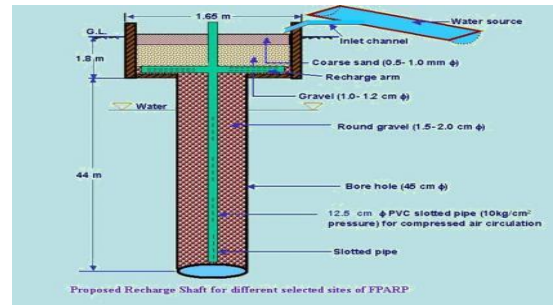
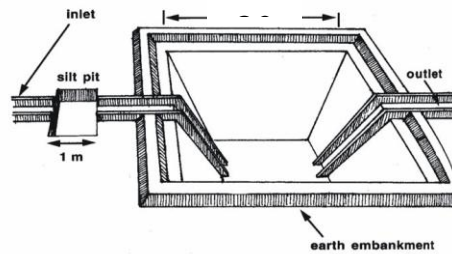




CENTRAL GROUND WATER BOARD
MINISTRY OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION
GOVERNMENT OF INDIA



Excavated/dugout farm pond



**ARTIFICIAL RECHARGE TO GROUND WATER AND
WATER CONSERVATION PLAN OF BASERI BLOCK,
DISTRICT DHAULPUR, RAJASTHAN**

Western Region, Jaipur
November 2016

ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF BASERI BLOCK, DISTRICT DHAULPUR

Plan at a Glance

1.	Area of the Baseri Block	1001.42 Sq. km.
2.	Area identified for Artificial Recharge	813.90 sq km
3.	Dynamic Ground Water Resources (as on 31.03.2011)	
	Net Ground Water Availability	75.68 MCM
	Annual Ground Water Draft	78.96 MCM
	Stage of Ground Water Development	104.34 %
4.	Volume of water to be harnessed	30.317 MCM
	Volume of water available for recharge through RS	2.52 MCM
	Volume of water available for recharge through PT	7.6 MCM
5.	Volume of unsaturated aquifer zone available for recharge	153.48 MCM
6.	Total number of structures to be proposed	
	Recharge structures	72 shafts in 57 Nos. of existing village ponds
	Existing village pond with recharge shaft/ well	
	Percolation Tanks	38 nos.
	Sprinkler Irrigation	300 ha
	Expected Annual GW recharge	8.10 MCM
	Provision for supplemental irrigation, thus reducing GW withdrawal for irrigation	0.24 MCM
	Total recharge/ saving of ground water	8.34 MCM
7.	Estimated Cost	21.567 crore
	Artificial Recharge Plan	18.80 crore
	Sprinkler Irrigation	1.50 crore
	Piezometer construction	0.24 crore
	Operation and maintenance	1.027 crore

ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION PLAN OF BASERI BLOCK, DISTRICT DHAULPUR

Introduction

The **Baseri Block, district Dhaulpur** 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 **104.34%**.

Location of the block

The Baseri Block covers an area of 1001.42 Sq. km. and runs from north to south in western direction of Dhaulpur district. It is located between North latitudes 26°39' & 26°57' and East longitudes 77°53' & 78°16'.

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 30.317 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)
Dhaulpur	BASERI	1001.4	813.9	SR	200.2	0.1	7.46	4.46	89.29
				HR	613.7	0.02	8.23	5.23	64.19

