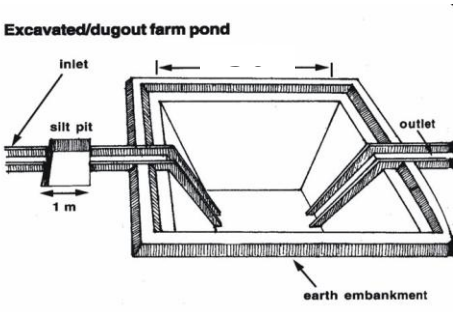
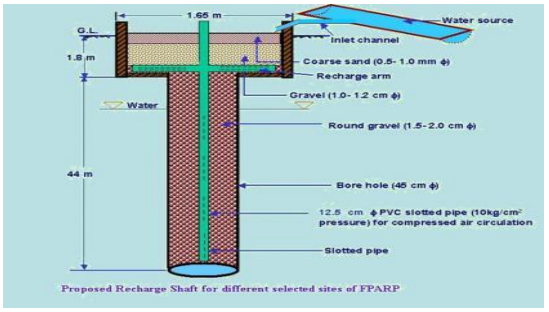
CENTRAL GROUND WATER BOARD

MINISTRY OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION
GOVERNMENT OF INDIA





ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF JASWANTPURA BLOCK, DISTRICT JALORE, RAJASTHAN

Western Region, Jaipur
January 2017

ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF JASWANTPURA BLOCK, DISTRICT JALORE

Plan at a Glance

1.	**Area of the Jaswantpura Block**	**1058.42 sq. km.**
2.	**Area identified for Artificial Recharge**	**932.37 sq km**
3.	**Dynamic Ground Water Resources (as on 31.03.2011)**	
	Net Ground Water Availability	**50.03 MCM**
	Annual Ground Water Draft	**64.74 MCM**
	Stage of Ground Water Development	**129.39%**
4.	**Volume of water to be harnessed** **Volume of water available for recharge through RS** **Volume of water available for recharge through PT**	**1.178 MCM** **1.170 MCM** **-**
5.	**Volume of unsaturated aquifer zone available for recharge**	**1004.301 MCM**
6.	**Total number of structures to be proposed**	
	Recharge structures Existing village pond with recharge shaft/ well Percolation Tanks Sprinkler Irrigation	**34 shafts in 34 Nos. of existing village ponds** **--** **300 ha**
	Expected Annual GW recharge	**0.936 MCM**
	Provision for supplemental irrigation, thus reducing GW withdrawal for irrigation	**0.24**
	Total recharge/ saving of ground water	**1.176 MCM**
7.	**Estimated Cost** Artificial Recharge Plan Sprinkler Irrigation Piezometer construction Operation and maintenance	**3.486 crore** 1.70 crore 1.50 crore 0.12 crore 0.166 crore

ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF JASWANTPURA BLOCK, DISTRICT JALORE

Introduction

The **Jaswantpura Block, district Jalore** is one of the over exploited blocks of Rajasthan and is under severe stress, as evident from the stage of ground water development, which has attained an alarming level of **129.39%.** 932.37 sq. km. area is potential zone area and thus feasible for artificial recharge.

Location of the block

The Jaswantpura Block of Jalore District covering an area of 1058.42 Sq. Km. falls in southern part of Jalore District and is located between North latitudes 24°45' & 25°17' and East longitudes 72°17' & 72°38'.

Surface Water Availability

As per the studies carried out by Water Resources Department (WRD), Government of Rajasthan there is very little surplus water available for further development at 75% dependability. Based on the data made available from GWD, the surplus runoff available at 75% dependability level has been worked out for the zones as part of watershed within the block. The nature of aquifer (Alluvium/ Hard rock) is also considered while computing the number of Artificial Recharge structures feasible.

Accordingly about 1.178 MCM has been considered for recharge plan in the block. Optimum utilization of rainwater runoff depends on availability of land, feasible conditions, etc. Volume of Aquifer available for Artificial Recharge is given in **Table.1**

Supply Side Management

Feasible Artificial Recharge and Water Conservation Structures

About 0.035 mcm/year surplus has been considered for each recharge shaft and 0.2 mcm/year for percolation tank wherever feasible. The areas with shallow water level (<5m) have not been considered for construction of Artificial Recharge Structures

The number of Recharge Shaft is decided based on the number of suitable ponds available within the zone. If still some surplus remained unallocated, than few Percolation tanks are proposed at suitable locations. However, in some of the blocks entire available surplus cannot be utilized due to non availability of ponds for Recharge shaft or suitable location for Percolation tanks. Zone wise number of Recharge Structures proposed to be constructed is given in **Table 2**.

