

2019

Project Completion Report

Creation of Irrigation Facilities Based on Development of Water Reservoirs In Dead Dolomite Mines in Village Zer in Ta. & Dist. Chhotaudepur



**Village: Zer
District & Block:
Chhota Udepur**

Supported by

Gujarat State Financial Services Ltd. (GSFS)

Gujarat CSR Authority: April- 2016



सेवा सद्भाव विकास

Shroffs Foundation Trust

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Project at a glance

Project Title	Creation of Irrigation Facilities Based on Development of Water Reservoirs In Dead Dolomite Mines in Village Zer in Ta. & Dist. Chhotaudepur
Geographic area & Coverage:	<ul style="list-style-type: none"> • Rath area of Chhotaudepur • Villages: Zer • Block & District: Chhotaudepur, Gujarat
Project Duration:	One year, implementation and monitoring (2017-18)
Objectives of the Project:	<ul style="list-style-type: none"> • To demonstrate use unused mine area for developing irrigation scheme in Chhotaudepur Block • To increase irrigation potential in and around villages having dead dolomite mines. • Organize tribal farmers under co-operative structure for using common resource. • Establish community managed operation of the irrigation scheme
Proposed Activities	<p>A. Water source augmentation:</p> <ul style="list-style-type: none"> • Establish Water lifting and distribution network • Establish Diversion channel for surface runoff • Land improvement in command area <p>B. Community Mobilization & Capacity building.</p> <ul style="list-style-type: none"> • Formation of Co-operative formation & registration • Training of co-operative members
Projected Outcome	<ul style="list-style-type: none"> • Establish farm based sustainable livelihood • Beneficial use of water under dead dolomite mines. • Water security to the village for drinking and irrigation purpose. • Create a model of dead dolomite mine based irrigation to bring additional 500 ha land under irrigation facility. • Bring about 40 ha of land under two agriculture seasons • Additional income of Rs.30,000/- from second crop • At least doubling of the income per ha of land

Financial Plannig: Rs.43.61 Lakhs for,

- Creating Irrigation Facility
- Institute building- Capacity building-Land Improvement & other
- Operation & Management support

Introduction

In the year 1994, SFT initiated the tribal development work in Chhotaudepur block with community based watershed program with a simple approach of increasing tribal families bonding with their land by increasing access to irrigation water by means of water harvesting. The watershed program has helped in building 249 water harvesting structures resulting conservation of 6.74 Lack cubic meter of water. The program has benefited 12000 ha of land and increased irrigation over 1265 ha in 36 tribal villages.

The watershed program had a positive impact on curtailing migration and increasing food security and generation of surplus from agriculture and animal husbandry in the villages covered under the program. The watershed development program in Chhotaudepur has establish learning's that the natural resource management is a pivotal activity in providing solution to the problems of migration, food security and nutrition among the tribal communities.

Ensuring water availability through water harvesting has proved its significance as a driving force for agriculture development and diversification in the whole of eastern tribal belt. Shroffs Foundation Trust working in Chhotaudepur Block since 1994 has successfully demonstrated agriculture development and diversification following increase in water availability for irrigation through watershed development programme. The small water harvesting structures like Nala plugs, check dams and farm ponds built under watershed development projects have resulted in development of ground water resources, which in turn resulting in construction of ground water wells supporting access to water for all needs. The experience of more than 20 years work with tribal community has established that the socio-economic development of tribal community is followed after ensuring water. The tribal farmer is no more behind in agriculture production if irrigation water source is ensured to them.

The availability of numerous streams and underlying geological formations in Chhotaudepur block is most conducive for groundwater recharging. The watershed area development work has resulted in increase of ground water table five to six folds during last two decades. Thus these small water harvesting structures (WHS) play critical role in providing sustainable irrigation. The field observations shows that these WHS helps in increasing period of water availability in wells located in its periphery, it has minimized the vulnerabilities of crop failure in long dry spells and has also allowed the farmers to take Rabi season crop.

