from the RWHS. This suggests that either the recharge from RWH is not reaching the aquifer, or the aquifer has large transmissivity and therefore strong lateral flow. About 30 % potential recharge is stored in the soil while at least another 30 % moves laterally. As a result the water recharged becomes spreads out over a larger area depending on the size of the aquifer.

Mr. PrithviRaj Singh, Founder-Trustee and Chief Functionary of Jal Bhagirathi Foundation

"Earlier Rajasthan was seen as drought stricken state, and mostly drought relief work, now after TBS efforts the scenario has changed and Rajasthan is now looked as from drought relief to development work".

Based on the Electric Conductivity (EC) analysis no base flow was observed in the river, water below the Anicuts was assumed to be lateral flow from the storage of the Anicuts upstream. While the analysis of recharge from the Anicuts was even more uncertain, the estimated potential recharge values were high compared with *Bandhs* and *Johads*. This confirms the local knowledge that the Anicuts provide a great amount of recharge. RWHS clearly have a large impact on the amount of recharge occurring in a local area.

Mr. Alireza Owrangi, Deputy Minister, Agriculture, Govt. of Islamic Republic of Iran 3rd February, 2012

“This model has proved successful in reversing migration from rural areas to cities and in terms of land and water conservation. What is notable in this model is the participatory nature which has attracted full participation of local communities as well as policy makers. I would like to invite you to visit Iran to get better insight to our activities in soil and water conservation. Thanks you for your warm hospitality”.

After the first few rainfall events, it was observed that water accumulated downstream of all three Anicuts on the river. This water was not flowing, and it was assumed either to be leakage from the dams or upwelling base flow from the shallow alluvial aquifer. This water was present from July 2007 to early 2008, and again in the monsoon of 2008 to early 2009. Based on EC measurements, it appears that the water is not base flow but lateral subsurface flow from the water stored in the Anicut upstream. The EC values of the water downstream of the Anicuts are closer to the EC values of water in the storage of the Anicuts than to values in the groundwater in the nearby monitored dug wells. From this data, there is also seen an increase in salinity levels in groundwater as water levels decline. This could be from return flow from irrigated agriculture, which increases salinity in the groundwater.



A scenic view of water and greenery, earlier rare but now common in TBS area.

10.2 IMPACT ON WATER CONSERVATION

Conservation of natural resources like soil and water always goes in tandem as any measure adopted for soil conservation also takes care of water conservation and similarly any measure adopted for water conservation also results in checking soil erosion and contributes to the conservation of the rich and vital top soil essential for sustainable agriculture.

All design details like selection of site, type of structure, construction of materials, bed width, side slopes, height, curvature etc. and construction details like preparation of foundation and abutments, compaction etc. are decided by discussion and consensus among villagers and TBS workers on the basis of their instinct – traditional knowledge, experience and gut feeling. All these persons appear to have a good and clear understanding of water divide or ridge line and of demarcating watershed on site and then estimating catchment areas. But no idea of amount of rainfall or storm intensity ever appeared and no calculations were ever done. College educated engineers will obviously doubt the safety and adequacy on the one hand and the economy, optimality and appropriateness on the other hand of such structures. While the author has personally visited and examined at least 30% of these structures and found such doubts by and large unfounded. The best proof of adequacy and safety is that these works have stood the test of time and ravages of intense rainfall of 1995 and 1996 when scores and scores of engineer designed structures maintained by the government failed creating tragic floods. And if the works under study have proved to be safe and have been really cheap, and have served the job well, why doubt or even talk of the technology.

Source: 'An Engineer's Evaluation of Water Conservation Efforts of Tarun Bharat Sangh in 36 villages of Alwar District', Prof. G.D. Agrawal, Ex Professor and Head of Civil Engineering, IIT Kanpur, 1996, pp. 14–16.

10.2.1 Restoration of Water Table

Opening up land for cultivation, regular tillage, over grazing of pasture lands and indiscriminate cutting down of trees had resulted in accelerated surface runoff leading to soil erosion and depletion in soil moisture and ground water reserves. The accelerated surface runoff led to perennial rivulets turning into seasonal ones and the reduction in the duration of the flow.

TBS constructed several RWHS with more concentration in the districts of Alwar, Karouli and Tijara. These structures have different nomenclature viz., *Johris*, *Johads*, *Bandhs*, *Anicuts* etc., depending on the size, material used for the construction, location and purpose. Whatever the name these structures have arrested the surface runoff forming



A villager taking a bath in TBS constructed RWHS.

water storage in the form of ponds to bigger storages such as *talabs* (minor irrigation tanks). In addition to harvesting and storing the surface runoff as a corollary the movement of silt and erosion of top soil was arrested. Infiltration of this water and seepage through subsurface flow led to the recharge of open well and to the increase in the water table.

In areas where the soils were accumulated on fractured bedrock the process of recharging ground water and filling up of underground aquifer was accelerated. In location where the bedrock or parent material was impervious to infiltration the rate of infiltration was poor but subsurface seepage has enriched the soil moisture regime in lands coming in the downstream portion of the water harvesting structure. In such instances there was a significant rise of water in the existing open wells and tube wells. This was made clear by the farmers in the villages of Bhaonta-Koylala, Kraska, Devri, Mandalvaas, Rajouri and other villages where they confirmed that they had noticed increase in the levels of the open wells and better/sustained yields from the tube wells.

The subsurface lateral flow in the stream beds was observed against the Anicuts along the rivulet. Arvari, especially had a very good stand of water in the upstream side of the Todisagar/Kunjsagar Anicut near the village Kaled and Hamirpur where the farmers mentioned that water has remained constant despite the variations in rainfall confirming the findings of Dr. (Ms.) Claire Jean Glendenning. From this it could be inferred that while the percolation has helped in the increase of the ground water table, the subsurface flow/seepage from RWHS in the upper catchments or an overflow from the aquifers found beneath the surface have contributed to the water bodies stored on the upstream side of the Anicuts.

Mr. Ram Lubhaya, Addl. Chief Secretary, Water Resources, Govt. of Rajasthan 29th November, 2011

"I had heard a lot about the work done by Tarun Bharat Sangh in water conservation and revival of rivers. Today, I could see and believe it. This in fact is a model for dealing with the water crisis. Community based water management is a vibrant and sustainable. This is the only way of managing water in future. The pioneering role played by Tarun Bharat Sangh in mobilizing communities, using local and traditional knowledge and carrying out works in a transparent manner is highly impressive and commendable. A memorable and educative visit"

In areas having hard bedrock as found in Karouli district, this resulted in checking topsoil erosion and surface retention. The soils here became waterlogged for several months and subsurface seepage to the downstream areas took place. The farmers' ingenuity in these areas converted this adversity into an opportunity to cultivate rice/paddy during the rainy season (*kharif*) and crops like wheat, barley and other during winter (*Rabi*).

In the alluvial plains and sandy loam areas encountered in Tijara, the major problem faced was intense sheet erosion of top soil resulting in the washing away of crops and repeated changing in the course of surface runoff caused extensive damage to the crops and loss of fertile topsoil. The *johads* constructed with earthen bunds resulted in mitigating the losses due to sheet erosion. The soils, being sandy loams, subsurface seepage resulted in better soil moisture regime and contributed to the significant rise in the soil moisture regime. This has led to higher sustained yields as narrated to the team by the farmers of Nyaana village.

BOX 4: NYAANA VILLAGE'S TRANSFORMATION

Mohammed (Md.) Rais a 55 year old farmer narrated that prior to the intervention of Tarun Bharat Sangh in 1995, the situation in Nyanna village in desert area of Tijara was bleak and people were desperate and used to migrate in search of work and livelihoods. He also thought to obtain a visa for travelling to Pakistan in search of livelihood.

Rainfall was scanty and erratic. The soils were susceptible to sheet and gully erosion during high intensity rains created unchecked runoff. The open wells dried up and even drinking water availability was scarce. Very small patches could be cultivated and the yields were abysmally low. The village presented such a bleak picture that prospective brides' parents started shunning grooms from this village.

The field functionaries of TBS visited this village in around 1995. Through community's participation they started constructing small RWHS. They constructed the first RWHS in 1996 and when the community saw the resultant storage of water and its effect in reducing the hazards of soil erosion they participated in the construction of a series of 12 such RWHS. The last one was the bigger one hence named "*Badi Bandh*" with a bund length of 400–500ft. The excess over and above the storage capacity was let out to the natural drain which flowed into Bhagoda Dam in Haryana.

Now the farmers are cultivating their entire holdings almost doubling the area under cultivation. With the silt flowing into their lands and improved soil moisture the yields rose gradually to 200 to 300%. The increased yields resulted in higher returns and prosperity began to flow in. The farmers are now investing in farm machinery, tractors, trucks, personal transportation in the form of motorcycles and in a few cases jeeps and cars.

Now Nyanaa is transformed to a bustling economically prosper village and the prospective grooms have no dearth of marriage proposals, says Md. Rais with a smile.

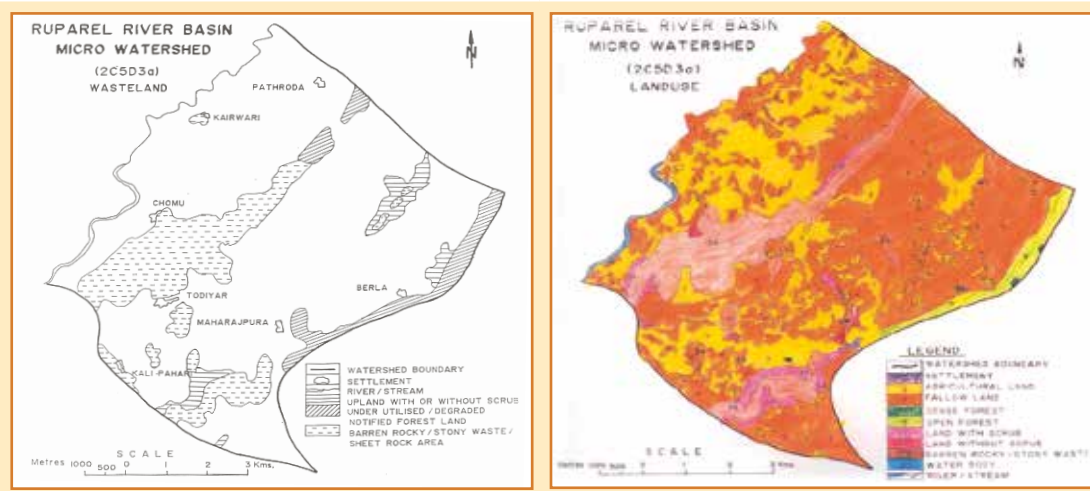
10.2.2 Rehabilitation and Rejuvenation

Improved soil moisture and ground water reserves led the farmers to cultivate all their land-holdings which they were unable to do earlier owing to the limitation of available water. This increased the extent of area under cultivation. With the increased availability of water the farmers are enabled to utilise more inputs and get better yields. This led to a phenomenal increase in the crop yields and availability of fodder. Water availability in the proximity and fodder acted as a fillip for animal husbandry in the form of milk yielding buffaloes, cows, sheep and goat rearing. This was very clearly observed in the Kraska village where Mr. Netaram Gurjar and Mr. Manohar Gurjar related that their herd size of the goats has increased from 30 to the present 50 and from 45 to 75 respectively. The total population of cattle in the entire village of Kraska/Devri/Mandalvaas have seen an upsurge of cattle population from 75–90 %.

