

# 2015

# Innovative Model for Safe Drinking water



Project Period: 27<sup>th</sup> May 2015 to 15<sup>th</sup> June 2015

### **Shroffs Foundation Trust**

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Project Period: 20 days 27<sup>th</sup> May 2015 to 15<sup>th</sup> June 2015

<u>Partners</u>: Pluga Pumps and Motors Pvt. Ltd. Franklin WELLS For The World Foundation & Franklin Electric, USA

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Pani Samiti, Kadavali Hamlet Bilvant Village



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### I. Conceptual Background

Safe drinking water is the essential need of every human being. Though availability of water is universal in nature; its quality and quantity is major constraint. Drinking water need of human is small in quantity and hence can be managed locally, but many villages still face acute shortage of drinking water due to various reasons of its management. The safe drinking water supply is the major issue for hilly areas and in coastal areas. The hilly regions due to hard rock terrain condition remain water scare even though rainfall is as high as 3000 mm/year e. g. village in tribal district in south Gujarat.

Similar situation of drinking water shortage exists in tribal villages of Chhotaudepur district having average rainfall of around 1000 mm/year. The traditional water supply through open wells and shallow hand pumps have become out dated due to increase ground water source in agriculture leading to lowering of water table in the area.

Thus now, Govt. program for drinking water supply has shifted to Mini Water Supply Scheme. Under this scheme drinking water is supplied through a deep bore well dug in area having good ground water potential. The water from the bore well is pumped to overhead tank and then distributed to households through pipe supply.

The major difficulty faced in the Mini Water Supply Schemes is to have timely availability of power supply for water pumping and lifting. Additionally the drinking water availability depends on power supply. As a result though many villages have water in the bore wells made for water supply; the villagers do not have access to drinking water.

Though Govt. record show village as fully covered under safe drinking water; on ground the villagers are found striving for getting their drinking water needs. This situation is prevalent in large number of villages covered under Mini Water Supply Scheme. Thus access to drinking water in most of the villages switched to Mini Water Supply Schemes is restricted by availability of power supply.



### II. About village Bilvant

The village Bilvant is a typical tribal village within forest area located about 42 Km. from Chhotaudepur town. This village is a part of Bhordali Group Gram Panchayat which covers total seven different villages. The Bilvant village is divided in to four hamlets encompassing total population of 910 persons and 146 households along with 584 animals.

There are total 31 drinking water supply sources including Hand Pump and Mini Water supply Schemes; of which only 16 are functional. The depth of available water resources ranges between 250 to 400 feet's and hence in its absence, villagers are dependent on open wells which are made for irrigation. These wells also dry up from month of March till beginning of monsoon. The water available in the open wells is highly contaminated with physical and biological pollutions; however the villagers are forced to use it for drinking.

Out of four falia (hamlets-Cluster of houses) in the village Bilvant – "Kadavali" falia having 48 household covering 288 people and 192 animals is found most water

scare area. There are total seven drinking water sources in this faliya; out of which only two (2) are functional. Both these water sources are under Mini Water Supply Scheme depending on availability of power for supply.

Since power supply is not reliable in this village and hence in situation of power interruption; women from these 48 household spent daily average 2 to 3 hours in collecting required water for drinking and their house hold chores.

The solar energy based pumping system has provided an opportunity for addressing the irregular power supply impacting access to water.



**Completion Report** 



# **III. Opportunity Created**

A Vadodara based corporate house named "Pluga Pumps and Motors Pvt. Ltd." is well known in manufacturing of pumping machineries for domestic and irrigation purposes. The management of the company is equally reputed in owning up of social responsibilities. The overseas partner of the company named "Franklin Wells" is in manufacturing of solar based pumping machineries.

The management groups of both the corporate houses proposed to create an innovative model for safe drinking water in one of the neediest and remote village of tribal area.

Shroffs Foundation Trust has long presence of about two decades in the Chhotaudepur region; had shortlisted three villages. Village Bilvant was finally selected for the project with following criteria for village selection:

- Village facing scarcity of drinking water
- Village that is small in size and compact in spread
- Readiness of villagers for providing their contribution as beneficiary
- Readiness of villagers to maintain the system

### **IV. Project Components**

The proposed project is innovative and highly technology driven in nature and hence the dialogue was initiated with the Pani Samiti of the Gram Panchayat. The project concept and its possible benefits were discussed and explained to the members of the Pani Samittee. Based on the usefulness of the project; the Pani samiti showed willingness to adopt the proposed pilot in one of the faliya of the village. Following the dialogue with the Pani samiti, the 2<sup>nd</sup> stage dialogue of selection of suitable location for the pilot was initiated.

