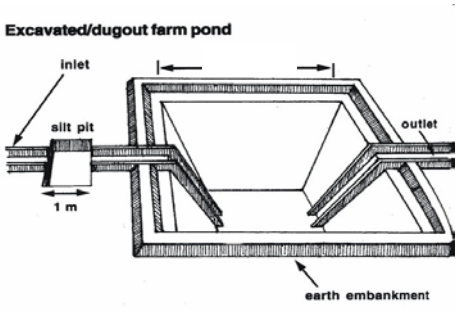
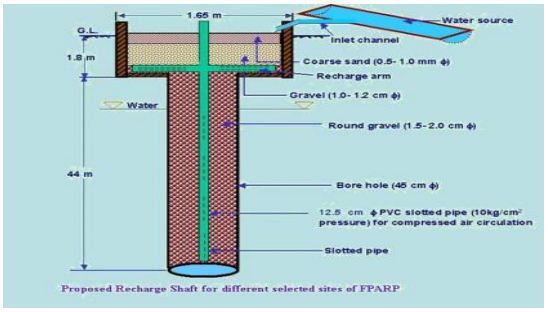
CENTRAL GROUND WATER BOARD

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





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

Western Region, Jaipur
April 2016

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

Plan at a Glance

1.	**Area of the Dausa Block**	**943.76 sq.km.**
2.	**Area identified for Artificial Recharge**	**894.74 sq km**
3.	**Dynamic Ground Water Resources (as on 31.03.2011)**	
	Net Ground Water Availability	**55.1480 MCM**
	Annual Ground Water Draft	**77.6026 MCM**
	Stage of Ground Water Development	**140.72%**
4.	**Volume of water to be harnessed** **Volume of water available for recharge** **Volume of water available for conservation by other interventions**	**1.7071 MCM** **1.7071 MCM** **-**
5.	**Volume of unsaturated aquifer zone available for recharge**	**1185.105 MCM**
6.	**Total number of structures to be proposed**	
	Recharge structures Existing village pond with recharge shaft/ well **Water Conservation** Farm pond	 **57 shafts in -- Nos. of existing village ponds** **-**
	Expected Annual GW recharge	**1.195 MCM**
	Provision for supplemental irrigation, thus reducing GW withdrawal for irrigation	**-**
	Total recharge/ saving of ground water	**1.195 MCM**
7.	**Estimated Cost** Artificial Recharge Plan Piezometer construction Operation and maintenance	**3.3516 crore** 2.85 crore 0.342 crore 0.1596 crore

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

INTRODUCTION

The demand of fresh water for agriculture, drinking and industrial uses etc. has significantly increased due to population growth and socio-economic development. As surface water resources in the State of Rajasthan are meagre, the dependability on ground water resources in the State has increased substantially. This has resulted in over exploitation of ground water resources vis a vis depletion of ground water levels in various parts of the State.

The **Dausa Block, district Dausa** 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 **140.72%.** In view of over exploitation of ground water resources in the block, ground water resources in the area are under continuous depletion. Thus there is urgent need for taking up suitable water management interventions based on integrated approach, which on one hand includes augmentation of ground water resources through appropriate techniques, and on the other hand requires the adoption of suitable water conservation measures, such as ensuring water use efficiency through creation of additional water storage facility, maintenance/ renovation of existing water bodies etc. Water awareness and capacity building of the stakeholders are also the important attributes of water management interventions as envisaged in the National Water Policy.

Artificial recharge to ground water is one of the most efficient, scientifically proven and cost effective technology to mitigate the problems of over exploitation of ground water resources. The technology serves as a means for restoring the depleted ground water storage, ameliorate the ground water quality problems and also enhance the sustainability of wells in the affected areas. A detailed knowledge of geology, hydrogeology, land use pattern, geomorphology and hydro-meteorological features are however, essential for selection of appropriate artificial recharge techniques as well as design and sites of ground water recharge structures.