In Mandalvas, a young farmer Rajesh Kumar Meena narrated that only half an acre were being cultivated before the construction of RWHS but now all the land (1–2 acres) are put under cultivation. In the neighbouring village of Rajour another farmers who has 0.7 acres of land presently with assured irrigation where it was less than half earlier. The same was reiterated by Bansiram Balai and Bodhram Kumhari of Jethpur Gujran village.

Diagram 1: Land use in Ruparel River before and after RWHS

IN 1993, TOTAL WASTELAND – 1057.5 HECTARES IN 2001, TOTAL WASTELAND – NIL



Source: A study on TBS's works in 40 villages undertook by Dr. K.N.Joshi, Inst. of Development Studies, Jaipur, 2003

With the return to prosperity distress migration became a rarity and reverse migration i.e. return to their villages became the order of the day.

10.2.3 Revival

With the prolific water conservation efforts carried out by the TBS with the whole hearted support of the village community there has been a remarkable recharging of ground water and the aquifers. Once these aquifers got replenished the subsurface flow became accelerated. This phenomenon led to the revival of the flow of the seven rivulets and resulted in a significant increase in the duration of the base flow of water in these rivulets.

Mr. Ove Andersson, Counsellor, SIDA, New Delhi 13th May, 2004 in Kolyala Village Visitors' Book

"It is a great honour for me to participate in the inauguration ceremony for the birth of Arwari River. I am confident that all the work by the villagers in cooperation by TBS will have long lasting effect on the livelihood of the villagers which will be in the vicinity of the river. It is an honour for SIDA to be able to support TBS in their efforts in constructing water harvesting structure".

Increased availability of water led to traditional community to revive culture of growing trees. The traditional practice of growing *Dev Vani* (Sacred groves) was revived in many of the villages including Bhaonta, Koylala, and Gopalpura. This revival augurs well for the restoration, rejuvenation and revival of the communities' interest in bringing back ecological balance. It is hoped that proliferation of such activities will contribute to the increase in the vegetative cover which will act as a wind break to the dry desiccating winds which exponentially increase the evaporation and transpiration losses of moisture. Increase in tree cover will also have a greater impact on the micro climate of the area and may contribute to receiving better rainfall.

10.3 ENVIRONMENTAL IMPACT

10.3.1 Flora & Fauna

Conservation of water has resulted in the formation of large bodies of water surrounding *Bandhs* and the Anicuts. Such water bodies have become the abodes of aquatic fauna in villages like Kraska, Hamirpur and Kaled which are responsible for the resurgence of fish and many an aquatic birds. The large bodies of water harvested against the *Bandhs* in the villages of Kraska, Mandalvas and Losal Gujran have teeming aquatic bird life and have become the gathering point of migratory birds such as Siberian Crane, ducks, geese, herons, spoonbills and many other species, confirming the fact that the entire ecological/environmental balance hinges on water as the liquid of life. Other forest fauna such as tigers, leopards, many species of deer and antelope living in the forests of *Sariska Tiger reserve* have benefited from the large water bodies created by the RWHS in *Kraska, Mandalvas* and *Devri* villages as drinking water sources. In addition the seepage/sub surface flow has resulted in increased base flow of small streams and natural drains within the forest and now these animals need not depend on rare ponds and water bodies for their drinking water.

10.3.2 Climate Change Adaptation

Climate change is a global challenge with diverse implications at the national and local levels, through impacts on various sectors such as agriculture, water resources, forestry & biodiversity, human health, energy and infrastructure. Climate change poses uncertainties to the supply and management of water resources, the most critical of desert resources. According to the IPCC (2007) “*Many semi-arid and arid areas are particularly exposed to the impacts of climate change and are projected to suffer a decrease of water resources (high confidence)*”.

Climate change can impact surface water resources directly through changes in the major long-term climate variables such as air temperature, precipitation, and evapo-transpiration. The direct effect of climate change on groundwater resources depends upon the change in the volume and distribution of groundwater recharge.



TBS efforts also benefitted wild animals.



New generations learning and appreciating efforts of elders on water conservation.

The responses to address climate change can be broadly classified as **Adaptation**, that is adjusting to the current and likely long-term risks and impacts of climate change and tapping potential opportunities that may arise; and **Mitigation**, that is reducing Greenhouse Gas (GHG) emissions from different sources or by increasing sequestration through sinks.

In TBS project area, improvement in the soil moisture regime and in the increased water availability from the water bodies created by the RWHS, increased water levels and discharge from the tube wells have created an environment where the flora in the form of trees and shrubs could be nurtured. This could be seen in the villages of Bhaonta-Koylala, Gopalpura and Losal Gujran villages where the growing of woods and groves as a tradition is being revived. The increase in the tree cover makes a significant difference in the micro climate as noticed in the villages noted above. Such an increase in the green cover would augur well for the fauna too.

10.3.3 Disaster Mitigation

The state of Rajasthan has a problem with uneven distribution of rainfall. Even the meagre rainfall that it receives is restricted to a very few rainy days. The perspective towards drought needs strengthening as its association as a phenomenon of arid and semi-arid areas is changing because even areas with high average rainfall often face acute water scarcity. For districts Alwar, Banswara, Bhilwara, Jaipur, Jhunjhunu, Pali, Sawai Madhopur, Sikar, Dausa and Karauli the frequency of droughts are once in 5 years. Rajasthan come under high damage risk zone owing to extreme events. In July 1981, Rajasthan received abnormally heavy rain that caused flooding in Jaipur, Tonk, Nagaur and Sawai Madhopur. In August 2006, the usually drought prone Barmer district was hit by flash floods¹⁶. All these floods have resulted in unprecedented loss of lives and property. Apart

¹⁶ Rajasthan State Action Plan on Climate Change, 2011, pp. 32



TBS efforts protected future generations from forced migration due to water scarcity.

from flooding from rainfall, river water flooding in Rajasthan has also caused havoc in past years.

The constructions of RWHS in the upper catchments has harvested this runoff and reduced the flooding in the lower reaches. As a corollary the stored water in these water bodies, the increased infiltration and recharge of ground water has mitigated the occurrence of droughts or at least the severity of the droughts. As a result the distress migration is almost checked, and the villagers are able to cultivate even during drought period.

10.4 ECONOMIC IMPACT

10.4.1 Change in productivity, income and well-being

The primary occupations of the villagers are agriculture, cattle rearing and allied activities. Water helped in conserving soil, improving water level in the wells and converted dried, seasonal rivers into perennial. As a result, food and fodder production increased. After keeping produced for household consumption villagers normally sell surplus to market. The efforts made visible impact on the economic scenario of the region.

The impact is most visible on agriculture and livestock. It impacted agriculture in three ways: (i) increasing crop yield; (ii) bringing more land into cultivation; and (iii) farmers taking up double/multiple crops. The crop yield increased to 2–5 times. The cropping pattern changed from coarse millets to crops like maize, wheat, mustard, etc. The Arvari River Parliament has prevented the farmers in taking high water consuming crops like, paddy and sugarcane. In Hamirpur village, Mr. Ranglal Meena informed that earlier wheat yield was only 1.0 to 1.5 quintal per acre, now after the water conservation work, it has increase to 8 quintals per acre. Similar is the experience in other villages, where yield of several crops increase from 1.0 to 1.5 quintals to 5.0 – 6.0 quintals per acre.



Reaping the benefits from bumper crop.

Earlier people used to take only single crop, mainly wheat, maize or coarse millets in *kharif* seasons. Now, mono cropping has changed to double and multiple cropping and from one season (*Kharif*) to two seasons (*Karif and Rabi*). The table 3 below indicate change in land area and productivity of different crops.

Table 3: Change in Area and Productivity of Major Crops in Rada-Nadu Village

CROP	BEFORE RWHS			AFTER RWHS			CHANGE IN PROD. (QUINTAL)
	AREA (HEC)	YIELD (Q/HEC)	TOTAL PROD (Q)	AREA (HEC)	YIELD (Q/HEC)	TOTAL PROD (Q)	
Maize	24	15	360	31	21	651	+291
Millets	51	12	612	49	16	784	+172
Mustard	12	8	96	16	11	176	+80
Wheat	29	16	464	43	24	1032	+568
Barley	26	18	468	14	20	280	-188

Source: An Engineer's Evaluation of water Conservation efforts of Tarun Bharat Sangh, by Prof. G.D. Agrawal, 1996, pp. 29

The crop area under wheat, mustard and maize increased significantly while area under poor's person crop 'Barley and Millet' has decreased, indicating people's preference on high value crops.

The Spearman's Rank Order Coefficient of Correlation for the rank-order for level of investment vs. rise in annual production works out to a very high value of 0.905 or 90.5%. In case the increase in production were due to factors like better weather, use of fertilizers, pesticides, improved seeds or other such factors, the rise in production could not have such a high correlation with investment on water conservation. An investment of Rs.100/- per capital on Johads raises the economic production in villages by as much as Rs.400/- per capita per annum.

Source: An Engineer's Evaluation of Water Conservation Efforts of Tarun Bharat Sangh in 36 villages of Alwar District. Prof. G.D. Agrawal, Former Professor and Head of Civil Engineering, IIT Kanpur, 1996, pp. 19-20

Apart from above people are also growing vegetables for house hold consumption. The change has also happened in the milk production due to increase in number of cattle and milk productivity. The villagers consume and sell surplus milk or milk products (*mawa*). Since the production is increased many folds, so the income has also substantially increased. The money earned is spent in following three ways:

- i. Purchase of agricultural implement,
- ii. Purchase of assets (and liabilities) like agricultural land, cattle and vehicles (Motorcycles, tractors, etc.); and
- iii. Improving living condition by improving housing infrastructure; quality food intake, purchasing clothes, jewelry, etc. and sending their children for higher education.

In agriculture implements tractors, seed drill, disc plough, cultivators, Diesel Pump Set, thresher, cutter, etc. were found. In the vehicles, villagers now possess motorcycles, cars, jeeps and trucks. The marriages are now a big occasion to show their prosperity. They have started to send their children to schools and colleges for further study.

10.4.2 Change in Saving Pattern

Very little change was observed in the saving pattern, as money earned is money spent. However, goats, kept in houses are considered as reserve money, as these could be sold in case of emergency. Earlier, villagers used to take frequent loans from money lenders. It had become a tradition to take loan from money-lenders during any ceremony or festival. Now, people do not need to take loan from the moneylenders, instead they either arrange from themselves or take from neighbours or relatives without any interest. Some even approach banks for loan for production purpose as their repayment capacity has gone up significantly and the banks advance them crop loans and other personal loans.