The technical team of the companies calculated the capacity of pumping machineries based on dependent population and numbers of cattle considering flow of available ground water. The proposed project was discussed in details with the community of Kadavali faliya of Bilvant village for their initiation and approval. Thus, a technically feasible and socially acceptable scheme was prepared.

The proposed project was as a pilot carried out; intending to solve the drinking water problem in the remote village which are invariably having poor and non-reliable power supply. The pilot project had four major components including:

- Development of water source by drilling of 380 ft. bore well
- Installation of solar power based water lifting mechanism
- Construction of pump house and overhead tank
- Set up of water distribution pipe line with stand posts and cattle trough



### **V.** Community Participation

Based on above mentioned criteria; the village Bilvant was identified for implementation of pilot looking at the water scarcity situation. Detail study was conducted to identify the basic need of the faliya. The process and information gathered to finalize the project is as follow.

Conducted several meetings followed by a Gram Sabha. During these meetings detail discussions were done with the village community to gather basic information and detailed information regarding the problems of drinking water for human beings and cattle, available sources of water and water table in the area.

Based on the information collected and visit in the village; it was decided to carry out pilot in *Kadavadi faliya* of village Bilvant through active involvement of village community and Pani Samiti.

After finalisation of faliya; detail investigation and dialogue were carried out with community of faliya to identify the location and strategies. The brief of the outcome of the process are as below.

- **Identification of potential locations** for tube well, main tank and distribution systems. The potential site belongs to individual owner and hence approval of the owner to provide piece of land for project purpose was done.
- **The beneficiaries of the project** were identified and strategies for community contribution were decided with their agreement. It was decided that 10% of the project cost will be shared by the beneficiary group as their contribution to the project.
- **Operation and Maintenance of the system**: It was decided that after commissioning of the project it will be handed over to Pani Samiti; who will be in-turn responsible for operation and management of the assets. For this purpose, water tariff was derived for benefiting individual household by the

Pani Samiti. The income from the water tariff will be used for purpose of paying for services of operation and management.

• A group of women belong to beneficiary household were organized and formed in a group and were involved in the management and maintenance of the system.



**Completion Report** 



### **VI.** Execution of works

The execution of the work was done under the supervision of the technical expert from Shroffs Foundation Trust (SFT) and Donor companies. Before beginning of the work a timeframe for the project activities was prepared with intention to complete the work before beginning of the monsoon.

Detail estimates of each component of the project were prepared based on existing SOR of the respective Govt. departments. The estimates of each component were approved by the competent authority in the SFT.





![](_page_8_Picture_0.jpeg)

The Work included component of the drilling of the bore well and construction of the pump house and pipe distribution system. The selection process of the vendor for bore well drilling was done through standard process of vendor selection followed in Shroffs foundation. The process includes inviting quotation and short listing of vendor based on their quote, experience and credentials. The finalization of the vendor selection is done by the higher committee of SFT.

The activities of construction of pump house and pipe distribution system was done under the supervision of civil engineer of SFT. For this work local mason and labor were used to help generate local employment.

The measurement books were maintained by the civil engineer based on which payments were made to the vendors and labor.

The solar panel and pumping system was installed by the expert technicians from the company. The scheme was tested and commissioned in the presence of the technical person of the company. The local person identified by the community as operator was explained the operation system and also explained the guideline of checking fault in the system when it does not work properly. The scheme was commissioned and handed over to the community on 20<sup>th</sup> June 2015.

![](_page_8_Picture_5.jpeg)

![](_page_9_Picture_0.jpeg)

### **VII.** Outcome

The pilot project is directly able to provide access to water on sustainable basis to 50 families. It has also reduced drudgery of women. But importantly, success of the pilot will lead to a technical solution to large No. of mini water supply schemes which are incomplete due to lack of availability of power connection. As per Government records there are large numbers of mini water supply schemes which are awaiting power connection to start providing drinking water.

The successful implementation of the project will provide an alternative to start these incomplete mini water supply schemes to start providing water to large No. of families.

Since, solar based power is a sustainable source of energy; the water will be available to the beneficiaries on demand.

![](_page_9_Picture_5.jpeg)

![](_page_9_Picture_6.jpeg)

![](_page_10_Picture_0.jpeg)

### VIII. Impact

The impact of the pilot is achieved as below:

#### All 50 families are enjoying 100 liters of Safe Drinking Water Daily

#### Easy access to drinking water at faliya level

• Which has helped in reducing dependency on outside source and reduced drudgery.