Many of the existing WHS built over a period of last two decades demand repair and maintenance. As a result of damage of WHS, the recharging of ground water is getting reduced, threatening water availability in the wells. In absence of WHS structures, the wells run dry converting huge investment in vain and creating situation of water crisis.

The project intended to develop vibrant agriculture based sustainable livelihood by rebuilding of WHS which were damaged and needed repair. Only those WHS are selected to be rebuild which were found benefiting in recharging the well when it was intact.

Background:

The Chhotaudepur block is blessed with the reserves of dolomite and limestone minerals. The dolomite and limestone open cast mining is operative in the block since early 60s and still continue. These mining operations help in providing wage employment opportunities during agriculture lean period in and around villages having dolomite mine sites.

The mines where mining is done since last 3 to 4 decades have become dead with no further dolomite reserves available. These sites have become crater without any use. These sites have potential to develop as water reservoirs for irrigation. This also fall in line with the guiding principles of scientific mine closure proposed under National Mineral Development Policy to help restore ecology and regenerate bio mass and improve socio-economic aspects of such closure.

The use of open cast mines site for economic and environmental use is a known practice in Gujarat and India. Ambuja Cement Limited, operating open cast mining of limestone with depth of 10-12 meter in Kodinar block of Junagadh district has successfully converted the mine pits to water bodies, orchards, and agriculture farms and pasture land. The water storage in the mine pits are increased by diversion of surface runoff from surrounding areas.

Over the years we have experienced that there are about 75 dolomite mines in 19 villages of Chhotaudepur, which have been excavated and not operational. These mines are good water reservoir and contain huge water round the year and could be used for irrigation facilities. The increased irrigation can help in transformation of agriculture on sustainable basis. As per our primary survey about 780 hectares (1950 Acres) of land can be brought under irrigation, to enable at least two cropping seasons in a year benefitting to 1000-1250 tribal farmers in pulling them out from extreme shortage of livelihood and ultimately from poverty. (This is an innovative project, upon success many such reservoirs can be used for irrigation water and would provide sustainable livelihood to the local tribal communities)



To demonstrate a model of irrigation scheme based on water reservoir created in dead dolomite mines in Chhotaudepur block, SFT had identified potential site at Zer village. Zer is located on the north of Chhotaudepur bordering the forest area of Devgadh Bariya. The area is known for dolomite mines, which are being regulated by Gujarat Mineral development Corporation, Govt. of Gujarat, having dolomite stone right from upper layer of the soil minimizing possibilities of Agriculture.

The livelihood of the village is mainly depends on the mine based labour work, which was full of hardship in terms of safety, health and social disparities. The people did not trust on agriculture based livelihood. SFT had lots of challenges, first of all to convince the people to shift on agriculture for livelihood and second to get through the legal constraints to get the project funds. Gujarat CSR Authority came forward to support. Thus a project to avail the huge potential for irrigation got grounded.

Village Zer

Demography and livelihood

Village Zer is located about 15 Km. from Chhotaudepur on Zoz road. The village form part of micro-watershed No. 5D17-aq1f. There are 374 house hold with population of 2312 person. The village is divided in four hamlets located at a distance of 0.5 to 1.5 kms from each other. Almost entire population belongs to tribal communities known as Rathwa, Dhanak and Koli. The village is having total area of 1530 ha. out of which 1255 ha. land is used for agriculture purpose.

Micro watershed No	a1f
AREA	1530
Household	374
Population	2312
Male	1164
Female	1148
Population Scheduled tribe	2307

Agriculture, wage employment in mining operation and animal rearing is the main income generation activities of the families living in the village. There are total 686 farmers in the village cultivating mainly Cotton, Tuwer and pulses- crops in the village. The village has 73 ha. land under irrigation using wells and water stored in the mine pits and pond. 47 ha. land is leased for dolomite

Land use in ha.	
Total area	1530
Forest	0
Agriculture land	
Irrigated	73
Un-Irrigated	1174
Cultivable waste	231
Not available for cultivation	52

The participatory rural appraisal (PRA) with the people of the village has helped in understanding present status of the existing water resources, agriculture and availability of other infrastructure required for basic needs.