BOX 5: HISTORICAL TREND ANALYSIS VILLAGE : BHAONTA – KOLYALA

Year	Activity
1987	Visit of Rajendra <i>bhaisaheb</i> , <i>Bandiwali Johdi</i> strengthen at Bhaonta
1989	<i>Chochawali Johdi</i> renovated at Bhaonta, <i>Kanya ki johdi</i> renovated at Kolyala
1990	<i>Bhairojeeewala Bandh</i> constructed
1991	Construction of <i>Sankra Bandh</i>
1992	Anicut of Gopal Tanwar constructed in Kolyala, All the wells recharged
	Govt. school started
	Road mettled
1993	<i>Naharsinghjee wala Johad</i> repaired and <i>Thakuro wal Bandh</i> constructed at Bhaonta, Harsoi Doi's anicut constructed at Kolyala, Mairbandh on Sharawan Bhopa's field, Ramkishan's field, Narayan's field and Nathu's field at Kolyala, <i>Johdi</i> near Dhanna Lohar repaired
1996	<i>Kolyala Johdi</i> repaired
1997	<i>Chariwali Johdi</i> constructed at Bhaonta, <i>Mairbandi</i> of Shankali's field, Kani's field, Jagadish's field at Bhaonta and Arjun's field, Chitar's field, Harsai's field, Ramlal Bhagwandoi's field, Rampal's field, Chaju's field, Bhairu Bhagat's field, Ramsahai Khutan's field, Pilipati's field, Kisna Khatana's field at Kolyala
2000	Check dam near Bhairuji's temple, Mairbandi of Hanuman Singh's field at Bhaonta
2001	Construction of Women's bathing <i>Ghat</i>
2002	<i>Piplawala Johdi</i> constructed at Bhaonta

10.4.3 Change in Migration Pattern

Earlier, absence of remunerative work and scarcity of food drove a large section of people to migrate to other places to earn a living. This distress or forced migration is almost completely checked after TBS started working in those villages. On the contrary, reverse migration was observed where people returned back to their villages for farming or ancillary work. Economic prosperity came together with ecological regeneration. Now, most of the people prefer to stay in the village for agriculture and allied activities. Mainly educated youths prefer to go to big cities in aspiring for good jobs.

BOX 6: DILEMMA OF KRASKA

Kraska is a picturesque village situated on a verdant and fertile small plateau between a few summits of the Aravali hill range. It is right in the midst of the Core- 1 area of Sariska Tiger Sanctuary. Owing to the community driven activity for the construction of Rain Water Harvesting Structures under the guidance of TBS there are now four medium to small water bodies (*Johads*). These water bodies were having good quantity of water stored when the study team visited the village on 1st Feb 2013. These water bodies abounded with exotic aquatic fowl, quite a few of them belong to the annual migratory birds from the cold winters of the European continent. The wooded slopes, the verdant pasture land and abounding bird life in the water bodies painted an idyllic pastoral village.



Kraska is inhabited by an agro-pastoral community called the *Gurjars*. This community is strictly vegetarian by tradition. We had detailed discussions with village elders and some younger men about the water harvesting interventions taken up under the mentorship of TBS and the impact of such work. During these discussions, Sri Bamboo Ramji Gujjar and Sri Radhakishan Gujjar both in their sixties narrated that this village was inhabited by their community ancestors for the last seven generations. They were dependent mainly cattle rearing and selling milk and by-products. The fertile soils rich in humus aided them in getting bountiful yields of food grains for their home consumption and the surplus was sold at Thangazi, a nearby town.

The village elder Sri Radhkishanji stated that by their herders taking the cattle for grazing in the forest was acting as a deterrent to illegal tree fellers and to poachers. These people had learnt to live in harmony with their environment including all the flora and fauna existing in it. The cattle droppings added manure to the forest and made the soils more fertile. Trees were venerated as deities. Fuel was obtained by harvesting dry and dead branches only. A live tree was never cut for fodder or fuel.

Their utopian existence got shook up after the Sariska Tiger Sanctuary was formed and their village fell plumb in the Core Area-1. The Government passed an order in 1993 banning agriculture in the vicinity of the village and they were given notice to vacate the village with a compensation of a couple of *lakh* rupees. This paltry amount in the present days when the land values have soared would be insufficient for acquiring new land elsewhere. Hence, the younger inhabitants are faced with a dilemma of having to shift but nowhere to shift to. They also face grave hardship for continuing their traditional livelihood of animal husbandry and marginal agriculture.

The feasible solution could be to shift them out of the Core Area-1 to the periphery and allot them some lands there along with grazing rights in the non-core areas so that they could continue their lives. In addition some of the youth may be trained and used as Forest Watchers on a consolidated salary so that both their livelihood and the needs of the Tiger Sanctuary are mutually benefited.

10.5 SOCIAL IMPACT

Two major communities belonging to OBC, *Meena* (60 %) and *Gurjars* (25 %) are living in the TBS operational area. *Gurjars* normally live in the hilly region and main occupation is livestock rearing. *Meena* live mostly in plains and their main occupation is agriculture. The other castes and sub-castes found in the project area are given in table 4.

TBS organized village people in the form of informal *Gram Sabha* or Village Councils (VC) to construct RWHS. The VCs were active in organizing people for water conservation efforts, planting trees and protecting village forests. The VCs also helped mitigating and resolving conflict, thereby reducing police complaints and court cases.

Water conservation efforts made visible social impact in the region. Following major social impacts were observed:

Table 4: Castes and subcastes in project area

CASTES/SUBCASTES IN PROJECT AREA	
OBC	mali, kumhar, keer, soni, lohar, gadulia lohar, nai, khati, raibari, Gujjar, Mochi, Jat, daroga, Yadav muslims (mev, teli, faquir, julaha)
SC	kanjar, bhand, nayak, Khatik, Raiger/chamar, Balai, Dhobi, Bairwa, Bhangji/Mehtar, Koli, Nat/nut
ST	dhanuka, bawaria and meena
Others	Brahman, Baniya, Rajput, rai, kalal

10.5.1 Women's Emancipation from Drudgery

Women were earlier severely affected by water scarcity. Every day they used to spend 6–18 hours on fetching water and procuring fodder & fuel wood, depending upon distance from water source as they had to walk for miles and climb hills/mountains to collect water and firewood. They gladly welcomed TBS work and actively participated in its water conservation efforts. During the construction, women's role was clearly visible. As mentioned by Mr. P.V. RajaGopal¹⁷ '*...TBS promoted women's participation in a society where women are not vocal*'.

The impact was outstanding: water started to flow in the rivers, wells were replenished, and ponds came into life. As the water started flowing, the fire wood became available in plenty in the community land and forest. Now, women do not have to go far off places to collect water and firewood which saved their energy and time. The increased availability of water for cooking, washing and bathing has definitely improved the quality of their life. Now they are liberated from the back breaking workload and find more time for themselves and caring of their children.

¹⁷ Vice Chairman of the Gandhi Peace Foundation, New Delhi, and the president and founding member of Ekta Parishad, a grassroots right-based organization



Women spending less time to collect water.

On the other side, women's role in agriculture has increased as more land was brought into cultivation and with conversion of mono-cropped area into multiple cropping. Nevertheless, with the material gains through RWHS their spirit of enterprise has further been strengthened, as found in discussion with women in Mandalvas and Gadh Basai.

Table 5 indicates comparative figures of sex ratio and literacy rate at National, State and District level. The literacy rate of Alwar in 2011 was 71.68 % compared to 61.74 % of 2001. From gender perspective, male and female literacy were 85.08 % (7.0 % increase) and 56.78 % respectively (13.48 % increase). During the same period, female literacy rate in Rajasthan and India has also seen upward trend though not as much as in Alwar. In Rajasthan, it was 67.06 % as per 2011 population census. Of that, male literacy stands at 80.51 % (10.19 % increase) percent while female literacy is at 52.66 percent (8.81 % increases since 2001), whereas at national level it was 65.46 % (11.30 % increase).

Table 5: Literacy and Sex Ration in Rajasthan and India

	YEAR	SEX RATIO	LITERACY RATE		
			AVERAGE	MALE	FEMALE
National	2001	933	65.38%	75.85%	54.16%
	2011	940	74.04%	82.14%	65.46%
Rajasthan	2001	911	60.41%	70.32%	43.85%
	2011	932	67.06%	80.51%	70.32%
Alwar	2001	886	61.74%	78.08%	43.30%
	2011	894	71.68%	85.08%	56.78%

Source: Census Survey of India, 2011

With regards to Sex Ratio in Alwar, it stood at 894 (increase by 8) compared to 2001 census figure of 886. Sex Ratio in Rajasthan is 926 (increase by 4 female), which is below national average of 940 as per census 2011. In 2001, the sex ratio of female was 922 per 1000 males in Rajasthan.

Though, there are several factors influencing sex ratio and literacy rate considering these factors constant at state and national levels, Alwar shows remarkable increase, which including others, could also be attributed to TBS work in this district.

BOX 7: KAJORI MAI

Rajour village in Rajgarh, Alwar is dominated by *Meena* community. Late Kajori Devi played very important role in the rejuvenation of Tildeh-Bhagani River. Because of her work related to water conservation, forest protection, social work and women empowerment she is known as '*Mai*' of Rajour village.

She was wife of village head 'Jagdish Meena' and was like any other illiterate woman in rural Rajasthan. She came in contact of TBS first time in 1999 when Bhagirathi Devi-women social worker of TBS visited her village. Bhagirathi started promoting women self help groups (WSHG) in the village, and Kajori Devi was made President of this WSHG. She visited *TBS Ashram* first time on *Gandhi Jayanti* (Mahatma Gandhi's Birth Anniversary) where she addressed large gathering of people and explained them need of RWHS for Rajour village. Influenced by her speech Mr. Rajendra Singh immediately sent TBS technical team in her village to help them design RWHS.

Gradually, Kajori Devi got associated with Bhagirathi and together they started establishing WSHGs in other villages. She encouraged these WSHGs in RWHS construction and forest protection. Earlier, the forest guards used to collect monthly charge from villagers for cutting forest trees. These WSHGs stopped this practice completely. Whenever any forest guard was found doing this, she used to immediately lodge complaint to senior officials as well as directs WSHG members to block his entry. At that time, liquor selling and consumption by men was very common. She mobilized women to stop liquor trading in the area completely. She was so active in social work that people started calling her '*Mai*' (mother). She is no more but her work will continue for generations to come.

10.5.2 Community's Rights and Responsibilities

The conservation and improved utilisation of water for domestic, cattle and human needs also brought an awakening to the local community. This is clearly illustrated by the fishing conflict in Hamirpur, as mentioned earlier. This awareness led to an entire community taking up activism which climaxed into a landmark judgement in the favour of the community rights over the river water they helped in conserving and its utilisation for their various needs. The activism that was generated by the fishing conflict brought around awareness for protecting their rights over water they had helped in conserving also carried with it a responsibility of the community to create an elected body to provide a legal entity to further their rights of conserving and utilising their natural resources.

TBS empowered people to conserve and properly utilise natural resources. The VCs established and monitor rules and regulations for conserving natural resources (land, water, forests) which are followed by the community. They also protect exploitation of these natural resources by outsiders.

10.5.3 Empowerment & Ownership

Construction of RWHS also brought empowerment and ownership among local communities. As the VCs took charge of planning and execution, it involved every household and in the process empowered them. Mr. Rudhamal Meena of Hamirpur village and Patel¹⁸ Dhannaram of Koylala village narrated that the VCs formed by their own village community ensured that the members, whether male or female, took responsibility to ensure that each household is shouldering its responsibilities without any dereliction of duty. They regularly check procurement of materials (concrete, sand, iron rod, etc), whether the mixing of material is properly done and that no substandard quality material is used. The VCs also take responsibility for the maintenance and management of RWHS.

¹⁸ Village head

10.5.4 Control and Management of Common Property Resources (CPR)

This aspect was very strongly observed as the people came together on a single platform to manage water, forest and land resources. The VCs decide types of crops to be grown, considering their water efficiency. The villagers are not allowed to grow sugarcane and paddy for commercial purpose as they consume more water. They also cannot lift the stored water from RWHS and divert to their field after January (lean season). The community use this period in visiting and meeting their families and friends, reviving some of the aspects of old culture and tradition. The VCs also governs cutting of woods for home consumption, and only the pruning of trees by removing dry and dead twigs and branches is allowed. They have watch and ward by deputing volunteers and put penalty for those who violate the rules.