#### The water can be made available to the families on demand

• Which is not possible in case of electric power based pumping. This has led to reduce the habit of water storage among the user and reduced wastage of water.

#### Decentralized model of water management

• This system catering need of small numbers of families and hence its management is easier due to participation of all beneficiary families.

#### Saved recurring expenditure of maintenance & electricity

• Which is one of the major constraints in management of water supply in rural area.

#### The replacement of electric power with solar energy

• Which is a clean energy will help in reducing green house gases (GHG) emissions occurring in production of electricity in thermal power station; will contribute reduce climate change impact.

![](_page_10_Picture_14.jpeg)

![](_page_10_Picture_15.jpeg)

![](_page_11_Picture_0.jpeg)

## **IX. Important Visitors**

The project was completed in record time of about five weeks; however during this time some important visitors have visited the village and observed the process. These visitors were:

**Mr. Chris Schantz**, Integration Manager-India, Franklin Electric, 9255, Coverdale Rd., Fort Wayne, IN 46809

Mr. August Lester, USA , Global head Solar, Franklin Electric

Mr. Haresh Asher, Pluga Pumps and Motors Pvt. ltd.

Mr. Vikas Vaze, CEO, Shroffs Foundation Trust

## X. Financial Closer

Following is the detail of expenses:

Sr.	Works	Expenses ₹
1	Bore well - 90 mt depth, 165 mm dia	33,110
2	Plate form for PVC Tank with stand post	48,463
3	Overhead HDPE tank – 5000 litre capacity	49,686
4	Pipe lines for stand posts and cattle trough	26,782
5	Cattle Trough (4.0 x 1.2 x 0.6 M.TRCC)	43,300
6	Pump room 2.00 x 2.00 meters	73,534
7	Raising main Pipeline, Stand post & Barbed wire fencing, Fixation of Solar panel	1,15,975
	Total amount ₹	3,90,853
8	Add: 1% Labour Cess	3,909
9	Add: 2% Contingency	7,817
	Net Amount for 1 Mini water scheme ₹	4,02,579
10	Admin & Capacity building of Pani Samiti	60,387
	Gross Amount for One Mini Water Scheme ₹	4,62,966
11	Add: Solar panel, pumping system provided by M/s. Pluga pumps	2,50,000
	Total Investment ₹	7,12,966

The *"Pluga Pumps and Motors Pvt. Ltd."* and *"Franklin Wells"* companies shared the expenses of the pumping machinery and Solar panels. These are provided and installed directly by the companies worth ₹ 2.50 Lakhs.

The community contributed ₹ 21,000/- as first installment and is deposited in the bank account exclusively opened for the O&M funds.

![](_page_12_Picture_0.jpeg)

### **XI.** Operation and Maintenance Strategies

The pumping of water by solar energy based pump set is new and innovative technology, first time introduced in the area; the day to day operation needed lots of technical skills. The technical team of the donor companies intensively trained the members of Pani Samiti and demonstrated various operations.

Also the team of SFT imparted trainings on subjects like, justified distribution of water, documentation system and water tariff. At present per family  $\gtrless$  50/- per annum is fixed as water tariff. SFT team helped in starting and establishing the documentation system and registers for documents like minutes of meeting, contribution, maintenance and receipt books are started documenting.

### XII. Learning

The solar energy based drinking water supply project is one of the most suited solutions for providing safe drinking water to the scattered habitats. This is particularly desirable in the areas like villages of Chhotaudepur block which are remotely located and having issues of continuous electricity supply.

The solar based solution is small in scale and hence has potential for easy management due to small number of its user. The technology is simple in nature and can be easily adopted by any person. The exposure of solar energy for pumping will also help in promotion of solar based pumping in agriculture sector.

Currently, large number of farmers are using diesel as a source of energy for irrigation. The farmer spent almost 50% of agriculture input cost in water pumping. If solar pumping is accepted in the agriculture for irrigation, it will reduce the input cost of farmer and will help in making farming affordable for all small and marginal farmers.

The solar energy is emerging solution in places like Chhotaudepur block. Since the technology is new, its spare parts are rarely available. It is desired that the company should provide some spare part. This will reduce waiting time in case of repairs.

The experience was shared in the district water and sanitation committee of Chhotaudepur; the collector as chair person shown keen interest to replicate the model in such remote village of the area.

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### XIII. Recommendations

The regular supply of electricity is still out of reach to the remote villages of Gujarat; which impacts the daily life style of the people. Not only supply of safe drinking water but lightening of streets and houses also are equally important in these remote areas.

The solar based electricity supply system can be a long lasting solution, hence it can be replicated in such areas.

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