Table 1: Volume of Aquifer available for artificial recharge

District	Block	Area of Block (Sq.km.)	Potential area suitable for recharge (Sq.km.)	Type of Aquifer	Area feasible for artificial recharge (Sq km)	Sp Yield	Average DTW (mbgl) NOV 2013	Thickness of unsaturated zone 3 m below ground level (m)	Volume of sub surface storage space available for artificial recharge (MCM)
JALORE	**JASWANTPURA**	1058.42	932.37	SR	500.00	0.070	27	24	840.000
				HR	432.37	0.020	22	19	164.301

Table 2: Number of recharge structure

ZoneCode	Sub_ Basin	Type of Aquifer	Zone-Area (sq. km.)	Total Surplus (mcm)	Water Level >5m	Feasible_ RS_Prop	Feasible_ PT_Prop
Luni_Bandi_001_RJ1904_AL	Bandi	SR	89.118	0.018	Y	1	0
Luni_Bandi_002_RJ1904_AL	Bandi	SR	156.463	0.000	Y	0	0
Luni_Bandi_003_RJ1904_AL	Bandi	SR	22.952	0.000	Y	0	0
Luni_Khari_029_RJ1904_AL	Khari	SR	5.562	0.008	N	0	0
Luni_Khari_030_RJ1904_AL	Khari	SR	495.817	0.488	Y	14	0
Luni_Sagi_087_RJ1904_AL	Sagi	SR	332.966	0.663	Y	19	0
Luni_Sukri (Sayala)_094_RJ1904_AL	Sukri (Sayala)	SR	41.725	0.000	Y	0	0
				1.178		**34**	**0**

Recharge Shaft

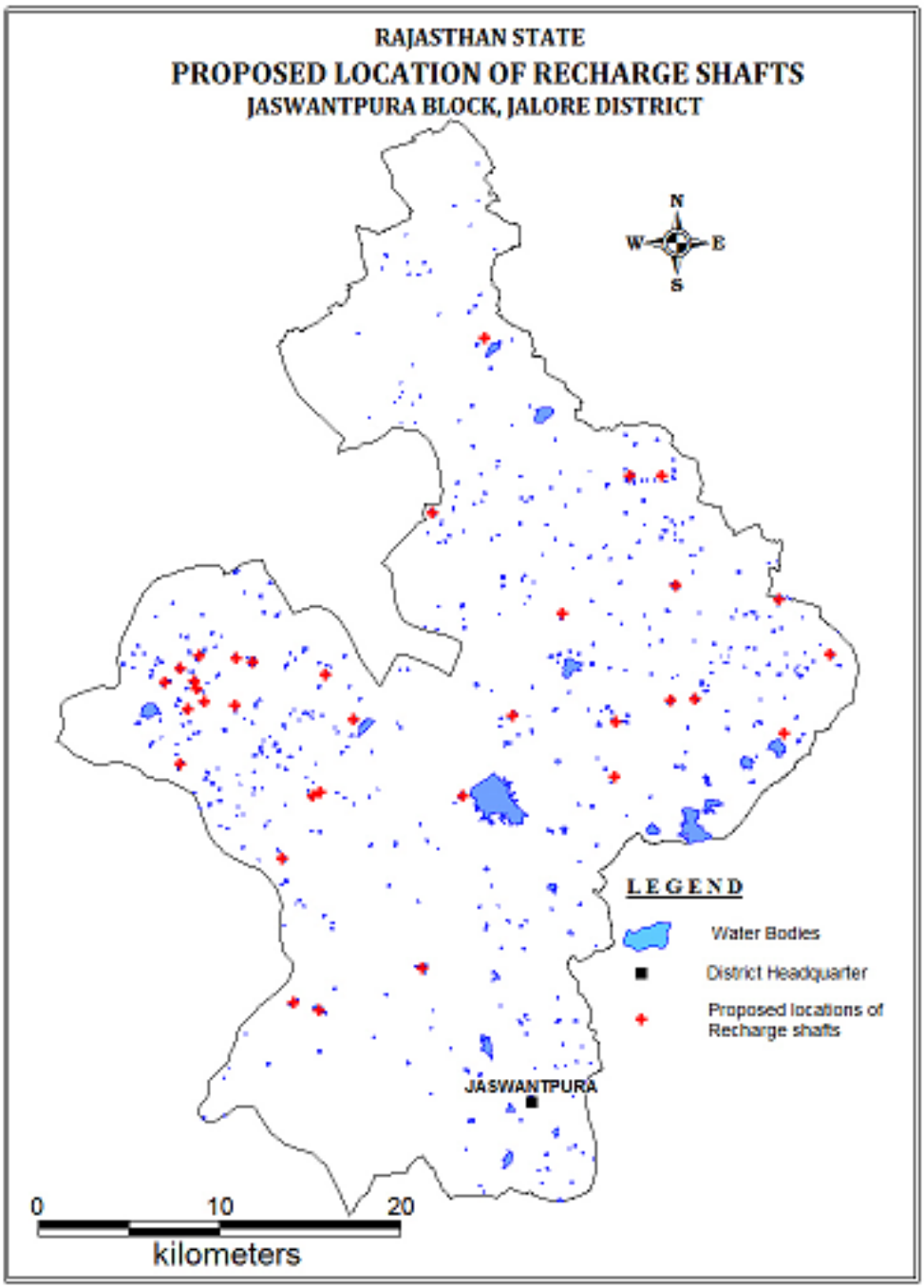
It is proposed to construct Recharge Shaft in existing ponds. The selected ponds should be atleast 3m deep and shallow ponds will be deepened accordingly. It is proposed that the inlet for the Recharge Shaft should be atleast 1m above bed of pond so that the pond retains adequate water for use by villagers.