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
Chambal_Chambal Downstream_010_RJ1302_AL	Chambal Downstream	SR	123.189	5.720	Y	9	19
Chambal_Chambal Downstream_010_RJ1302_SR	Chambal Downstream	SR	96.882	4.498	Y	25	4
Gambhir_Gambhir_011_RJ1302_AL	Gambhir	SR	95.134	0.000	N	0	0
Gambhir_Gambhir_011_RJ1302_AL	Gambhir	SR	0.000	0.996	Y	8	3
Gambhir_Gambhir_011_RJ1302_SR	Gambhir	SR	38.450	0.402	Y	8	1
Gambhir_Gambhir_012_RJ1302_AL	Gambhir	SR	66.082	2.864	Y	7	0
Parbati_Parbati_004_RJ1302_AL	Parbati	SR	0.604	0.000	N	0	0
Parbati_Parbati_005_RJ1302_SR	Parbati	SR	81.884	0.000	Y	0	0
Parbati_Parbati_006_RJ1302_AL	Parbati	SR	34.504	0.000	Y	0	0
Parbati_Parbati_006_RJ1302_SR	Parbati	SR	21.364	0.000	Y	0	0
Parbati_Parbati_007_RJ1302_SR	Parbati	SR	0.539	0.000	N	0	0
Parbati_Parbati_008_RJ1302_SR	Parbati	SR	59.127	0.000	Y	0	0
Parbati_Parbati_009_RJ1302_SR	Parbati	SR	124.660	0.000	Y	0	0
Parbati_Parbati_010_RJ1302_SR	Parbati	SR	58.477	0.000	Y	0	0
Parbati_Parbati_011_RJ1302_SR	Parbati	SR	73.496	0.000	Y	0	0
Parbati_Parbati_013_RJ1302_SR	Parbati	SR	0.003	0.000	N	0	0
Parbati_Parbati_015_RJ1302_AL	Parbati	SR	39.087	3.415	Y	0	2
Parbati_Parbati_018_RJ1302_AL	Parbati	SR	49.128	6.935	Y	3	8
Parbati_Parbati_018_RJ1302_SR	Parbati	SR	19.960	2.631	Y	8	1
Parbati_Parbati_018_RJ1302_SR	Parbati	SR	18.637	2.818	Y	4	0
Parbati_Parbati_019_RJ1302_AL	Parbati	SR	0.570	0.039	N	0	0
				30.317		72	38

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.

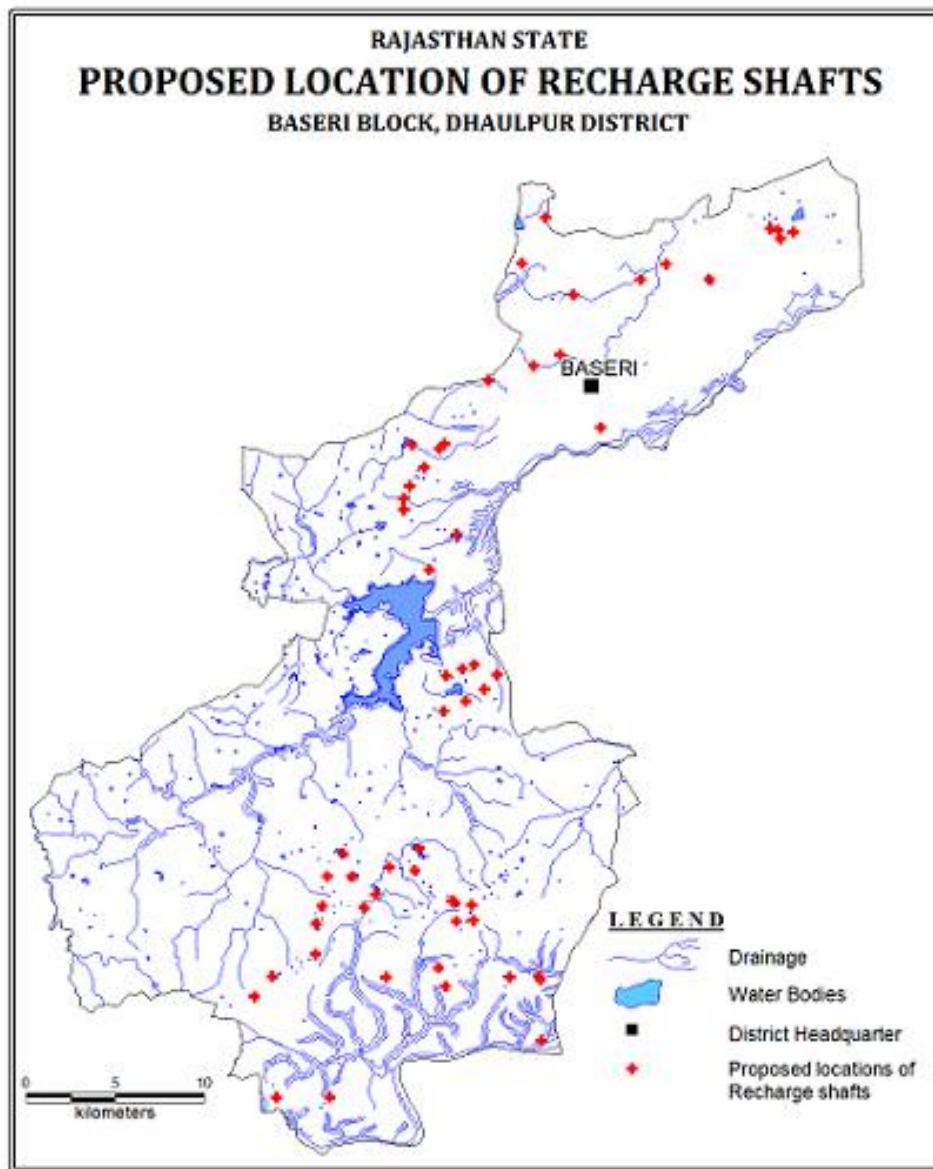
Table 3: Tentative locations of village for village pond with recharge shaft