As per directions of Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India and in pursuance to letter no 16-24/M(SML)/CGWB/ARP- OE Blocks/2015-6957, dated 13.7.2015 & 3.8.2015 & letter no 39(43)/TC/CHN/CGWB/2015-7929,dated 4.9.2015 from Central Headquarters, Central Ground Water Board, **the preparation of Artificial Recharge and Rainwater harvesting Plan for the Over exploited blocks in the State of Rajasthan has been taken up** on priority by the Western Region, Central Ground Water Board, Jaipur. Each Plan discusses the broad framework of ground water situation in the block, status of water availability (both surface and ground water), identification of feasible areas for interventions, feasibility of artificial recharge and other water conservation structures, their design considerations, numbers and cost estimates. The expected outcomes of the proposed interventions have also been elucidated in the report

The GIS layers used in the Plan include administrative (upto village level), Hydrogeology, Depth to Water level (pre and post monsoon), geomorphic, drainage, water bodies and the map of tentative locations of proposed interventions.

Methodology:

As per Ground Water Department, Government of Rajasthan direction the basin wise availability of surplus run off is calculated after taking into account 75 % dependability on the rain water for all uses. In furtherance, the sub basins with surplus run off available for recharge were taken into consideration. The block area falling in particular sub basin was taken into account and a proportionate area of the sub-basin draining the block was calculated. Based on this area of sub-basin draining the block, proportionate surplus run off, in the block by the sub basin, for recharge was calculated. Thus was calculated the final amount of surplus run off available for recharge in particular block by one particular sub-basin. The available run off was considered for Recharge through Recharge Shaft (@ 0.03 MCM) and Percolation tank (@ 0.2 MCM). If after allocating water for Recharge through Recharge Shaft, large amount of surface run off was left then the Water conservation through Farm Ponds, along with recharge through Percolation Tanks, was also taken into account. Besides the available run off the Average Water Level for the time span of ten years (Nov., 2005 to Nov. 2014) and the Decadal Water Level trend (Nov., 2005 to Nov. 2014) were also taken into account. The blocks showing average water level more than 5 m bgl and declining water level trend were considered suitable for Artificial Recharge Plan.