10.5.5 Community Leadership

Earlier, due to water scarcity and falling income youth had migrated to cities, leaving behind women, children and old people in the villages. When the success of Gopalpura village in water conservation spread, people from neighbouring villages started visiting. Influenced by the success, people like Mr. Rudhamal from Hamirpur, Mr. Kanhaiyalal from Bhaonta, Mr. Gopal Singh from Garh Basai, Dhanna Baba from Koylala, Radhakishan Baba from Kraska village started coming forward, taking responsibilities to replicate the success story in their villages. A number of such community leaders emerged. TBS created an environment where such leaders were encouraged to come forward to take its support in constructing water conservation structures in their villages. As such Gopalpura success story was replicated in more than 1000 villages of Alwar, Karauli, Dausa, Jaipur, Sawai Madhopur, Pali and Ajmer districts of Rajasthan. The leadership did not end after finishing the construction work, but continued to supervise and maintain the water conservation work through VCs. Gradually, the community leaders brought solidarity among the villagers and maintained the community's cohesiveness.

10.5.6 Self- Governance & Political Empowerment

Arvari Parliament is an excellent example of people's self-governance and their political empowerment to safeguard natural resources. People from 70 villages of Arvari river basin, created their own "river parliament" to sustain the water commons. Its importance can be understood by the instance that Late Siddharaj Dadda, Member of Parliament, who once refused to be the chairman of the *Lok Sabha*, accepted to chair the first season of Arvari Parliament. The Parliament meets twice a year, but urgent issues can be discussed by calling the meeting in between. The objective of the institution is to protect, conserve and manage natural resources in a sustainable way by community participation. Certain guidelines were drawn to regulate the utilisation of natural resources by people, foresee future problems in management, resolve conflicts, if any related to access and use of resources, provide guidelines for conservation, protection and management of resources and treat water and forest as community resources rather than private property.

Mr. D. C. Samant, then Principal Secretary, Water Resources, Government of Rajasthan 9th April, 2004 at Koylala village visitors' book

"I was extremely impressed with the water harvesting work undertaken here by the local community with assistance and guidance of TBS. Water is indeed a scarce & precious resource in Rajasthan and need to be harvested and managed in a way as to lead its maximum utilization. The initiative in this area is indeed worth replicating on a large scale. I commend all those who have been involved in the overall development of the area with focus on water harvesting and its conservation".



Team leader, documentation with village head at Gadh Basai village.

10.5.7 Initiation of Social Movement

Jal Biradari

It was founded in 1999 in *Jal Sammelan* (Water Conference) of Neemi village. The meeting was chaired by Late Siddharaj Dadda and Late Anil Agrawal. Around 10,000 people, who were facing acute water shortage, attended the meeting. The participants understood the need of 'Water Community' (*Jal Biradari*). It was also decided to organize a *Pad Yatra* (foot march) for bringing water literacy among the society. *Jal Biradari* organized first foot march throughout India from 23 December, 2002 to 26 June, 2005. This helped in raising public awareness about the crisis of Indian rivers. Mr. Rajendra Singh, Chairman of TBS & *Jal Biradari* organized *Pad Yatras* by the community of 144 rivers in India to make the community aware about the crisis of rivers like encroachment, pollution and atrocities to the rivers in the form of unchecked pollution both through industrial effluents and sewage from the towns and cities. TBS formulated and submitted Policy Drafts for National Rivers to Central Government and for State Rivers to the different State Government.



A satisfied and happy villager. TBS improved quality of life in the villages.

On 1st August 2007, TBS Chairperson, Mr. Rajendra Singh initiated plantation on the Yamuna river bed to protest against the building construction for Commonwealth Games. On 20th August, Mr. George Farnandes, the Chairman of Commonwealth Games communicated to Mr. Rajendra Singh that being the Chairman of the Commonwealth Games he takes the responsibility of not being able to understand the crisis of the river Yamuna. On 12th September, 2007, Cabinet Ministerial Group nominated Mr. Rajendra Singh as a member of this group. Mr. Rajendra Singh explained in detail about the atrocities against Yamuna River and also made them aware about future adverse consequences. Later, Mr. Arjun Singh issued an instruction not to do any construction on Yamuna River to Mr. Tejender Khanna, Governor of Delhi and Mrs. Sheela Dixit, Chief Minister, Delhi. Mr. Tejender Khanna issued a circular to announce the Yamuna bed as protected for Yamuna River only. Despite of all such instruction and communication Commonwealth Village was constructed on the encroached land of Yamuna and Metro rail also made its depot on the Yamuna bed. Jal Biradari lodged a case in High Court and won. Delhi Govt. filed an appeal in Supreme Court against the decision. The Supreme Court gave the verdict in the favour of Delhi Government on the Ground that Commonwealth Game is a National Prestige, so the construction should not be stopped. In 2008, to stop the construction of dams like Lohari Naagpala, Paala Maneri and Bhairi Ghati on Bhagirathi and to declare the stretch of 135 kms from the origin of Ganga as sensitive area, Mr. G.D. Agrawal started fast unto death and his both demands were agreed upon. It was one of the pinnacles of achievement for TBS and *Jal Biradari*.

River Arvari Parliament

The River-Basin focused approach of TBS has led to the rejuvenation of seasonal rivulets as perennial rivers. This also led to the formation of *Arvari Sansad* (Arvari Parliament). The *Sansad* represents 72 villages, each of which sends two representatives. Thus, it has 142 members who are nominated by their respective village institutions (*Gram Sabhas*). The primary objective of the *Sansad* is to safeguard integrated and water management efforts of the community of river catchment. It follows Gandhian ethos of participatory, equitable and decentralised paradigm for water management (*Jal Swaraj*), where decisions are made at the grassroots not by centralized institutions. *Arvari Sansad* develop policies and enforce rules to govern the integrated management of interlinked natural resources like water, soils and the forest for the wellbeing of the villagers as well as other forms of life-flora and fauna.

The *Sansad* convenes its general meeting twice a year to deliberate upon best strategies for resource conservation and management issues. A coordination committee comprising members selected by the *Sansad* handles the routine operations and ensures compliance



Inspection of a RWHS .

with the rules. The *Sansad* has framed 11 rules for the river basin conservation and management on following issues:

1. Arvari basin shall not have sugarcane, paddy & chilli. People growing these to be penalised.
2. No one shall draw water from the river after Holi (March) up to monsoon (July).
3. Borewells not be allowed in Arvari catchment.
4. Recommended crops – barley, Maize, Sorghum in upper and vegetables in lower reaches.
5. No axe can be carried to Bhairodev people's sanctuary, catchment of the source of Arvari.
6. Fishing can be done only for food.
7. Large-scale trade of foodgrains and vegetables was banned. Local production and consumption to be emphasised.
8. Village people to help people from other areas for implementing water harvesting structures.
9. Cattle outside the region are not permitted for grazing.
10. Rotational grazing to be followed by farmers in their own pasturelands.
11. Industrial units prohibited in 405 sq km of Arvari basin.

In situations where village-level violations are reported, solutions are arrived at cordially through discussion and mutual consent within the village communities.

A vital water-use policy formulated by the *Arvari Sansad*, was to enforce a cropping pattern that comprise of crops that consume very less water and discourage water intensive crops (e.g. sugarcane). However, this policy initially faced unyielding opposition from *saansads*

(parliament members) as it was argued that sugarcane provide cash, jaggery and sugar for domestic use. Through a long process of debate and discussions in various meetings with the farmers (in *Gram Sabhas*), *Saansads*, social workers and TBS volunteers, the *Arvari Sansad* arrived at a “compensatory agricultural crop pattern”. Under this system, a farmer can devote 25 % of his land under water intensive crop i.e. sugarcane and the rest of his land-holding would be under less water intensive crops. This was unanimously agreed upon in the *Sansad* and is being successfully implemented. Another triumphant policy was to prevent the sale of agricultural land to industries or big private companies interested in water based enterprises such as brewery. The *Arvari Sansad* is also taking advantage of a law that requires special permission for conversion of agricultural land for non-agricultural purposes. Growing evidence in terms of various studies prove that compliance of rules and regulations stood at about more than 80 % now.

Nirmal Awiral Ganga (Ganga River Rejuvenation)

TBS started to work actively on *Nirmal Awiral Ganga* in 2007. It worked on seven rivers: Arvari, Sabi, Ruparel, Jahajwali, Sarsa, Bhagani and Maheshwara rivers earlier and constructed more than 10,000 RWHS. As mentioned by Mr. Singh, ‘...not a single dam in the world is able to check as much amount of rain water as these structures could. Dr. Peter McCully’s commented that ‘...TBS’s effort for water conservation not only provided water and crop for livelihood, but also added greenery to nature and environment for life. This greenery ensured dignity among the poor. Therefore, the revolution proved to be helpful for life, livelihood and dignity. For this, it made youth educated and sensible’. TBS efforts increased awareness about the importance of the River Ganga, and many such youth began to take lead in river rejuvenation. TBS organized several camps at different places. Now, there are many people spread over different places working on to evolve action plans to restore the pride of the Ganga River.



Mr. Rajendra Singh and volunteers during cleaning of the Ganga River.

National Ganga River Basin Authority (NGBRA)

TBS under the leadership of Dr G.D.Agarwal (Vice Chairman of TBS) launched a nation-wide campaign to maintain an unaffected flow of the river Bhagirathi in Uttarakhand. In response to this campaign the Government of India designated River Ganga as National River and notified the National Ganga River Basin Authority (NGBRA) as an empowered planning, financing monitoring and co-coordinating authority for the Ganga in February, 2009.

The NGBRA would be responsible for addressing the problem of pollution in the Ganga in a holistic and comprehensive manner. This will include water quality, minimum ecological flows, sustainable access and other issues relevant to river ecology and management. Under the new approach, the river basin will be the unit of planning.

The Prime Minister heads the NGBRA. According to the announcement, the authority will be vested with appropriate powers to carry out its functions. It will be a planning, financing, monitoring and coordinating authority for strengthening the collective efforts of the central and the state governments for effective abatement of pollution and conservation of the Ganga. The authority would combine regulatory and developmental functions, keeping in view the powers vested with state governments and its institutions.

The NGBRA would be responsible for addressing the problem of pollution in the Ganga in a holistic and comprehensive manner. This will include water quality, minimum ecological flows, sustainable access and other issues relevant to river ecology and management. Under the new approach, the river basin will be the unit of planning. The authority would seek to maintain minimum ecological flow in the Ganga with the aim of ensuring water quality and environmentally sustainable development.



Awareing common masses on ecological flow of rivers.

Anti Mining Campaign

When TBS completed water conservation work at Tilwadi village it realized that the wells continued to be dry and the beneficial effect of its water conservation work was not observed. Upon probing TBS workers learned that all conserved water was going into the mines (marbles excavation work) and the mine owners used these water to wash the stones and throw the wastewater. They also learned many social evils in these mines including sexual exploitation of women workers. While the mines owners were getting richer day by day, the villagers were becoming mine workers from farmers by selling their land to these mines at throw away prices. Whatever they used to earn from mine as wage labour, was spent either on liquor or to doctors as they were getting lungs diseases. After months of investigation, TBS found that many of these mines were illegal. It filed petition at Supreme Court in 1991. The Supreme Court gave stay order to 262 mines by its judgment on 11th October, 1991. It also formed a five members' committee under Chairmanship of Justice M.L. Jain to enquire whether these mines were within protected area.