. The tentative location of villages for construction of recharge shaft/well in existing village pond and their cost estimates are shown in Fig 1 and Table 3.

Table 3: Tentative locations of village for village pond with recharge shaft

S.No.	Village	Long	Lat	Watershed	No of Shafts	Unit cost (Rs in lac)	Total cost (Rs in lac)
1	Ambatri	72.422	24.954	Luni_Bandi_001_RJ1904_AL	1	5	5
2	Modra	72.433	25.180	Luni_Khari_030_RJ1904_AL	1	5	5
3	Gola	72.513	25.112	Luni_Khari_030_RJ1904_AL	1	5	5
4	Warka Goga	72.530	25.112	Luni_Khari_030_RJ1904_AL	1	5	5
5	Chandna	72.538	25.057	Luni_Khari_030_RJ1904_AL	1	5	5
6	Bhootwas	72.595	25.051	Luni_Khari_030_RJ1904_AL	1	5	5
7	Punang Khurd	72.622	25.023	Luni_Khari_030_RJ1904_AL	1	5	5
8	Modra Ki Dhani	72.405	25.094	Luni_Khari_030_RJ1904_AL	1	5	5
9	Mudtara Sili	72.476	25.044	Luni_Khari_030_RJ1904_AL	1	5	5
10	Thoor	72.449	24.993	Luni_Khari_030_RJ1904_AL	1	5	5
11	Boogaon	72.505	24.990	Luni_Khari_030_RJ1904_AL	1	5	5
12	Ramseen	72.535	25.000	Luni_Khari_030_RJ1904_AL	1	5	5
13	Ramseen	72.549	25.001	Luni_Khari_030_RJ1904_AL	1	5	5
14	Punang Kalan	72.597	24.985	Luni_Khari_030_RJ1904_AL	1	5	5
15	Boogaon	72.505	24.963	Luni_Khari_030_RJ1904_AL	1	5	5
16	Bhinmal (M)	72.267	25.016	Luni_Sagi_087_RJ1904_AL	1	5	5
17	Bhinmal (M)	72.259	25.009	Luni_Sagi_087_RJ1904_AL	1	5	5
18	Bhinmal (M)	72.278	25.023	Luni_Sagi_087_RJ1904_AL	1	5	5
19	Bhinmal (M)	72.275	25.010	Luni_Sagi_087_RJ1904_AL	1	5	5
20	Bhinmal (M)	72.276	25.006	Luni_Sagi_087_RJ1904_AL	1	5	5
21	Bhinmal (M)	72.272	24.996	Luni_Sagi_087_RJ1904_AL	1	5	5
22	Bhinmal (M)	72.281	25.000	Luni_Sagi_087_RJ1904_AL	1	5	5
23	Bhinmal (M)	72.298	24.998	Luni_Sagi_087_RJ1904_AL	1	5	5
24	Bhinmal (M)	72.307	25.019	Luni_Sagi_087_RJ1904_AL	1	5	5
25	Bhinmal (M)	72.298	25.022	Luni_Sagi_087_RJ1904_AL	1	5	5
26	Bhinmal (M)	72.268	24.969	Luni_Sagi_087_RJ1904_AL	1	5	5
27	Khanpur	72.347	25.013	Luni_Sagi_087_RJ1904_AL	1	5	5
28	Delwara	72.362	24.991	Luni_Sagi_087_RJ1904_AL	1	5	5
29	Mandhar	72.340	24.954	Luni_Sagi_087_RJ1904_AL	1	5	5
30	Mandhar	72.344	24.955	Luni_Sagi_087_RJ1904_AL	1	5	5
31	Sawidar	72.324	24.923	Luni_Sagi_087_RJ1904_AL	1	5	5
32	Raji Ka Bas	72.400	24.868	Luni_Sagi_087_RJ1904_AL	1	5	5
33	Dantlawas	72.344	24.847	Luni_Sagi_087_RJ1904_AL	1	5	5
34	Panseri	72.330	24.852	Luni_Sagi_087_RJ1904_AL	1	5	5
					34		**170**