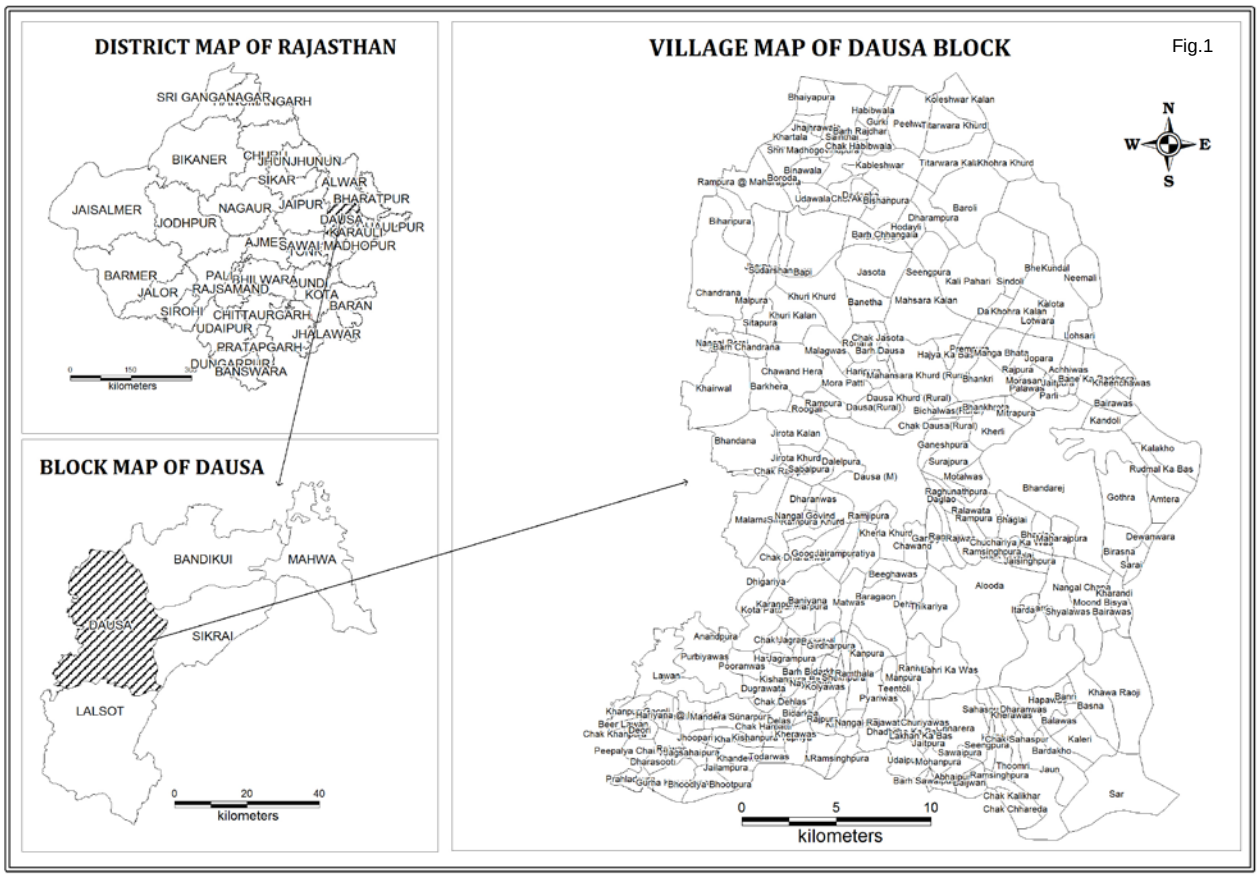
Location of the block

The Dausa Block covering an area of 943.76 Sq. Km. falls in western part of Dausa District and is located between North latitudes 26°42’ & 27°04’ and East longitudes 76°11’ & 76°30’. As per 2011 census, the total rural population of the Block is 334977 persons consisting of 175053 males & 159924 females. Location map is shown in fig 1.

Source wise Irrigated Area

Out of total area of 943.76 Sq.Km., an area of 287.01 (30.41%) falls under irrigation. The dug wells/ Tubewells are the major source of irrigation in Dausa Block. An area of 9.01 Sq.Km. falls under canal irrigation. The wells irrigate total 278.00 Sq.Km. area in this Block.

Fig: 1



Physiography & Drainage

Physiographically, the block is characterized by presence of alluvial plains, pediments, ravines and hills. The minimum and maximum elevation of Block is 281.50 m. amsl and 535.00 m. amsl, respectively. The map showing various geomorphic units is presented in **fig 2**.

There is no perennial river flowing in this Block. It is drained by Banganga river. The major part of block falls under Banganga basin and remaining southern & south western parts fall under Banas river basin. The map showing drainage and water bodies in the Dausa block are shown in **fig 3**.