S.No.	Village	Long	Lat	Watershed	No of Shafts	Unit cost (Rs in lac)	Total cost (Rs in lac)
1	Khushiyalpur	77.366	26.385	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
2	Bhampura	77.396	26.385	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
3	Golari	77.457	26.450	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
4	Golari	77.461	26.441	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
5	Jhiri	77.428	26.446	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
6	Gunraich	77.497	26.446	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
7	Madanpur	77.514	26.446	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
8	Madanpur	77.514	26.444	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
9	Madanpur	77.515	26.414	Chambal_Chambal Downstream_010_RJ1302_AL	1	5.00	5.00
10	Shitalpura	77.354	26.436	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
11	Shitalpura	77.364	26.446	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
12	Dadroni	77.388	26.457	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
13	Dadroni	77.389	26.472	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
14	Dadroni	77.392	26.481	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
15	Jakha	77.415	26.480	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
16	Jakha	77.422	26.487	Chambal_Chambal	3	5.00	15.00

				Downstream_010_RJ1302_SR			
17	Sarmathura	77.404	26.508	Chambal_Chambal Downstream_010_RJ1302_SR	3	5.00	15.00
18	Padampura	77.395	26.496	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
19	Jakha	77.409	26.496	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
20	Thoomri	77.446	26.510	Chambal_Chambal Downstream_010_RJ1302_SR	4	5.00	20.00
21	Golari	77.444	26.499	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
22	Garha Khoh	77.430	26.501	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
23	Golari	77.465	26.484	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
24	Golari	77.466	26.483	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
25	Gopalpur	77.476	26.482	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
26	Golari	77.477	26.474	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
27	Golari	77.467	26.474	Chambal_Chambal Downstream_010_RJ1302_SR	1	5.00	5.00
28	Nagla Darwasha	77.511	26.753	Gambhir_Gambhir_011_RJ1302_AL	1	5.00	5.00
29	Baseri	77.525	26.759	Gambhir_Gambhir_011_RJ1302_AL	1	5.00	5.00
30	Patharra	77.517	26.828	Gambhir_Gambhir_011_RJ1302_AL	1	5.00	5.00
31	Bharli	77.504	26.805	Gambhir_Gambhir_011_RJ1302_AL	1	5.00	5.00
32	Jarga	77.585	26.804	Gambhir_Gambhir_011_RJ1302_AL	1	5.00	5.00
33	Jarga	77.571	26.797	Gambhir_Gambhir_011_RJ1302_AL	1	5.00	5.00
34	Bagthar	77.533	26.789	Gambhir_Gambhir_011_RJ1302_AL	2	5.00	10.00
35	Dhaur	77.442	26.714	Gambhir_Gambhir_011_RJ1302_SR	4	5.00	20.00
36	Dhaur	77.449	26.702	Gambhir_Gambhir_011_RJ1302_SR	1	5.00	5.00
37	Dhaur	77.458	26.711	Gambhir_Gambhir_011_RJ1302_SR	1	5.00	5.00
38	Dhaur	77.461	26.714	Gambhir_Gambhir_011_RJ1302_SR	1	5.00	5.00
39	Kotra	77.485	26.746	Gambhir_Gambhir_011_RJ1302_SR	1	5.00	5.00
40	Kuiya	77.609	26.797	Gambhir_Gambhir_012_RJ1302_AL	3	5.00	15.00
41	Dadipura	77.644	26.822	Gambhir_Gambhir_012_RJ1302_AL	1	5.00	5.00
42	Dadipura	77.648	26.821	Gambhir_Gambhir_012_RJ1302_AL	1	5.00	5.00
43	Mau Gulawali	77.657	26.820	Gambhir_Gambhir_012_RJ1302_AL	1	5.00	5.00
44	Ekta	77.649	26.817	Gambhir_Gambhir_012_RJ1302_AL	1	5.00	5.00
45	Tajpur	77.467	26.668	Parbati_Parbati_018_RJ1302_AL	2	5.00	10.00
46	Rampur	77.548	26.722	Parbati_Parbati_018_RJ1302_AL	1	5.00	5.00
47	Rahrai	77.460	26.579	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
48	Pipret	77.462	26.597	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
49	Noorpur	77.471	26.601	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
50	Tarwa	77.473	26.584	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00

51	Angai	77.477	26.603	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
52	Angai	77.483	26.591	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
53	Angai	77.490	26.598	Parbati_Parbati_018_RJ1302_SR	2	5.00	10.00
54	Khanpura	77.438	26.681	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
55	Khanpura	77.438	26.686	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
56	Khanpura	77.441	26.693	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
57	Badriya	77.452	26.650	Parbati_Parbati_018_RJ1302_SR	1	5.00	5.00
					72		360