Ground water resource



As mentioned the village Zer is surrounded by dolomite mines, as per primary information there are about 18 dolomite mines of different capacities. Among the mines 2-3 mines have good potential to develop the irrigation facilities as community schemes. The area is hilly and hence in the dawn streams there are about one group well benefitting about 20 acre of land and 66 hand pumps for drinking water. The first layer of ground water is found in wells after depth of 15 ft.

in White Moram having average thickness of about 15 ft. This rock strata is followed by water bearing strata of hard murrum having average thickness of 10 ft. This is followed by hard compact rock of 20 ft. thickness, which is having water in some zones.

The average wells dug in the village is of 35–45 feet depth and gets water from murum formation. This wells yield water from fissures and crevices in the rocks. In Rabi season the water level of these wells drop to bottom after pumping of 3 to 4 hours, while in summer the water level drops after pumping of only one hour. The wells refilled by seepage water in 3 to 5 hours

after pumping. The geological formations in the village allow recharge of ground water within periphery of Water Harvesting Structures.

The project genesis:

Problem statement:

The tribal communities of Chhotaudepur block mainly depend on agriculture and forest produce based livelihood; there are 38513 lakh hectares of land under cultivation out of this 11173 hectares are under irrigation which is around 29% of total land, thus huge nos of farmers depend on rain fed agriculture. In the uncertain rainfall situation the vulnerability of the farmers for livelihood has emerged as one of the burning issues leading to migration, exploitation and all other social issues. This issue can be addressed by developing irrigation facilities to enable farmers to increase the crop intensity by adding at least one more cropping season.

Sustained recommendation:

The Chhotudepur region is known for dolomite mines, which provides direct employment to the surrounding villages. The dolomite mines are operational by getting lease from Gujarat Mine and Mineral Development department- over the years we have experienced that there are about 75 dolomite mines in 19 villages, which have been excavated and not operational, these mines are good water reservoirs currently contains huge quantity water round the year and can be used for irrigation facilities. The increased irrigation facilities can help in transformation of agriculture on sustainable basis.

The farmers of the area are constantly raising this issue at local authorities; however this is a policy matter at government level involving multi departments, hence it required strong support to emerge with a collective decision. Shroffs Foundation Trust presented the issue with various higher authorities at state level but because of the complexity involved, no positive results found after prolonged process.

The issue was presented at GCSRA management and after studying the feasibility of the proposed project it was decided to create a replicable model of its kind.

Based on the detail exercise and mapping of the potential the project was designed with the following details.

Objectives of the proposed project

1. To demonstrate use unused mine area for developing irrigation scheme in Chhotaudepur Block
2. To increase irrigation potential in and around villages having dead dolomite mines.
3. Organize tribal farmers under co-operative structure for using common resource.
4. Establish community managed operation of the irrigation scheme

Key feature of the project

1. Develop dead dolomite mines into water reservoirs and irrigation water distribution through piped network to reduce water loss due to evaporation
2. Operation of scheme based on co-operative irrigation pattern
3. Self sustenance of scheme by means of water tariff to reduce water wastage

To achieve Expected Outcome through the implementation in village Zer:

1. Beneficial use of land under dead dolomite mines.
2. Water security to the village for irrigation purpose.
3. Create a new model of water harvesting in villages having dead dolomite mines.
4. Total about 40 ha. land will get benefit of irrigation.
5. Additional annual income of Rs. 10-15 lakhs from second crop on 40 ha. land
6. Additional 20 ha. area will cropped during third cropping season.
7. Helping to doubling of the income of beneficiary farmers.

Execution of project interventions

The dolomite mines are idly lying since decades, the nearby farmers were using for irrigation purpose at very little scale. Hence before planning for a big scheme and make sizable investment it was imperative to check the quality of water and its compatibility for irrigation and soil texture. As precautionary measure water sample was tested at laboratory of Gujarat State Fertilizer Co (GSFC) Vadodara. Surprisingly it was found that the water was highly suitable for the irrigation.