Rajasthan government and mines owners stated that these mines are outside the protected area. They also said the Rajasthan government circular which declares these areas under protected area were interim order and the boundary of protected area is not decided. The mining work did not stop even after the stay. When Supreme Court learned, it sent its team under Justice M.L. Jain to verify whether its stay order was followed or not. On 26th November, 1991 the mines supporters attacked Mr. Rajendra Singh in front of the Supreme Court team. When the District Magistrate (DM) tried to take him away in his car, they also attacked DM's car and damaged it. Somehow, Mr. Singh's life was saved. The mines supporter then attacked TBS Advocate Mr. Rajeev Dhawan and his wife at TBS Ashram. The Jain Committee submitted its interim report on 19th January, 1992 and final report on 28th September, 1992 to the Supreme Court.

Meanwhile, TBS also mobilized communities in all nine villages, coming under mines and they gave ultimatum to mine owners that if they don't close mines by 25th January, 1992 the villagers will close these mines. They started their campaign from 25th January, 1992 by stopped working in the mines and not allowing any truck to cross village boundary. Finally, after villagers' pressure and Supreme Court order all 262 mines were closed down. Gradually, the groundwater level rose, and Bhagani River started flowing again.

Save the Tiger Campaign

TBS believed that *Jungle*, *Jeevan*, *Junglewasi* and *Jungli Janwar* (Forest, Life, Forest dwellers and forest animals) all the four require protection. Though it believes that necessity of life cannot be fulfilled just by saving tigers, it feels that saving Tiger Campaign will give a sense of feeling for nature and effects that would restore natural balance in the ecology. Therefore, TBS started the campaign to save tigers with students and teachers in neighbouring schools of the Sariska Reserve Forest. Initially, TBS staff faced opposition from forest officials as well as from local communities. But, when forest officials realized that poachers along with mining Mafia were killing the tigers, they started supporting TBS efforts to educate the communities living in Sariska and nearby to save Tigers. When TBS started to work in Sariska in 1985, only 5 tigers were there. By 1995, a number of RWHS were constructed and water started flowing in the rivers in Sariska. TBS constructed big pond in Siliberi, Jahaj and Mandalwas villages which are flowing

throughout the year. Due to flowing rivers, it became very difficult for poachers to guess from where the tiger will drink water and put the trap to kill them. The villagers were also sensitized and they started opposing these poachers and mining mafia as well as started informing forest officials on their movement. As a result the number of tigers increased to 28 in 1995–96.

Till date, TBS has trained 25000 students and 200 teachers in 60 schools to save the tigers. It has organized 3-days residential training to the students of Std. 6 to Std 12 in every school. The curriculum include classroom teaching, field visits, drawing and essay competitions, Rallies, *Pad Yatra* (foot March), *Nukkad natak* (Street plays), environmental talks, exhibition, distribution of resource kits, plantation, slogans and board writings. The teachers and students are also encouraged to prepare action plans for the next three months which they follow in their respective schools.

10.5.8 Guidance to Rural Youth

As the production increased, prosperity came and parents started sending their children for higher education as well as in getting specialized skills. The negative impact of this education was realized when young educated generation showed their interest in mainly white collar jobs in cities. Only a few get them, rest of them have to come back to the village but they are reluctant to work in the fields. The villagers suggested TBS to start providing skill training to these youth, including in carpentry, mechanics, craft work and other. Young generation is found to be very motivated with the efforts of water conservation, and with proper guidance and livelihoods support they are likely to get engaged in skill based work.

10.5.9 Health and Wellbeing

General health and well- being of the villagers was found good with low incidence of life threatening diseases which could be because of food security and increase in household



Teaching school children on water conservation.

income. Vegetables, milk and milk products are normally included in every house hold's meal. This has helped in intake of carbohydrate, vitamins and mineral in a balanced manner. As a result, health condition improved among the people, especially women and infants. TBS may also look into providing support in Maternal and child health care and adolescent health care, especially for high school and college going girls.

BOX 8: TARUN ASHRAM

Tarun Ashram is situated in the village Bheekampura at the foothills of Aravali Ranges. Ashram comprises an office, residential block, a training complex, a hostel, a dining hall, a guest house and peaceful open space with clean air to inhale.



Guest house at Ashram comprises rooms on the sharing basis. Accommodation of 25 persons is available in the guest house. The capacity of dormitory is around 70 people. Guest rooms have facility of attached bathrooms and hygienic bed/ mattresses with simple living standards. Supply of Electricity in the Ashram is irregular due to being situated in remote area. For conferences/ meetings Tarun Ashram has sitting arrangements of 50 people.

Ashram has its own farm fields where vegetables, millets, fruits are grown organically. The milk in the kitchen & manure used in the agriculture comes from cows of the Ashram.

Water is conserved through rain water harvesting structures. *Tarun-Taal* is the Step-Well in the ashram made from voluntary labour contribution of the visitors. On the entrance of the Ashram, A small temple of *Taruneshwar Mahadeva* is situated.

10.6 CULTURAL IMPACT

10.6.1 Change in the customs, norms and values

People of different caste like *Gurjar* and *Meena* have their own norms and values since ages and the communities were guided by these customs, norms and values. The water revolution brought on cohesiveness and more social bonding.

Most of these communities have a wealth of knowledge about the relationship of water, trees and pastures for leading a life in harmony with nature. However this knowledge was being gradually lost because of the struggle for existence. The improvement in the quality of life due to increased productivity, better economic status in the communities has led to the revival of these traditions in the form of growing *Dev Vani* (sacred groves) and *Rakaht Vani*. *Dev Vani* is a type of forest which is grown around temples and nobody is ever allowed to cut trees from the forest. These forests keep the ambience of the area very

Differential view of forests protected by the community and the government.



pleasant and cool and help to maintain water availability in temple pond or well. Rakaht Vani is a type of forest where the villagers plant a tree which represents their ancestral family. Each family of the village has its own family tree they plant and protect it and every year they come to perform worship of the tree with the belief, that their ancestors would give their blessings.

10.6.2 Change in Aspiration

Prosperity brought change in community's aspiration. Now, instead of sending their children to forest to collect firewood or water and take the cattle for grazing, they send them to higher study. Access to education to the children and youth has broadened the horizons and is helping them to seek more knowledge for themselves and to realize the role they have to play in the development of their community and their village. This can be seen where the boys and adolescents are convincing their parents and elders to send the girls for



Increased access to education for boys and girls.

higher education. This trend was felt by the interaction of the team with the young men of Hamirpur village. Mr. Ranglal Meena of this village expressed that he would like to see more of the girls from this village go for higher education so that they can come out of the restrictions placed on them by the age old traditions. He felt that a college in Pratapgarh a nearby town would help the girls to attend to college. They are also using modern agricultural implements (tractors, machinery, pump irrigation) and aspire to grow more.

Mr. Dhannaram Gurjar of Koylala village foresees a change in some of the rigid customs in marriage; women are now coming forth and actively participate in village development activities. However, while acknowledging change Mr. Dhannaram was a little apprehensive regarding the erosion of traditional values in the community.

10.6.3 Change in Kinship

Prosperity brought more dignity and respect to the villagers. As told by the people of Nyaana and Hamirpur villages *'Now a day people from other villages prefer to marry their sons and daughters in our villages. Earlier, when the situation the village was very bad with no water and crop production was very low, it was very difficult to find a suitable match for their sons and daughters'*. Now, people of other villages are happily marrying their children in TBS intervention villages. This was very emphatically related to documentation team by the village elders in Nyaana village of Tijara where the young men are now getting good proposals from outside which was not so earlier.

Elders in TBS intervention villages don't want to marry their sons or daughter to an uneducated boy/girl. They first check educational background, whereas, earlier they used to check the farm size and number of cattle. The opinion on girl children is also changing. In Bhaonta –Koylala, Gharh basi villages, people told that nobody in the village wants to marry their daughters in a family which does not have any daughter. People started to ask questions like, *why have you come to take my daughter for marriage to your son, when you do not have a daughter of your own. How can my family be sure that you will treat our daughter well?*' The

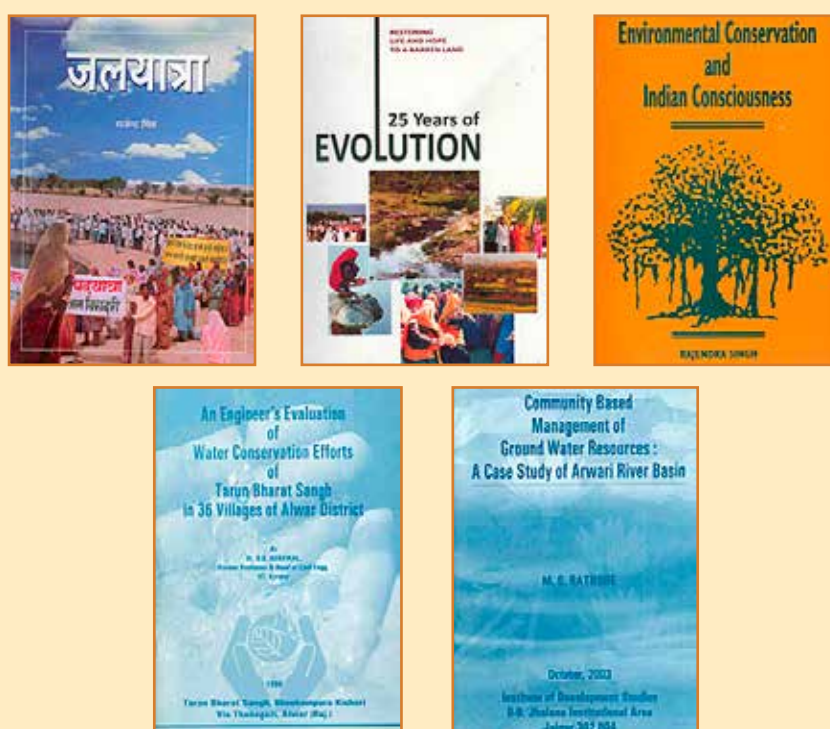


New generations learn about water conservation.

community is realizing the importance of a girl child now whereas before the parents used to consider girl child as a liability. This bodes well for a more balanced society in the not so far away future.

Relatives and friends now frequently come to seek their advice and support. For example, some people, who do not have pasture land available to feed their cattle, give them to their relatives at Kraska. They also provide monetary support to their friends and relatives at the time of need and charge no interest. TBS has improved sense of support among the people of its intervention villages to the needy friends and relatives. The people in Garh Basai village informed that there are no cases of conflict in the village, in case it happens the villagers solve it themselves by sitting together to find out real issues and resolve them.

BOX 9: PUBLICATIONS BY TAURN BHARAT SANGH (ENGLISH)



11 Epilogue

There have been sea changes in the contexts, technology, attitude and mentality of the people, development pattern and political willingness over last three decades since TBS started its work in Gopalpura. In the changed circumstance TBS will need to brainstorm to find its relevance and take its work forward. Some of the areas where TBS may consider working in coming years are explained below. The possible resource mobilization for these areas has also been highlighted:

1. Advocacy on River Rejuvenation through Influencing National Policies
2. Replication of Model through training and technical support
3. Replication of model through *Jal-Biradari*
4. Strengthening of community based organizations in existing villages
5. Diversification of TBS work on use of water (hygiene & sanitation, production and value chain development, etc.)

11.1 POLICY ADVOCACY ON RIVER REJUVENATION

The objective of this component is to pursue policy dialogue with government and influence them to develop national river water policy for maintaining ecological flow of rivers, improving livelihoods of most vulnerable populations and improving community's



TBS secretary Mr. Kanhaiya Lal explaining river basin approach.

resilience to climate change. TBS has been working in this area since 2005, and positive development has been made through social movements on 'Yamuna' and 'Ganga' rivers. Major activities taken under this component are '*Jalyatra*', public hearing, workshops, conferences, etc.