Figure 1: Showing Tentative location of the Recharge Shaft



Percolation Tank

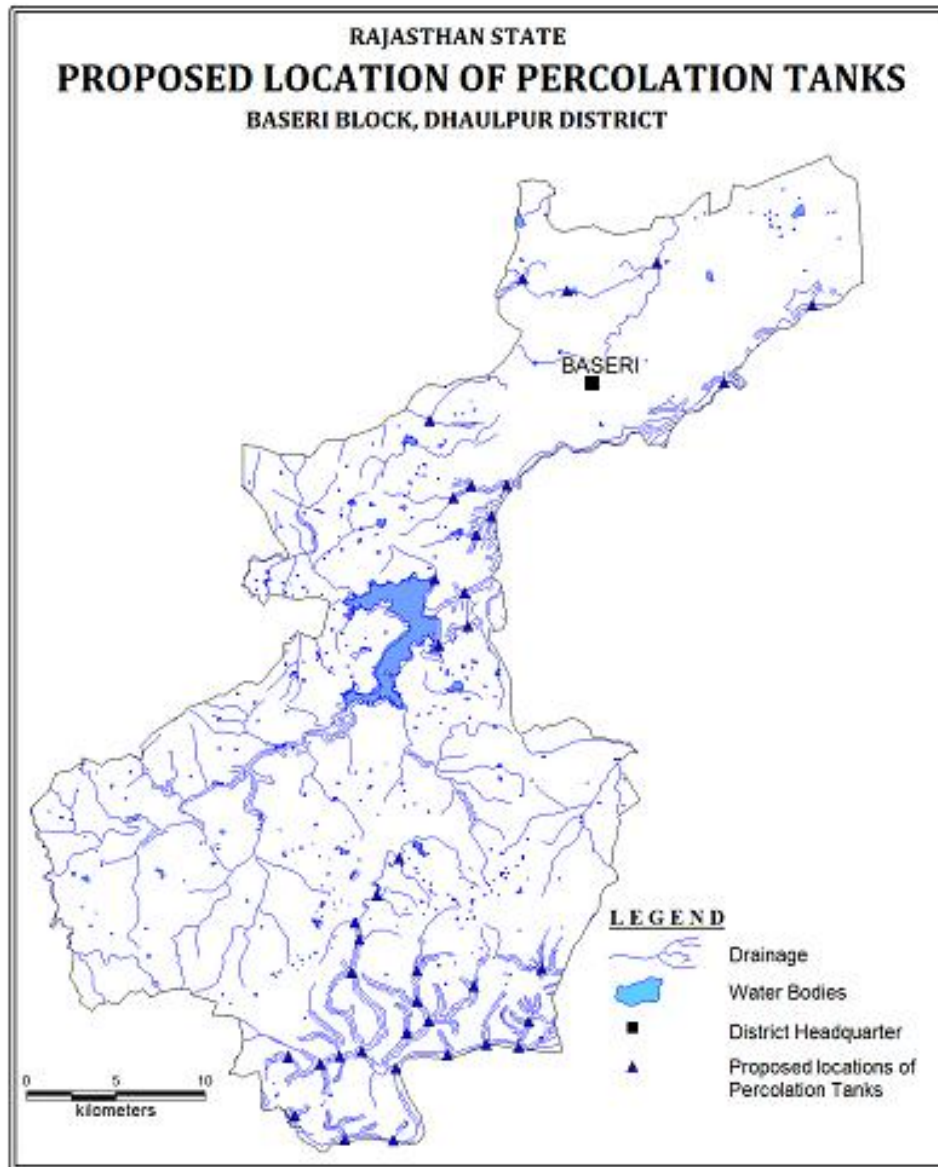
The tentative location of villages for construction of percolation tank and their cost estimates are shown in Fig 2 and Table 4