No. Of Samples: 2 Nos.

Sample Souce : From Village Zehr & Bedvi

Type of Sample: From Dolomite Excavated Pits

Analysis Report:

Sr. No.	Parameters	Village Zehr (Sample No.1)	Village Bedvi (Sample No.2)
1.	pH	7.26	7.54
2.	Color	Colorless	Colorless
3.	Odour	Odourless	Odourless
4.	TDS (ppm)	256	300
5.	Total Hardness (ppm)	190	200
6.	Chlorides (ppm)	25	55
7.	Sulfates (ppm)	11	Nil

As it was observed that the people are depending on hand pumps for water for drinking and domestic use purposes, hence a similar testing was done at GSFC laboratory to check the quality of water for drinking purpose. This report also is showing good quality of water for drinking purpose. After assurance of water quality the project interventions were started.



A. Community Mobilization Process:



SFT's technical team observed that the empty dolomite mines can be developed as good source of irrigation to make Kharif crops successful and add Rabi season to enhance the family income.

Because of negligence of generations, the people do not trust in any such innovative interventions hence the community mobilization processes took considerable time to create common understanding and to take up the project. Shri R. K. Sama, Trustee of Shroffs Foundation Trust took keen interest in

guiding the working team with involvement in community process and technical aspects of the project.

- Initially a village level committee was formed consisting of representatives of all hamlets of the village to facilitate the work execution process, later the committee will be registered as irrigation cooperative society as per state cooperative laws.
- As a part of operation and maintenance the rules for water tariff are set, the members are being trained on documentation system and Season wise Crop planning for optimum utilization of available water resources.
- Since the farming is a secondary option of livelihood, the farmers are not able to pay contribution in cash together; it has been decided to collect the cash as advance contributions for the works of individual land and contribution in form of work/ labor.

B. Technical Survey

It was necessary to conduct a detailed technical survey of the entire command area of the irrigation scheme, since GCSRA had approved the concept note with model costing SFT hired services of a senior irrigation engineer and his team to conduct detail technical survey with work execution plan. Further this technical team accepted to monitor the execution of the works for assurance of quality & technical aspects up to testing of the irrigation scheme and also to meet the timeframe.

According to this survey there was potential to bring 45.26 hectares of land under irrigation benefitting 65 farmer families.

C. Work Execution

SFT has an internal system of procurements and hiring the agencies for work execution, also SFT has a pull of such specialized contractors who can execute the projects with desired quality and meeting the timeline. As per the system, quotations were invited from the reputed and

Particulars	Completed as Phase-I	Proposed as Phase-II
Nos of Farmers	53	16
Hactares of land	35.94	20.18
Nos of land parcels	52	17
Pipeline laid metres	2100	1055
Nos of outlets	21	12

experienced contractors. A team of senior managers examined the quotes and finalized the agency and awarded the works.

The agency started excavation of the pipeline network. Excavation and the construction of outlets have been completed including pump house, chambers, etc.

The farmers group was trained on quality checks of the assets created and made them responsible to facilitate and monitor the quality of works.