TBS also focused on Save the Tiger Campaign as it realized that the mining mafia and hunters together made the Sariska void of tigers. It started the dialogue with people of Sariska to make it a place inhabited by tigers from a place annulled of tigers.

Development agencies like 'Oxfam India Trust', 'ActionAid' and 'WaterAid India' support this kind of advocacy programs. Concept note and project proposals can be submitted to them after organizing meeting with them. Individual contributions can also be mobilized.

11.2 REPLICATION OF TBS MODEL THROUGH TRAINING & TECHNICAL SUPPORT

TBS is internationally known for its model on community based decentralized water resources management through its solid experience of more than 25 years. It has worked in different regions including arid (Tijara, Jodhpur), semi-arid (Alwar) and Daang (Chambal-Karauli region of Sawai Madhopur). Over the years it has perfected RWHS through responding to community's requests, ensuring their participation and contribution in designing and implementing suitable RWHS. These are not done by following the same technology and engineering followed in different regions, but by sensing the needs and using traditional knowledge rather than just science which talks about a location specific approach and not tools and techniques.

Many NGOs, state and central government officials, universities and resource agencies are interested to replicate this model. Taking the cue from its experience on '*Jal Vidyapeeth*' (Education Centre on Water) where the emphasis was on learning through a creative process of experimentation and experience – designing and conducting short duration courses



Mr. Rajendra Singh and Mr. Maulik Sisodia teaching school children.

(6–8 weeks) could be considered. TBS can consider imparting the knowledge and skills in following ways:

Stage 1: TBS may conduct customized courses for selected staff of interested NGOs at its campus in Bhikampur where the staff will be trained on community based processes and approach of RWH. It could combine lecture, demonstration, field assignments and exposure visits. Such courses shall include: environment building for community mobilization, personality development to be a successful community workers, RWHS techniques and processes, site selection, skills to involve communities in decentralized decision making processes, their participation and contribution in implementation and management of the RWHS

Stage 2: TBS technical staff will visit NGOs' area and provide technical supports in initializing the projects while staying for short duration (4–6 weeks) with them;

Stage 3: TBS technical staff will make periodic visit to provide technical monitoring and follow up support in project implementation

TBS may charge nominal fee from NGOs for providing such training and technical support. In case there is no existing funding with NGOs for such activities TBS may help the NGOs to develop supplementary project and mobilize funding through its existing donors.

11.3 REPLICATION OF TBS MODEL THROUGH JAL-BIRADARI

TBS's efforts of organizing the local communities, individuals, government, civil societies, government organizations, etc. across the country have resulted in the formulation of a national level network called *Rashtriya Jal Biradari* (National Water Community). It was formally launched in 2001 at National Water Convention at Neemi, Rajasthan. *Jal Biradari* has been active in almost all Indian states and raising awareness on water issues



Mr. Rajendra Singh explaining revival of Sarsa river.

through *Padyatra* (Footmarch), conferences, meetings, workshops and campaigns. *Rashtriya Jal Biradari* is an impressive network which provides platform for concerned citizens to discuss and debate on water issues. It has been observed that many members have been working voluntarily on community's actions to local issues related to water. TBS should support such actions and use the RJB platform to replicate TBS learning on community based decentralized water resources management.

TBS could identify a few states (M.P., U.P., Maharashtra, Odisha and Chattisgarh) where its model can be replicated on pilot scale. TBS should work hand-in-hand with its Jal Biradari members in these states to develop proposals and identify a suitable donor agency to replicate the model.

11.4 STRENGTHENING OF VCS

TBS has consolidated its work in Thanagazi, Tijara and Karauli regions. The local communities in these areas have made significant progress and are almost self-sufficient in food production. They have also gained economically and socially, and have promoted VCs to monitor and maintain RWHS. However, role of TBS normally does not end with construction of some RWHS. Even the villages where TBS worked for long have been seeking its mentoring support to develop more RWHS. This is also because of nature of support which is a departure from conventional watershed ridge to valley approach. TBS provides support to those village communities that commit to consensus, contribution and judicious use of water. Therefore, though TBS may start work from upper catchment, it does not attempt to saturate the area before moving downward. As people observe the impact of the RWHS and identify need for more structure, they come forward for similar work. As such, though TBS expects to cover full potential of water harvesting in a micro-watershed, it does it gradually over a period of time.

TBS should continue with this approach and provide such mentoring support on request. It should do so by ensuring community consensus, their participation and contribution in establishing new structures. As these activities will not take huge financial support, TBS can mobilize individual donors to provide such support.



Participatory impact assessment exercise.

11.5 DIVERSIFICATION OF TBS WORK

Over the years TBS realized that to maximize the impact of water harvesting it should now put more focus on enhancing water utilization. Its earlier work in this regard focused on crop planning, checking promotion of water intensive crops (like Sugarcane and Paddy), discouraging third crop during one year and utilizing that time in social activities (visiting/meeting relatives, ceremonies, etc.). The other areas which TBS intend to explore regarding water utilization include hygiene and sanitation; improving crop productivity, processing and marketing (value chain development), improving water efficiency through micro-irrigation systems, etc. TBS will need to develop expertise in new areas by building capacities of its existing staff and hiring professionals

There are many agencies in India and abroad which are working in these areas. TBS should identify such agencies and share concept notes. Based on the feedback and interests from such agencies TBS should develop and implement such projects. A donor tracking system has been developed to identify donors in above areas. TBS should also take support of its international visitors and volunteers to identify such agencies in their countries.

11.6 OTHER AREAS FOR TBS FUTURE WORK

- Organizing Study Tours/exposure visits by putting nominal charges for food, accommodation, resource persons' fee and institutional charge
- Designing and introducing curricula on environment education at selected schools in Rajasthan on pilot scale, and then influencing educational policy to include environment education as a subject at school level.



Mr. Rajendra Singh and TBS senior staff discussing technical details of RWHS.

BOX 10: PUBLICATIONS BY TAURN BHARAT SANGH (NON ENGLISH)



12 Glossary of Words

ANICUT

Anicuts are built across the main *nallah* (reach) of the river. They are generally made of cement and stone or concrete. Due to their position, these structures supposedly have a very large impact on local groundwater tables and on stream flow. Their main purpose is to recharge the aquifer.



Anicut.

BANDH

In English *Bandh* means dam, but in relation to the Arvari River catchment, *Bandhs* are similar to *Anicuts*. *Bandhs* mainly sit across tributaries of the main river reach in this catchment. They generally consist of a concrete core, but the outer edges are of earth, and some are entirely made of earth. The main purpose of a *Bandh* is recharge in addition to surface storage of water.



Bandh.

JOHAD AND JOHADI

Johads are earthen dams shaped like a crescent moon. They are found at the foothills of slopes, collecting water from a small hilly catchment area. The main purpose of *Johads* is for livestock drinking water with some contribution to recharge. *Johadis* are smaller *Johads*.



Johad.

TALAB AND TALAI

In each village of India, a Talab or Talai can be found. A Talab is a deep hole or pond-like structure that has high raised edges on 3 sides made of earth (similar to Johad). Monsoon water is collected in the Talabs for village use and livestock drinking with some small contribution to recharge. Talais are smaller Talabs.



Talab.

MEDHABHANDHI

Medbhandis are constructed in farmed fields. The lower sides of the field are raised slightly to retain runoff to increase soil moisture content, and are made from earth. The purpose of a *Medbhandi* is to retain soil moisture for *Kharif* and *Rabi* crops.



Medhabhandhi.

13 Vocabulary

Abhiyan	Mission
Aurvedic	A medical stream which belief in natural therapy
Aviral	Perennial, Continuous
Bachao	Save, Protect
Bigha	1/20 part of an acre
Daang	Eastern plateau part of Rajasthan
Dev Vani	God Forest (developed around temple)
Gram	Village
Jal Biradari	A forum to protect water
Jal Sammelan	Conference on Water
Jal vidhyapeeth	Institute to teach water protection
Jeevan	Life, Living thing
Junglewasi	Forest dweller/s
Jungli Janwar	Wild animal
Kharif	Cropping season between June – November
Nirmal	Pure, Clean or Unadulterated
Nukkad natak	Street Play
Pad yatra	Foot March
Panchayat	Administrative unit for a group of villages
Rabi	Cropping season between December – March
Rakhat Vani	Forest preserved for ancestral protection
Sansad	Parliament
Sanrakshna	Conservation
Sarpanch	Judiciary head at Panchayat Level
Tehsil	An administrative unit in India

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Annexure 1 Assessment of Impacts of TBS work in 15 villages

NAME OF VILLAGES	SOCIAL	ECONOMIC	CULTURAL	ENVIRONMENTAL
Bhanwta-Kolyala (Arvari Water-shed)	<p>Drudgery of women for carrying water for drinking and household needs reduced so they have more time for their other family duties.</p> <p>Additional food production has improved the nutritional consumption of the household especially the children whose ailments and deficiency symptoms have been forgotten.</p> <p>Rise in confidence of the community to demand the right of self governance and responsibility of maintaining the structures. They have now a say in the River Parliament which has been created by the efforts of the community.</p> <p>Increased pride in their ability after receiving the President's award in recognition of their community driven conservation of natural resources.</p>	<p>Extent of land under cultivation has increased by 50 to 75% and doubling of yields has brought in significantly higher household income improving the economic status and enabling them to invest in agricultural inputs, tractors and other farm machinery in addition to personal transport in the form of motorbikes.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p> <p>Conserved water and vegetation has increased the cattle wealth which in turn has augmented the income of this traditionally pastoral community.</p>	<p>Quality of life has improved and the children are having time, inclination and the schools in the vicinity to take up education including the girls.</p> <p>Resurgence of traditional customs, ties within the community and the fabric of the community has become strengthened and geared for self reliance. Elders foresee erosion of rigid and restricting taboos and blurring of caste distinctions.</p> <p>Importance of the girl child realised and one can anticipate better gender balance in the future</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably as could be ascertained by looking into the open wells where the water is available quite close to the surface i.e. The water in the well is in the range of 4ft to 12 feet depending on the location of the well.</p> <p>Cutting down of trees has come down significantly and planting of Dev Banis (Sacred Woods) is a resurgence of old village traditions and is adding to the number of trees and influencing the micro climate beneficially.</p> <p>The cattle do not have to travel very far for water. Water availability has improved fodder availability</p>