Fig: 1: Tentative location of Recharge Shaft



Demand Side Management

Efficient Irrigation:

In Flood/ furrow irrigation method more than 50% of applied water is wasted through seepage to deeper levels, local inundation causes loss through evaporation and it leaches out the nutrients from the plants. While through drip and sprinkler irrigation method, wastage through irrigation loses could be minimized. Ground water usage can be minimized drastically by using HDPE pipes. Initially the scheme can be proposed to be started in 300 ha area, which is worst affected showing deepest water level and declining trends. The area is to be finalized based on land holdings, willingness of farmers and No Objection certificate from the land owner.

Impact Assessment and Monitoring

Assessment of impact of the artificial recharge schemes implemented is essential to assess the efficacy of structures constructed. It helps in identification of cost-effective recharge mechanisms for optimal recharge into the ground water system. It also helps to make necessary modifications in site selection, design and construction of structures in future.
It is proposed to construct 20 piezometers, at suitable locations for monitoring of water levels, in the vicinity of proposed recharge structure.

Revival, Repair of Water Bodies

The existing ponds and tanks with time loose their storage capacity as well as the natural ground water recharge through these water bodies has also become negligible due to siltation and encroachment by farmers for agriculture purposes. There are several such villages where ponds/ tanks are in dilapidated condition. These existing village tanks, which are normally silted and damaged, can be modified to serve as recharge structure in case these are suitably located to serve as percolation tanks. Through desilting, coupled with providing proper waste weir, the village tanks can be converted into recharge structure.

Financial Outlay of the Plan

The total estimated cost of the Plan is Rs. 3.486 cr. The tentative cost estimates of the various activities of the Plan are shown in Table 4 & 5. The unit rates are as followed by the Govt. of Rajasthan (BSR).

Table 4: Cost of the recharge structures

Cost Recharge Shaft Rs in crs (Unit cost Rs 0.05 cr for alluvium and Rs 0.026 cr for hard rock)	Cost of Percolation Tank in Rs in crs (Unit cost Rs 0.4 cr)	Cost of Sprinkler irrigation in Rs (Unit cost 0.005 cr/ha)
Soft rock – 1.70	-	1.50

Table 5: Tentative cost of different activities

Feasible Artificial Recharge & Water Conservation structures/ activities	Tentative Design	Quantity (in nos. or area in ha)	Rainwater harvested (mcm) or No. of sprinklers (/ha)	Tentative unit cost (in Rs lakh)	Total tentative cost (in Rs lakh)	Expected Annual GW recharge/ conservation (mcm) @ 0.8 mcm/structure
Recharge Structures/ Activities						
Recharge shaft within the pond /tanks	Alluvium – Depth 80m, Dia: 10-12" with filter pit	34	1.170	5	170	0.936
	Hard rock: Depth –60m, Dia 10-12"with filter pit	-	-	-	-	-
Percolation tanks (3 fillings)	200m*200m*1.5 m	-	-	-	-	-
Water Conservation Measures	Sprinkler Irrigation	300 ha	25	0.5/ha	150	0.24
		Total			**320**	**1.176**
Impact assessment & Monitoring						
Piezometer	50 – 80 m	20		0.6	12	
Impact assessment will be carried out by implementing agency						
O & M - 5% of total cost of the scheme					16.60	
TOTAL					**348.60**	**1.176**

Note: Type, number and cost of structure may vary according to site after ground verification