As per the approve action plan following works have been executed

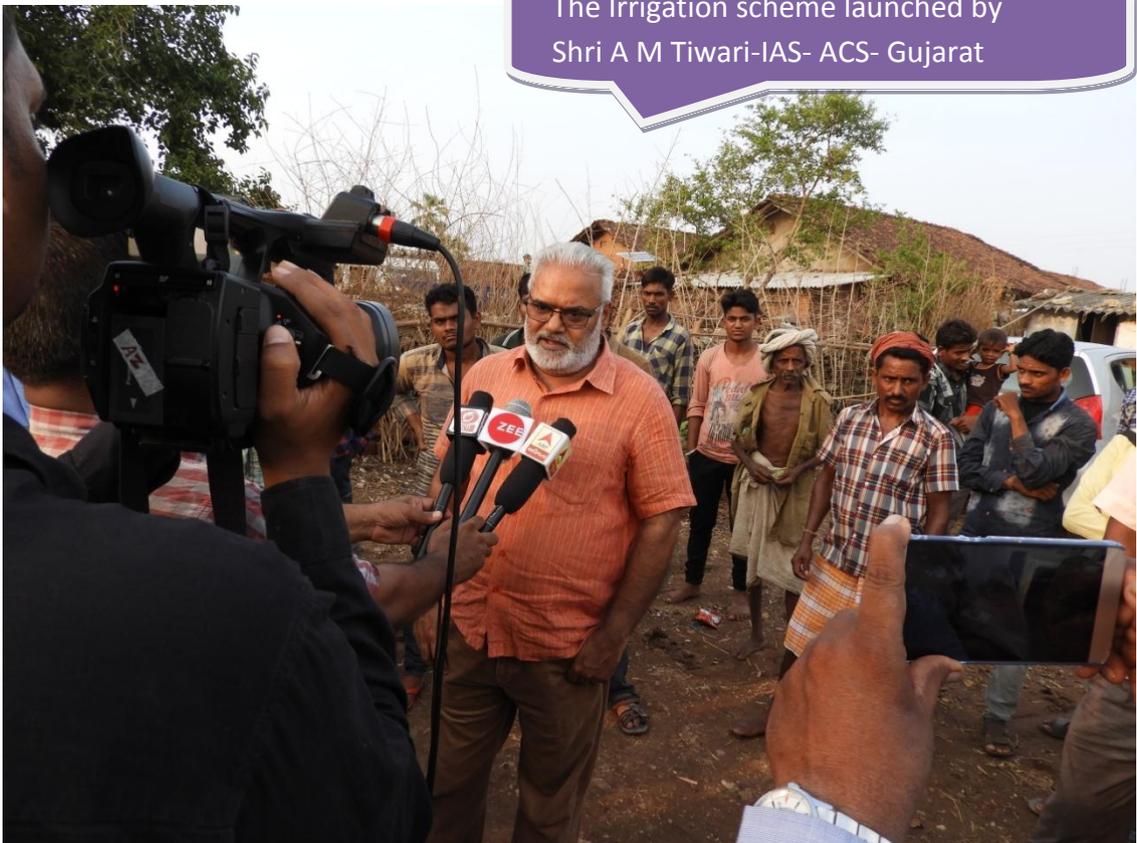
- Co-operative formation & registration: As part of community mobilization process an informal group of beneficiary farmers was formed. To avail the electric connection and other programmatic benefits of government schemes, institutional arrangement is essentially required. Accordingly the formation of Irrigation cooperative society is initiated as per the established bylaws of state government. The registration of cooperative society requires lots of legal compliances, NOCs and support documents hence it will take at least six months of time.
- Training of co-operative members: The operation, Management & Maintenance of the assets created requires related skills to understand the technical aspects. The members were trained by technical resource persons on service of machineries, operating hours, spare parts with small repairing works. The members were also trained on institutional building aspects such as, concept of working together, conflict resolution, positive attitude along with the documentation and record keeping system.



- Since the cropping pattern and practices of the farmers of the coverage area were primitive by nature, hence it was imperative to train them on high yielding crops, quality inputs and modern practices by the senior agronomist.
- Water lifting and distribution network: The major work of the project was laying of water distribution pipeline, construction of outlets and installation of pumping machineries. As per planning and actual survey conducted by the technical agency 2100 running meters of pipeline is laid with 21 outlets for water distribution system. The pumping system is based on 15 HP diesel oil engine, the provision of 15 HP submersible pump is made but it can be functional only after getting the electric connection.