Fig: 2

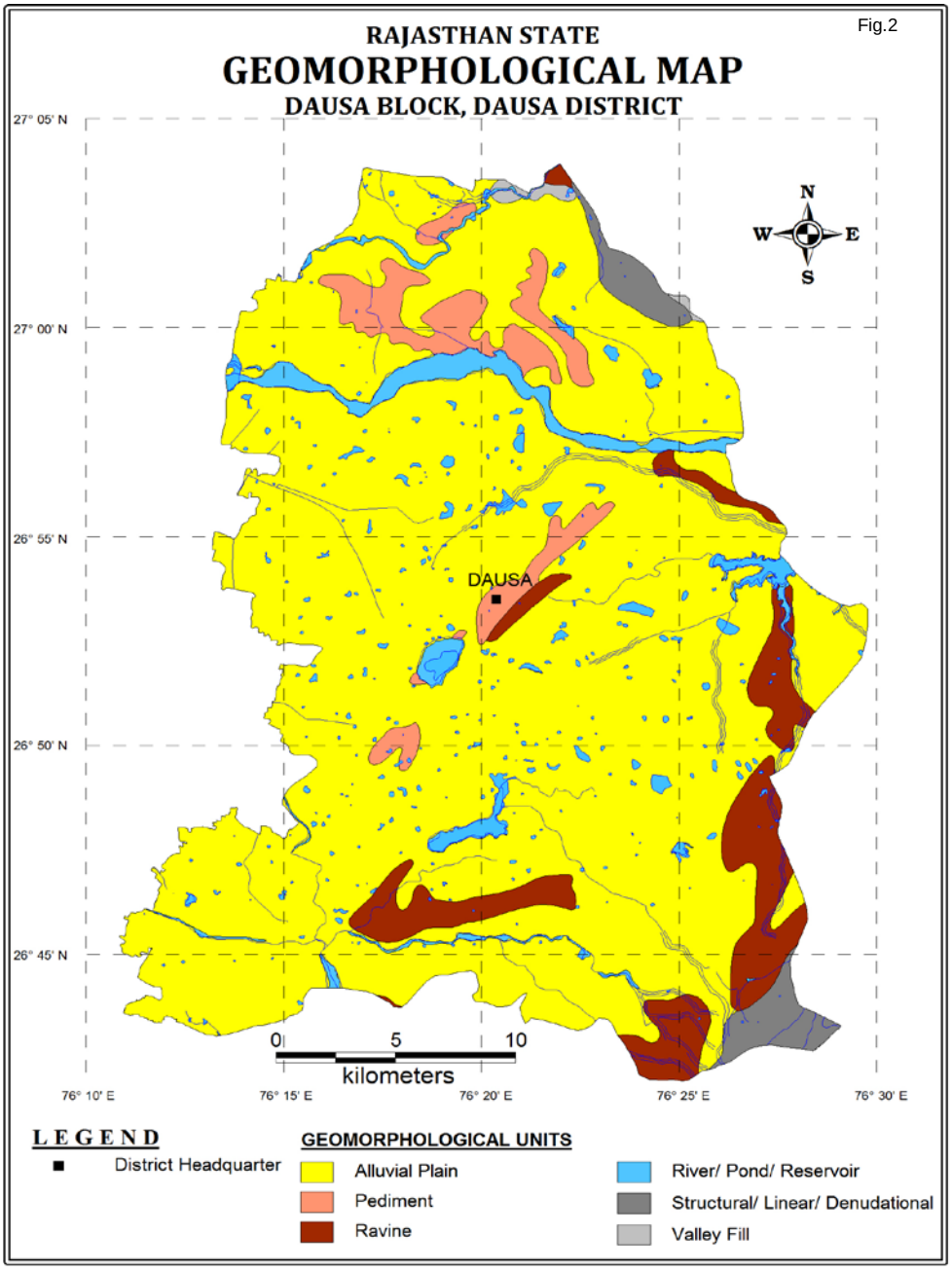
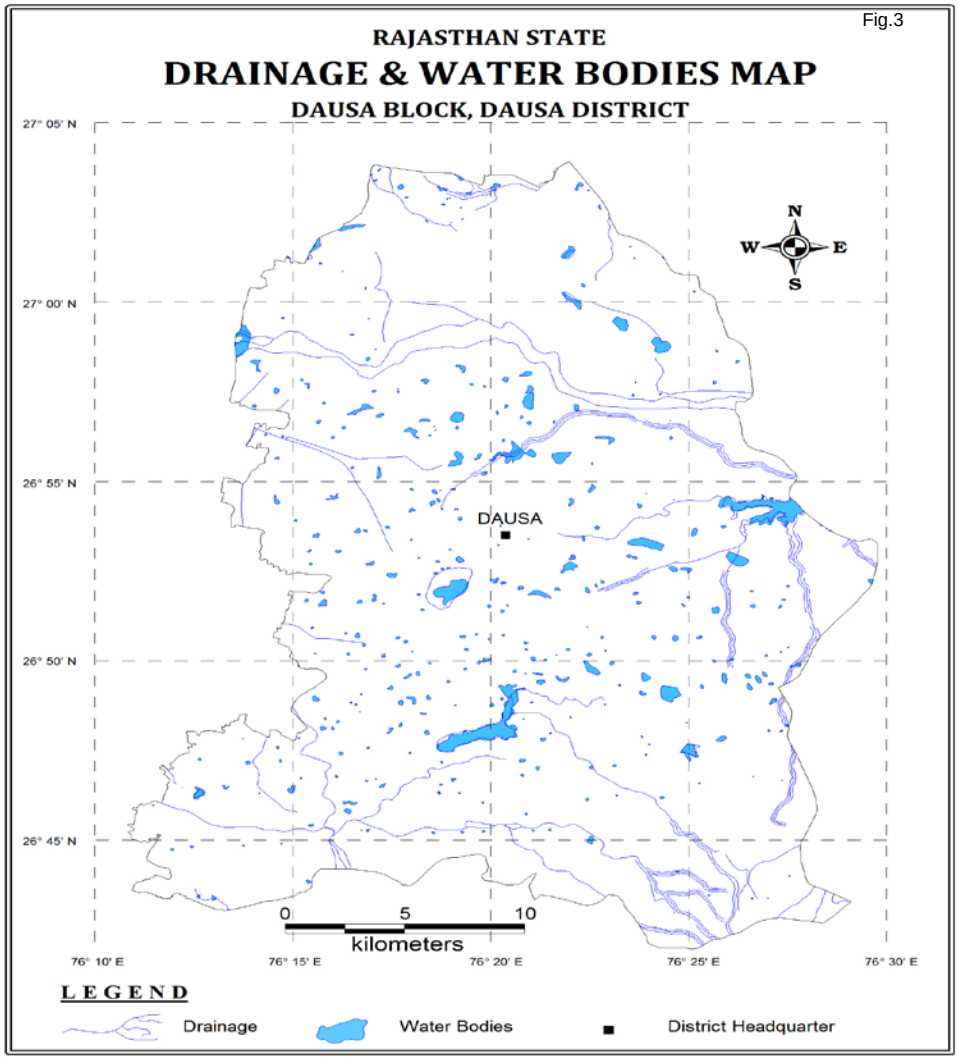