NAME OF VILLAGES	SOCIAL	ECONOMIC	CULTURAL	ENVIRONMENTAL
Hamirpur (Arvari Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>Increased awareness of social rights and responsibilities leading to landmark judgment upholding the rights of the village community.</p> <p>Community driven movement for self governance by the formation of Arvari Nadi Samsad (Arvari River Parliament).</p> <p>Pride of achievement enhanced by the visit of Prince Charles to witness their work.</p>	<p>Extent of land under cultivation has increased by 30 to 50% and doubling of yields has brought in significantly higher house-hold income improving the economic status. This has resulted in a cascade effect enabling them to invest more in agricultural inputs(leading to more yields), tractors and other farm machinery, trucks/lorries in addition to personal transport in the form of cars/jeeps & motorcycles.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p>	<p>Quality of life has improved and the children both boys and girls are having time, inclination and the schools in the vicinity to take up education.</p> <p>The male youths are aspiring for better access to higher education of the girls in the village</p> <p>Resurgence of traditional customs, ties within the community and the fabric of the community has become strengthened and geared for self reliance.</p> <p>Importance of the girl child realised and one can anticipate better gender balance in the future</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably as could be ascertained by looking into the open wells where the water is available quite close to the surface i.e. The water in the well is in the range of 4ft to 12 feet depending on the location of the well.</p> <p>Cutting down of trees has come down significantly and planting of Dev Banis (Sacred Woods) is a resurgence of old village traditions and is adding to the number of trees and influencing the micro climate beneficially.</p> <p>The cattle do not have to travel very far for water. Water availability has improved fodder availability</p> <p>The increased base flow of the rivulet Arvari and the formation of large water bodies has increased aquatic fauna in the form of large fish population and birds both local and migratory in the downstream.</p>
Gopal-pura (Sarsa Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>These villagers are proud of the fact that the entire movement for conservation of water had its humble beginning here.</p>	<p>Extent of land under cultivation has increased by 30 to 50% and doubling of yields has brought in significantly higher house-hold income improving the economic status and enabling them to invest in agricultural inputs, tractors and other farm machinery in addition to personal transport in the form of motorcycles. Diversified livelihoods and occupations as civil construction workers/ plumbers, carpenters are observed.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p> <p>Increased cattle population has augmented the income of the population of this traditionally pastoral community.</p>	<p>Improved quality of life has resulted in children both boys and girls having time, inclination and the schools in the vicinity to take up education.</p> <p>Resurgence of traditional customs, ties within the community and the fabric of the community has become strengthened and geared for self reliance.</p> <p>Importance of the girl child realised and one can anticipate better gender balance in the future</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably as could be ascertained by looking into the open wells where the water is available quite close to the surface i.e. The water in the well is in the range of 4ft to 12 feet depending on the location of the well.</p> <p>Cutting down of trees has come down significantly and planting of Dev Banis (Sacred Woods) is a resurgence of old village traditions and is adding to the number of trees and influencing the micro climate beneficially.</p> <p>The cattle do not have to travel very far for water. Water availability has improved fodder availability</p>

NAME OF VILLAGES	SOCIAL	ECONOMIC	CULTURAL	ENVIRONMENTAL
Lilya-Dhiroda (Sarsa Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>These villages are having residents belonging to many castes who have learnt harmonious coexistence.</p>	<p>Extent of land under cultivation has increased by 30 to 50% and doubling of yields has brought in significantly higher household income improving the economic status and enabling them to invest in agricultural inputs, tractors and other farm machinery in addition to personal transport in the form of motorcycles. Diversified livelihoods and occupations as civil construction workers/plumbers, carpenters are observed.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p>	<p>Improved quality of life has resulted in children both boys and girls having time, inclination and the schools in the vicinity to take up education.</p> <p>Importance of the girl child realised and one can anticipate better gender balance in the future</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably as could be ascertained by looking into the open wells where the water is available quite close to the surface i.e. The water in the well is in the range of 4ft to 12 feet depending on the location of the well.</p> <p>Cutting down of trees has come down significantly.</p> <p>Thanks to the dedicated efforts of a lone individual the small pieces of Common Property Resources are being developed as a village forest /pasture land.</p> <p>The cattle do not have to travel very far for water. Water availability has improved fodder availability</p>
Gadh-basai (Sabi Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>These villages are having residents belonging to many castes who have learnt harmonious coexistence. All internal conflicts are settled amicably within the gram panchayat by mutual a lot of respect and consent.</p> <p>The Gram Sabha has garnered respect and faith of the people and decisions of local self governance are arrived at through thorough discussions with the members and the residents.</p>	<p>Extent of land under cultivation has increased by 50 to 150% and in a few individual cases a staggering 300% doubling of yields has brought in significantly higher household income improving the economic status and enabling them to invest in agricultural inputs, tractors and other farm machinery in addition to personal transport in the form of motorcycles. Diversified livelihoods and occupations as civil construction workers/plumbers, carpenters are observed. The traditional livelihoods and occupation of the different castes and communities are being practised unhindered.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p>	<p>The system of dowry in marriages of the girls is gradually becoming less of a constraint.</p> <p>Importance of the girl child is witnessed by parents of girls refusing to give the brides away to households who do not have girl children.</p> <p>About fifty girls are studying in college at the Tehsil head quarters of Thanagazi. Girls are going to the local higher secondary schools and use cycles for transportation to attend school.</p> <p>The gender ratio is expected to return to a fair balance in the near future.</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably as could be ascertained by looking into the open wells where the water is available quite close to the surface i.e. The water in the well is in the range of 4ft to 12 feet depending on the location of the well.</p> <p>This village has now got the name of "Paniwala Gaon" meaning water village.</p> <p>The cattle do not have to travel very far for water. Water availability has improved fodder availability</p> <p>However, forestry and pasture land development need more attention for optimal development and for restoration of ecological balance.</p>

NAME OF VILLAGES	SOCIAL	ECONOMIC	CULTURAL	ENVIRONMENTAL
Buja (Sabi Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p>	<p>Extent of land under cultivation has increased by 30 to 100% and doubling of yields has brought in significantly higher house-hold income improving the economic status and enabling them to invest in agricultural inputs.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p>	<p>Improved quality of life has resulted in children both boys and girls having time, inclination and the schools in the vicinity to take up education.</p> <p>Importance of the girl child realised and one can anticipate better gender balance in the future</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably as could be ascertained by looking into the open wells where the water is available quite close to the surface i.e. The water in the well is in the range of 4ft to 12 feet depending on the location of the well.</p> <p>Indiscriminate tree felling and lopping of live branches is still in practice and needs to be curbed.</p> <p>Improved water availability and increase in fodder for cattle and wild fauna of the vicinity.</p>
Kraska (Ruparel Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>Improved water availability and grazing in the forest of the core area of Sariska Tiger Reserve has elevated the social status of these residents in the eyes of the community as they help them out by rearing the cattle of their relatives in the plains who do not have pastures or grazing lands.</p>	<p>Despite abundant water availability no agriculture is being practiced as directed by the Government.</p> <p>Increased water availability and pasture fallows the cattle population has gone up. Sale of milk products forms the greater part of the income.</p>	<p>The residents of this village are under a threat to vacate their village and relocate themselves elsewhere.</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably. There are four large water bodies stored against the RWHS. These expansive water surfaces have become a roost for the many migratory aquatic birds. These water bodies have increased the period of the base and seepage flow of all the drains, streams and minor rivulets in the downstream. The fauna of the Sariska Tiger Reserve do not have a dearth of drinking water.</p>

NAME OF VILLAGES	SOCIAL	ECONOMIC	CULTURAL	ENVIRONMENTAL
Mandalwas & Rajour (Bhagani Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p>	<p>Extent of land under cultivation has increased by 50 to 100% and in some individual cases a good 150%. Manifold increase in yields has brought in significantly higher household income improving the economic status and enabling them to invest in agricultural inputs. Tractors, farm implements and motorcycles for personal transport have become prolific in this village. Cultivation of cash crops like hukkah tobacco has augmented the income considerably.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness</p>	<p>Improved quality of life has resulted in children both boys and girls having time, inclination and the schools in the vicinity to take up education.</p> <p>Importance of the girl child realised and one can anticipate better gender balance in the future.</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably. There are four large water bodies stored against the RWHS. These expansive water surfaces have become a roost for the many migratory aquatic birds. These water bodies have increased the period of the base and seepage flow of all the drains, streams and minor rivulets in the downstream. The fauna of the Sariska Tiger Reserve do not have a dearth of drinking water.</p> <p>Cutting down of trees has come down significantly and planting of Dev Banis (Sacred Woods) is a resurgence of old village traditions and is adding to the number of trees and influencing the micro climate beneficially.</p>
Devvari (Jahajwali Water-shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>The economic upsurge has made this community not only self reliant but capable of extending aid and assistance to their kith and kin residing in other less fortunate villages.</p>	<p>Extent of land under cultivation has increased by 50 to 100% and in some individual cases a good 150%. Manifold increase in yields has brought in significantly higher household income improving the economic status and enabling them to invest in agricultural inputs. Tractors, farm implements and motorcycles for personal transport have become prolific in this village.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness</p>	<p>Improved quality of life has resulted in children both boys and girls having time, inclination and the schools in the vicinity to take up education.</p> <p>Importance of the girl child is realised and one can anticipate better gender balance in the future.</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably. There are five large water bodies stored against the RWHS. These expansive water surfaces have become a roost for the many migratory aquatic birds. These water bodies have increased the period of the base and seepage flow of all the drains, streams and minor rivulets in the downstream. The fauna of do not have a dearth of drinking water.</p> <p>Cutting down of trees has come down significantly and planting of Dev Banis (Sacred Woods) is a resurgence of old village traditions and is adding to the number of trees and influencing the micro climate beneficially.</p>

NAME OF VILLAGES	SOCIAL	ECONOMIC	CULTURAL	ENVIRONMENTAL
Losal Gujraan	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>Improved social awareness but need follow up to make them more self reliant.</p>	<p>Extent of land under cultivation has increased by 50 to 100% and in some individual cases a good 150%. Manifold increase in yields has brought in significantly higher house-hold income improving the economic status and enabling them to invest in agricultural inputs. Tractors, farm implements, heavy goods transport vehicles, cars/jeeps and motorcycles for personal transport have become prolific in this village.</p> <p>Additional income has been invested in better housing and a gradual increase in saving ability thereby increasing their repayment ability and credit worthiness.</p>	<p>Improved quality of life has resulted in children both boys and girls having time, inclination and the schools in the vicinity to take up education.</p> <p>Importance of the girl child is realised and one can anticipate better gender balance in the future.</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably. There are five large water bodies stored against the RWHS. These expansive water surfaces have become a roost for the many migratory aquatic birds. These water bodies have increased the period of the base and seepage flow of all the drains, streams and minor rivulets in the downstream. The increase in the levels of ground water have been tapped by good yielding bore wells.</p> <p>The fauna of do not have a dearth of drinking water.</p> <p>Cutting down of trees has come down significantly and planting of Dev Banis (Sacred Woods) is a resurgence of old village traditions and is adding to the number of trees and influencing the micro climate beneficially.</p>
Khijoura Raibeli Bandhan ka pura (Mahesh- wara Water- shed)	<p>Reduced drudgery for the women folk for carrying water.</p> <p>Increased time devoted for the well being of the family.</p> <p>Improved nutrition has resulted in better child health.</p> <p>Improved social awareness but need follow up to make them more self reliant</p> <p>Distress migration and forced labor (bonded labor) still exist.</p>	<p>Extent of land under cultivation has increased by 50 to 100% and in some individual cases a good 150%. Manifold increase in yields has brought in significantly higher house-hold income improving the economic status and enabling them to invest in agricultural inputs. A few motorcycles for personal transport are found.</p> <p>Additional income has been invested in better housing.</p>	<p>Improved quality of life has resulted in children both boys and very few girls having time, inclination and the schools in the vicinity to take up education. Here the womenfolk undertake a lot of farming tasks including crop watching in the night to protect against wild Indian antelope grazing. Men folk go for menial jobs in the town of Karoli to augment the household income.</p>	<p>Soil and water erosion has been mitigated to a large extent and the ground water table has risen considerably. There are three large water bodies stored against the RWHS. These expansive water surfaces have become a roost for the many migratory aquatic birds. These water bodies have increased the period of the base and seepage flow of all the drains, streams and minor rivulets in the downstream. The increases in the levels of ground water have been tapped by good yielding bore wells.</p> <p>The fauna of do not have a dearth of drinking water.</p> <p>Planting of a few trees such as neem (<i>Azadirachta indica</i>) and peepal (<i>Ficus religiosa</i>) is found but no concerted effort of planned agro-forestry is noticed.</p>

Annexure 2 Terms of Reference

INTRODUCTION

Tarun Bharat Sangh (TBS) has been working in the area of water management and natural resource development for over 27 years. It works with communities to develop self-reliance in water management.