Table 4: Tentative locations of village for Percolation Tanks

S. No.	Village	Longitude	Latitude	Micro Watershed	Unit Cost (Rs. In lacs)
1	Madanpur	77.515	26.448	Chambal_Chambal Downstream_010_RJ1302_AL	40
2	Bhauhari	77.502	26.410	Chambal_Chambal Downstream_010_RJ1302_AL	40
3	Madanpur	77.484	26.411	Chambal_Chambal Downstream_010_RJ1302_AL	40
4	Gulawali	77.462	26.405	Chambal_Chambal Downstream_010_RJ1302_AL	40
5	Durgasi	77.404	26.363	Chambal_Chambal Downstream_010_RJ1302_AL	40
6	Shankarpur	77.431	26.362	Chambal_Chambal Downstream_010_RJ1302_AL	40
7	Jhiri	77.433	26.399	Chambal_Chambal Downstream_010_RJ1302_AL	40
8	Khushiyalpur	77.373	26.404	Chambal_Chambal Downstream_010_RJ1302_AL	40
9	Gironiya	77.391	26.401	Chambal_Chambal Downstream_010_RJ1302_AL	40
10	Jhiri	77.402	26.405	Chambal_Chambal Downstream_010_RJ1302_AL	40
11	Jhiri	77.414	26.407	Chambal_Chambal Downstream_010_RJ1302_AL	40
12	Mallapura	77.408	26.447	Chambal_Chambal Downstream_010_RJ1302_AL	40
13	Golari	77.445	26.432	Chambal_Chambal Downstream_010_RJ1302_AL	40
14	Gulawali	77.452	26.422	Chambal_Chambal Downstream_010_RJ1302_AL	40
15	Gulawali	77.439	26.416	Chambal_Chambal Downstream_010_RJ1302_AL	40
16	Madanpur	77.477	26.440	Chambal_Chambal Downstream_010_RJ1302_AL	40
17	Bhauhari	77.508	26.422	Chambal_Chambal Downstream_010_RJ1302_AL	40
18	Golari	77.445	26.448	Chambal_Chambal Downstream_010_RJ1302_AL	40
19	Jhiri	77.376	26.375	Chambal_Chambal Downstream_010_RJ1302_AL	40
20	Thoomri	77.435	26.505	Chambal_Chambal Downstream_010_RJ1302_SR	40
21	Jakha	77.423	26.486	Chambal_Chambal Downstream_010_RJ1302_SR	40
22	Mallapura	77.412	26.463	Chambal_Chambal Downstream_010_RJ1302_SR	40
23	Jakha	77.410	26.472	Chambal_Chambal Downstream_010_RJ1302_SR	40
24	Jarga	77.580	26.804	Gambhir_Gambhir_011_RJ1302_AL	40
25	Bharli	77.505	26.795	Gambhir_Gambhir_011_RJ1302_AL	40
26	Bagthar	77.529	26.789	Gambhir_Gambhir_011_RJ1302_AL	40
27	Dhaur	77.452	26.724	Gambhir_Gambhir_011_RJ1302_SR	40
28	Nonera Prithvisingh	77.617	26.743	Parbati_Parbati_015_RJ1302_AL	40
29	Nagla Raijeet	77.667	26.782	Parbati_Parbati_015_RJ1302_AL	40
30	Jindapura	77.473	26.621	Parbati_Parbati_018_RJ1302_AL	40
31	Khokhala	77.457	26.611	Parbati_Parbati_018_RJ1302_AL	40
32	Jhinna	77.472	26.638	Parbati_Parbati_018_RJ1302_AL	40
33	Tajpur	77.478	26.667	Parbati_Parbati_018_RJ1302_AL	40
34	Tajpur	77.487	26.676	Parbati_Parbati_018_RJ1302_AL	40
35	Banora	77.496	26.692	Parbati_Parbati_018_RJ1302_AL	40
36	Kharagpura	77.465	26.686	Parbati_Parbati_018_RJ1302_AL	40

S. No.	Village	Longitude	Latitude	Micro Watershed	Unit Cost (Rs. In lacs)
37	Kharagpura	77.475	26.691	Parbati_Parbati_018_RJ1302_AL	40
38	Badriya	77.455	26.645	Parbati_Parbati_018_RJ1302_SR	40
				Total	1520

Figure 2: Showing Tentative location of the Percolation Tank



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 losses 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 40 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. 21.567 cr. The tentative cost estimates of the various activities of the Plan are shown in Table 5 & 6. The unit rates are as followed by the Govt. of Rajasthan (BSR).

Table 5: 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 – 3.60	15.20	1.50

Table 6: 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	72	2.52	5	360	2.02
	Hard rock: Depth –60m, Dia 10-12”with filter pit	-	-	-	-	-
Percolation tanks (3 fillings)	200m*200m*1.5 m	38	7.6	40	1520	6.08
Water Conservation Measures	Sprinkler Irrigation	300 ha	25	0.5/ha	150	0.24
		Total			2030	8.34
Impact assessment & Monitoring						
Piezometer	50 – 80 m	40		0.6	24	
<i>Impact assessment will be carried out by implementing agency</i>						
O & M - 5% of total cost of the scheme					102.70	
TOTAL					2156.70	8.34

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