Fig.2
RAJASTHAN STATE
GEOMORPHOLOGICAL MAP
DAUSA BLOCK, DAUSA DISTRICT
27° 05' N
27° 00' N
26° 55' N
26° 50' N
26° 45' N
N
W
E
S
DAUSA
0
5
10
kilometers
76° 10' E
76° 15' E
76° 20' E
76° 25' E
76° 30' E
LEGEND
District Headquarter
GEOMORPHOLOGICAL UNITS
Alluvial Plain
Pediment
Ravine
River/ Pond/ Reservoir
Structural/ Linear/ Denudational
Valley Fill

Fig: 3



Rainfall

The climate of the block is semi arid. The Normal annual rainfall of block is 606.88 mm (IMD, 1901-70). The available data of rainfall indicates that larger part of annual rainfall is received through SW monsoon during July to September.

Hydrogeology of the Area

Alluvium (composed of sand, clay, kankar and gravel) forms the principal and potential aquifer in the area. Ground water occurs under unconfined to confined conditions in the primary porosity i.e. pore spaces. Talus and scree deposits form minor aquifer occuring on the flanks of almost all the hills. Lithologically, these are composed of rock fragments. Topographically, these are situated in such a position that they receive all the run-off from the hills/hill ranges located nearby. Width of talus and scree deposits along the foothills varies from a few metres to over 500 m. It is more where hill ranges are tectonically affected and disrupted by faulting. Ground water occurs under unconfined to semi-confined conditions. Thickness of talus and scree deposits goes up to 50 m of which the aquifer comprises 28 to 50 m. Phyllite & Quartzites of Delhi Supergroup and Quartzite, phyllite/shale, gneisses of Bhilwara Super Group form the minor aquifers. Out of total geographical area of 943.76 Sq. Km, an area of 894.74 Sq. Km. (94.81%) forms aquifer system (potential zone) in the block and remaining 49.02 Sq. Km. (5.19%) area is represented by hills. Out of this total potential zone of 894.74 Sq.Km., 647.10 Sq.Km. area is formed by alluviums and 247.64 Sq.Km. area is formed by hard rocks. Ground water occurs under unconfined condition to semi-confined conditions in the weathered mantle (ranging in thickness from 2 to 25 m) and deep-seated secondary porosity i.e. fractures, joints, contacts etc. of hard formation. In general yield of wells tapping alluvial aquifers varies from 0.35 to 4.63 lps depending on the thickness of saturated granular zones and yield of the wells tapping hard rock aquifers in ranges from 0.06 to 1.16 lps.

Ground Water Level

As per Average decadal depth to water level (from November, 2005 to November, 2014), the block majorly falls in water level range 5 – 10, 10 - 20 and 20 - 50 m bgl range from west to east. **(Fig 4)**

The average decadal depth to water level is 17.91 m bgl for Pre monsoon & 14.93 m bgl for Post monsoon. According to depth to water level map of May 2014, water level becomes deep in general as moving from north to south areas. The water level ranges between 5 to 10 m bgl in north western part, 10 to 20 m bgl in central & north eastern parts and 20 to 40 m bgl in southern & south eastern parts. According to depth to water level map of November 2014, water level ranging between 5 to 20 m bgl in north western & central parts, 20 to 40 m bgl in southern, western & north eastern parts and more than 40 m bgl in south western parts.Depth to water level maps for May 2014 & November 2014 is shown in **fig 5 & 6**.