The Irrigation scheme launched by
Shri A M Tiwari-IAS- ACS- Gujarat



Impact on agriculture:

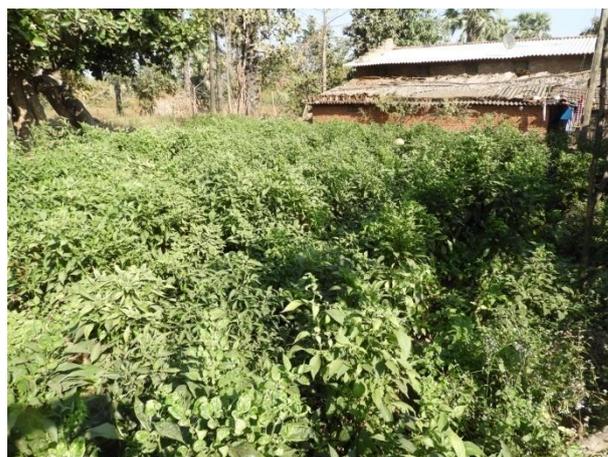
Changes in Cropping & Agriculture Practices

- Farming of High valued crops:** The farmers of the village were depending only rain fed farming such as Maize, Black gram and Paddy due to absence of irrigation facilities. As per the monitoring data the farmers have slowly started shifting from primitive farming to progressive farming by adding new crops like cotton and vegetable and reduced

Sr.no	Crop	Pre-2016-17		Post-2017-18-19	
		Area in Acre	Production in Kg/Acre	Area in Acre	Production in (Kg/Acre)
1	Blackgram	3	185	3.38	219
2	Cotton	-	-	25.30	744
3	Maize	42	662	37.13	915
4	Paddy	12	697	11.00	889
5	Tuver	22	303	10.05	360
6	Gram	-	-	0.00	-
7	Bajara	-	-	0.00	-
TOTAL		79	1,847	86.85	

the cereal crops. SFT team has trained the farmers on scientific management of seed with appropriate seed rate, seed tracing and spacing technique are the key factors of successful farming.

- Plantation of Drumstick:** SFT has initiated the plantation of drum stick in the Rath area of the Chhotaudepur block to address the nutrition deficit among of the tribal families and also to create an additional source of livelihood. The beneficiary farmers of the irrigation scheme are motivated to plant 50 plants of improved variety of drum stick. This will be an additional support in family income. Also it will be used as nutritious cattle feed. During last Kharif season 2500 plants of drum stick (PKM-2 variety) were developed in the village.



Agriculture, Animal Husbandry and allied activities are the major sources of livelihood for the tribal community of the area; all these activities depend on successful monsoon, available water for irrigation and climatic conditions. But because of hilly hard rock restricts the availability of the ground water for irrigating second crop; the undulating farms result in severe soil erosion problems. The cumulative impact is uncertainty in the agriculture production and availability of fodder that poses serious threat of food and drinking water security to the small and marginal farmers. The irrigation facility created under this project has minimized the threat of crop failure in uncertainty of rainfall and long dry spells.



Because of increased irrigation facilities additional 35 hac of land could be brought under assured irrigation during Rabi and Kharif seasons. Protective irrigation facilities are available to whole command area (35 hac) by networking of water distribution pipelines and outlets wells.

The yield data maintained during the Kharif & Rabi 2018-19 reveal that the farmers are able to grow long term cash crops and irrigated Paddy in Kharif season followed by 100% coverage in Rabi crops in 35 hectares of land. Comparing to the baseline yield data it also reveals that the income has been increased in tune of 3.5 folds.

Program Cost		Pre Project production Value Rs.		Post Project - Production Value Rs.		Net Incremental Income Rs.
Program Cost	35,79,905	Kharif	7,57,053	Kharif	16,71,793	19,36,326
Management Cost	3,96,538	Rabi	-	Rabi	10,21,586	
Total Investment	39,76,443	Total	7,57,053	Total	26,93,378	

Way Forward

Saturate the village

- In the first phase a lift irrigation system is developed using water stored in the mine located on survey No. 405. The scheme has brought 53 survey numbers with an area of 35.94 Hectar under irrigation facility. Intensive community mobilization was considered through several meetings in the village incorporating all the stake holders. They found very hard to convince for such innovative project and to believe that their farms would have water besides rain water. The existing mine and installed pumping system has still potential to irrigate more 20.80 hac of land to benefit about 30 tribal farmers.
- The village Zer has second unused mine in the different direction of the village, this mine also have potential to irrigate about 40 hac of land benefitting about 60 tribal farmer families, if these two phases can be completed the village will have 100% irrigation facilities and a long lasting solution for poverty eradication.