The Embassy of Sweden has contributed with 16.46 MSEK (about INR 116 million) as core funding from 2002–2009. During the current strategy period (2009 – 2013) the Embassy of Sweden is supporting TBS with 4.5 MSEK (about INR 29 million). It has been able to mobilise little direct support other than the Embassy of Sweden. This is justified because of the sometimes challenging position it has taken with regard to the Government of India's position on land use and communities. However, this places TBS in a highly vulnerable position. As part of its responsible exit, Sida is working with TBS to develop its opportunities for continued work and support.

Both TBS and the Embassy of Sweden now wish to document the impact of the work carried out since the Embassy of Sweden's involvement to make it available to all interested, nationally and globally.

The **outcome** of the study is enhanced knowledge and understanding with development community (international and national agencies, government, civil society and other interested stakeholders) on the impact of all the rural development work carried out by TBS through the Embassy of Sweden support.

The output of the study will be a document reporting on the outcomes/results/impact of TBS/The Embassy of Sweden programme on the lives of the communities and their natural resources endowment and the policy level changes effectuated through TBS efforts at local, state and national levels.

STUDY OBJECTIVES

The objective of this study is to

1. Document major outputs, outcomes, results and impacts of the project in promoting integrated natural resource conservation and management in the project area and impacting the lives of poor people ;
2. Document project and organizational best practices, gaps in implementation, how challenges in implementation were handled, major lessons learned and way forward for TBS including organizational sustainability aspects;
3. Document and disseminate outcomes/results/impact of the policy influencing work through publication and wider dissemination among “wider circles” including reference communities

METHODS & TOOLS

The assessment and documentation will follow the participatory approach that will involve all concerned stakeholders (The Embassy of Sweden, local community, district and state government officials, donor community and others. It is envisaged that the methodology will include the following:

- Secondary documentation review available with the Embassy of Sweden, TBS and other relevant sources;
- Focused groups discussions (FGDs) and interviews with key project as well as field staff at the Embassy of Sweden, TBS, other stakeholders and rights-holders;
- Primary field visits, collection and analysis of primary data and analyses through participatory methods through a rights-based and gender perspective
- Workshops with key stakeholders including Government authorities at local and state level.

The participatory method will include a combination of tools including

1. In-Depth Individual Interviews (15 villages × 2 persons each = 30)

Semi-structured interviews using a flexible interview guide will be conducted with randomly selected households to assess level of income and livelihoods improvement taking into account the support provided by TBS. The team will also physically verify the assets/structures created through The Embassy of Sweden support in the area.

2. Key Informant Interviews (approx. 10)

KII will be conducted with concerned stakeholders (The Embassy of Sweden, district and state government officials, other agencies). The key informants would be interviewed on key aspects of the programme components, their approach and insights gathered through the programme interventions. Challenges faced would be especially captured for future learning. The major focus will be on the level of sustainability of achievements and on impact of the project interventions.

3. Focused Group Discussion (FGD) (15 villages × 1 group = 15)

This tool will be used with the community based organizations (CBOs) formed under the Embassy of Sweden-TBS project to bring out information on the deliveries made through the Embassy of Sweden contribution. FGDs with both women and men's groups will be facilitated. Experiences of poor and most vulnerable people including women and men, girls and boys will be documented. Case studies of most vulnerable people including elderly people without caregivers, infirm, People with disabilities (PWDs), single women and children will be covered. In particular, information on sustainable livelihoods promotion, soil and water conservation, environment protection and climate change adaptation will be collected. Changes – both positive and negative effectuated in poor people's lives as a result of the policy level interventions to be documented from a right based perspective.

4. Historical Timeline Analysis (15 villages × 1 = 15)

This tool will be used to learn and highlight the processes followed with the target communities. This tool will also help in capturing the change in people's life and impact of the

Embassy of Sweden-TBS work on the environment. Capture the concrete policy level interventions of TBS especially on water and environment aspects over the years.

5. Participatory Sharing Workshop (4 sites × 1 workshop each = 4)

This workshop will be conducted at four different project districts/sites to share experience on impact of TBS work in the community as well as to gather evidences towards those impacts.

6. Active Observation

While carrying out impact assessment study, the team will record what they see by taking descriptive notes.

TEAM COMPOSITION AND RESPONSIBILITY

The assessment team will comprise Team Leader (TL), Rural Sociologist and Documentation Specialist.

The TL together with Rural Sociologist and Documentation Specialist will visit randomly selected 15 villages to conduct assessment on impact. They will record the interviews conducted in addition to personal notes which will be referred to at the time of doing analysis. The team will also take photographs where necessary and relevant which will be used at the time of analysis and report writing.

Team Leader: Mr. Jitendra Kumar Sinha

The mission will operate under the overall guidance and responsibility of the Team Leader. He will be directly responsible to the Embassy of Sweden for the overall quality and consistency of impact document, and the other members of the team will operate under his/her direct supervision. While supervising other team members in their field assessment he will conduct key informants' interviews, facilitate participatory sharing workshops and coordinate with publishers for the quality publication of the document.

Jitendra has extensive experience in natural resources management in 8 countries in Asia region. He has 10 publications and more than 75 reports under his credential. He has earlier conducted the Embassy of Sweden assignment for TBS to review and recommend on TBS's future financial viability to ensure organisational sustainability. He has also conducted internal mid term evaluation of the Embassy of Sweden-TBS current phase of the project. Currently, Jitendra is providing long term consultancy support to UNDP/GEF and Government of Iran as its Chief Technical Adviser and to IFC-World Bank as its Adviser to Farm Forestry Programme in India.

Jitendra has completed M. Sc. In Rural Development, M.Sc. in Agricultural Economics, a Post Graduate Diploma in Development Planning and a B.Sc. in Agriculture.

Documentation Specialist: Mr. Umesh Rao Adapa

The Documentation Specialist will be responsible to churn out relevant information from secondary review of documents, and prepare draft of impact document under the leadership of Team Leader. During field assessment, he will support Rural Sociologist in conducting PRAs and in-depth interviews of the community members.

Mr. Umesh Rao Adapa has vast knowledge and experience of over 30 years in rural development. He has earlier served Karnataka Government as Assistant Director and

Agricultural Officer. He has a number of publications under his name. He has been extended faculty to BASIX – India and Chairman, Consultancy services Cell of the Institution of Agricultural Technologists, Bangalore.

Mr. Adapa has completed MBA in Marketing Management and B.Sc. in Agriculture.

Rural Sociologist: Mr. Manoj Sinha

The Rural Sociologist will be leading the field assessment component, and will be responsible for PRAs, FGDs and in-depth interviews with local community, under the direct supervision of Team Leader.

Mr. Manoj Sinha has an extensive experience of more than 22 years in community development. He has a very strong skill in participatory approaches and earlier provided services to ActionAid, Aditya Birla Group of Companies and local NGOs in project development and documentation through participatory assessment.

He has completed Post Graduate Diploma in Rural Development from Xavier Institute of Social Services (XISS).

IMPACT STUDY PROCESSES

The process will be carried out through three phases, namely:

1. Desk Phase,
2. Field Phase,
3. Synthesis & Writing Phase

Desk Phase (5 days)

In this phase, the relevant project documents as well as documents related to TBS work will be reviewed. The study team will also have a briefing session with the Embassy of Sweden and TBS. (either at Delhi or TBS Ashram at Bheekampura village).

Towards the end of desk phase, the study team will prepare report on secondary information available on impact of TBS work. The study team will also review and finalize tools for information collection from the field.

Field phase (20 days)

The field phase will consist of visiting -TBS 15 project villages (randomly selected – both old and new) and interacting with the local communities on the impact of TBS work. A variety of PRA tools like historical timeline, social and natural resources maps, spider web analysis, etc. will be used for data collection.

The study team will also conduct one day participatory workshops to assess impact of TBS work on wider community.

Synthesis and Writing phase (5–7 days)

This phase will be mainly devoted to the preparation of the draft and final report. The study team will make sure that:

- Their assessments are objective and balanced, affirmations accurate and verifiable,

- When drafting the report, they will acknowledge clearly where changes in the desired direction are known to be already taking place.
- Based on the feedback and comment, the TL will prepare final report incorporating all relevant feedback and comments. The TL will be responsible for submission of the final report to the Embassy of Sweden, New Delhi. The final report will be up to a maximum of 30 pages including a brief synopsis of the work. Annexures may be annexed in addition to the main report. Case studies both positive and negative (if any) and voices of rights holders including photographs to be covered in the report. The report to be shared with the Embassy of Sweden and TBS for comments and feedback before finalisation. The report in hard copy and softcopy will be shared with the Embassy of Sweden, New Delhi, TBS and key stakeholders. The TL will have a final sharing/debriefing of the work with The Embassy of Sweden and TBS at a mutually convenient date after the completion of the assignment.

TENTATIVE TIMELINE

The assignment will be completed over three month's period, starting from 21.02.2013 and ending 31.05.2013. The following time schedule is proposed (estimated working days):

TASK	TEAM LEADER	RURAL SOCIOLOGIST	DOCUMENTATION SPECIALIST
Review of documents	4	4	4
Preliminary briefing & preparatory work for information collection	1	1	1
Field visit for data collection	10	20	20
Preparation for participatory assessment workshop	1	–	–
Participatory workshops (4 no x 1 day each)	4	–	–
Information synthesis & drafting of report	7	5	5
Final report preparation	3	–	–
Coordinating with publisher on layout, design and publication of document	5	–	–
Total working days per position	35	30	30



Flow – River Rejuvenation in India

Impact of Tarun Bharat Sangh's work

Tarun Bharat Sangh (TBS) was established in 1974 to provide relief and succour to the victims of a devastating fire in the campus of the University of Jaipur. Since 1985, TBS focused mainly on water conservation through small Rain Water Harvesting Structures (RWHS). Embassy of Sweden has been supporting TBS since 1994 to continue its efforts in water conservation in different parts of the Rajasthan. The book covers major impacts of the TBS work on river rejuvenation. It highlights initial struggle and efforts made by its staff and local people's journey over last 30 years from disparity to prosperity. The impact on social, cultural, economic and environmental aspects have been investigated and explained. The book also provides direction to TBS future work.

The Team Leader, **Mr. Jitendra Sinha** has extensive experience of more than 20 years in natural resources management in 8 countries in Asia region. He has 10 publications and more than 75 reports under his credential. Currently, Jitendra is providing long term consultancy support to UNDP/GEF and Government of Iran as its International Chief Technical Adviser.

Mr. Umesh Rao Adapa has vast knowledge and experience of over 30 years in rural development. He has earlier served Karnataka Government as Assistant Director and Agricultural Officer. He has a number of publications under his name. He has been extended faculty to BASIX – India and Chairman, Consultancy services Cell of the Institution of Agricultural Technologists, Bangalore.

Mr. Manoj Kumar Sinha has diverse and extensive experience of more than 25 years in community development. He has a very strong skill in participatory approaches and earlier provided services to ActionAid, Aditya Birla Group of Companies and local NGOs in project development and documentation through participatory assessment.

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