Fig: 4

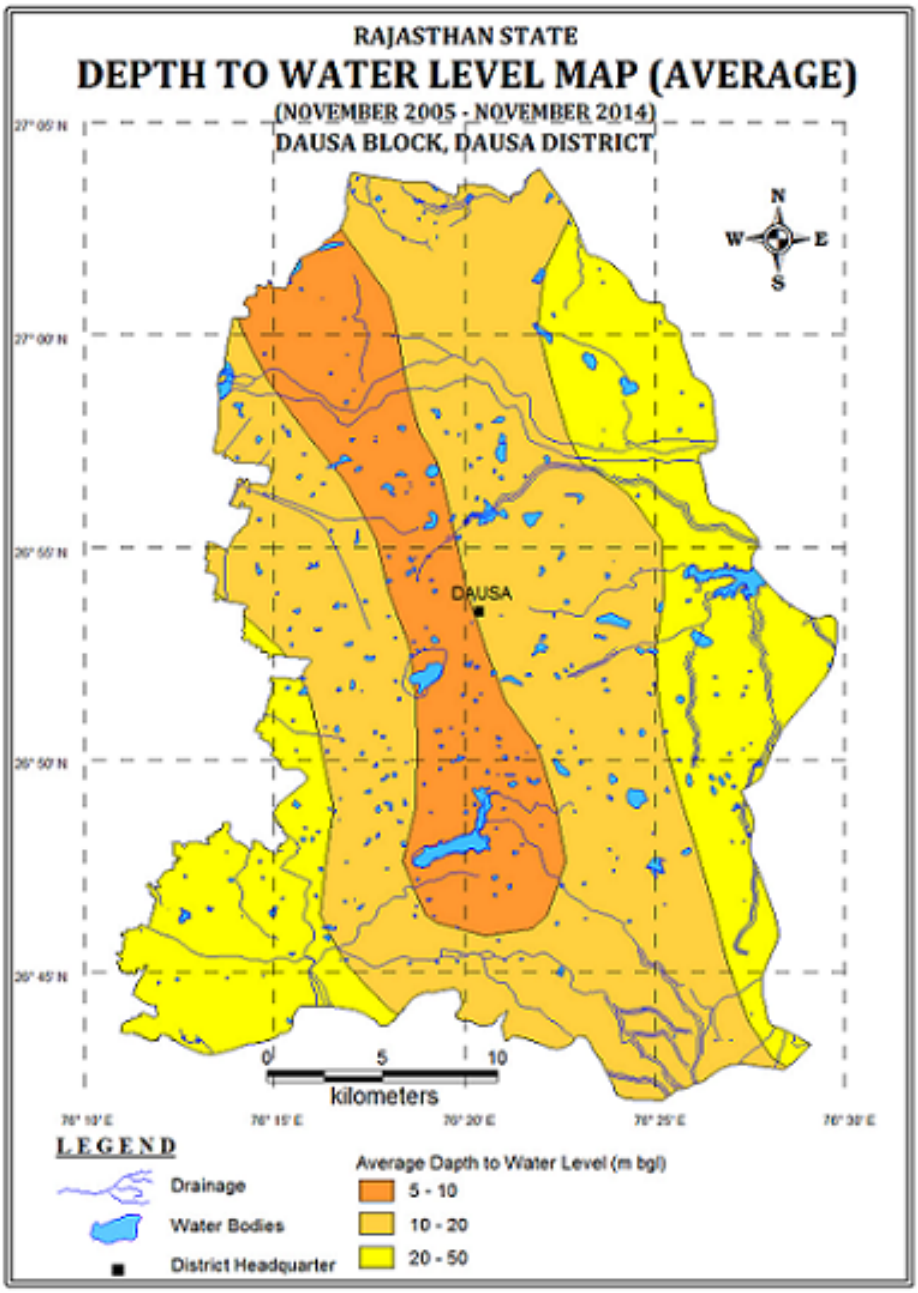

RAJASTHAN STATE
DEPTH TO WATER LEVEL MAP (AVERAGE)
(NOVEMBER 2005 - NOVEMBER 2014)
DAUSA BLOCK, DAUSA DISTRICT
N
W
E
S
DAUSA
0
5
10
kilometers
LEGEND
Drainage
Water Bodies
District Headquarter
Average Depth to Water Level (m bgl)
5 - 10
10 - 20
20 - 50