Replicable model for mine regulation policy:

This project was undertaken as a model to create a sustainable and productive source of livelihood and also to create a path way to convert about 75 such empty dolomite mines into productive assets.

As per the primary survey about **780** hectares (1950 acres) of land can be brought under irrigation, to enable at least two cropping seasons in a year benefitting **1000-1250** farmers in pulling them out from extreme shortage of livelihood.

This needs a collective effort to showcase the model for policy framing for the empty mines

Important Visitors

1. Shri A M Tiwari, IAS, ACS, Government of Gujarat
2. Smt Shrutiben Shroff, Managing Trustee, Shroffs Foundation Trust
3. Shri R K Sama, Trustee, Shroffs Foundation Trust
4. Shri Pankaj Kamaliya COO-GCSRA
5. Shri Vikas Vaze, Chief Executive officer, SFT
6. Dr.Chirag Patel, Agriculture Scientist, KVK



Audited UC



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Ref No.SFT/2018-19/

Shroffs Foundation Trust

Date: 21.02.2019

Government of Gujarat

Gujarat CSR Authority

Project: Creation of Irrigation facilities based on Development of Water Reservoirs in Dead Dolomite Mines in Village Zer, Tal & Dist. Chhotaudepur

Utilization Certificate

This is to certify that Shroffs Foundation Trust has executed the Project: "Creation of Irrigation facilities". Under this project a sum of ₹.42,19,793/- (Rupees Forty Two Lakhs Nineteen Thousands Seven Hundred Ninety Three only) has been incurred as expenditure for the F.Y. 2017-18 and F.Y. 2018-19 for the purpose for which it was sanctioned sum of ₹. 43,61,914/- (Rupees Forty Three Lakhs Sixty One Thousand Nine Hundred Fourteen only) out of which Rs. ₹.34,89,530/- (Rupees Thirty Four Lacs Eighty Nine Thousand Five Hundred Thirty only) received as a Grant of this project.

We hereby attach the Statement of Expenditure in details with estimated cost.

For and on behalf of
Shroffs Foundation Trust


Vikas Vaze
Chief Executive Officer

Encl.: as above (SOE)

For Amar Shah & Associates,
Chartered Accountants


Amar Shah
Partner



M.No.49868
UDFN NO 119049868AAAAAW2336

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Summary of Expenses

SHROFFS FOUNDATION TRUST			
Project: Creation of Irrigation Facilities Based On Development Of Water Reservoirs (ZER)			
In Dead Dolomite Mines			
Sr. No.	Budget Heads	Program Cost	Program Cost
		Budgeted Cost	Actual Expenditure
A	Co-operative formation & registration	10,000	10,000
	Training of co-operative members	25,000	24,130
	Total A	35,000	34,130
B	Creating Irrigation facility	-	-
	Diversion channel for surface runoff	2,50,000	34,63,669
	Land improvement in command area	3,80,000	
	Pump House & Quarter	2,50,000	
	Main Delivery Chamber	1,00,000	
	Purchase of Material & Installation for raising main	3,50,001	
	Distribution Work	18,37,500	
	Pumping Machinery purchase & Installation	4,00,000	
	Total B	35,67,501	
C	Power Connection	1,00,000	
	Labour welfare 1%	30,375	16,400
	Detail survey & Preparation of estimate 1%	30,375	30,100
	Operation & Management support for 3 years @ Rs. 1000/Year/Hac	1,11,000	1,10,000
	Contingency 3%	91,125	81,876
	Total C	3,62,875	3,38,376
Total (A+B+C)		39,65,376	38,36,175
D	Project Management & Implementation cost 10%	3,96,538	3,83,618
Grand Total		43,61,914	42,19,793