Fig: 5

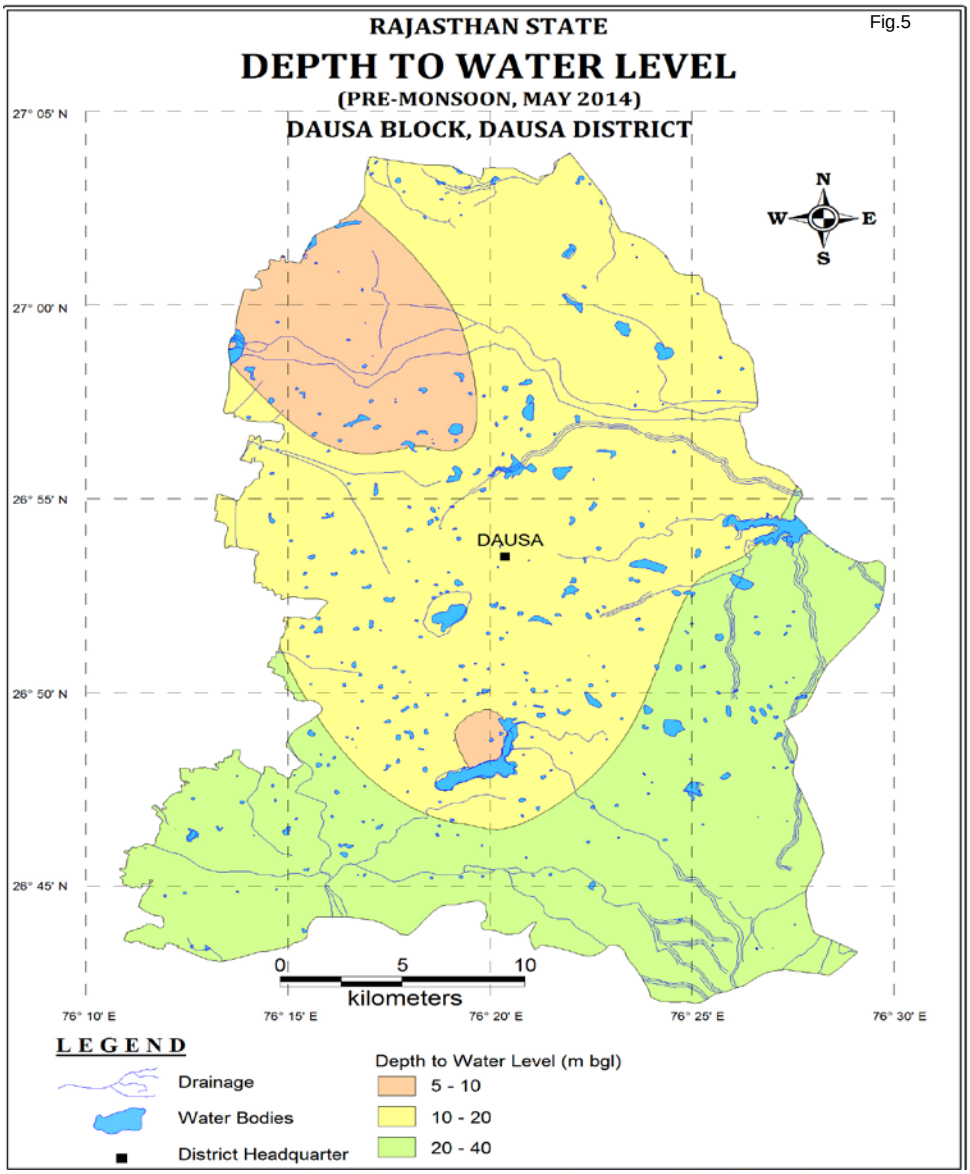
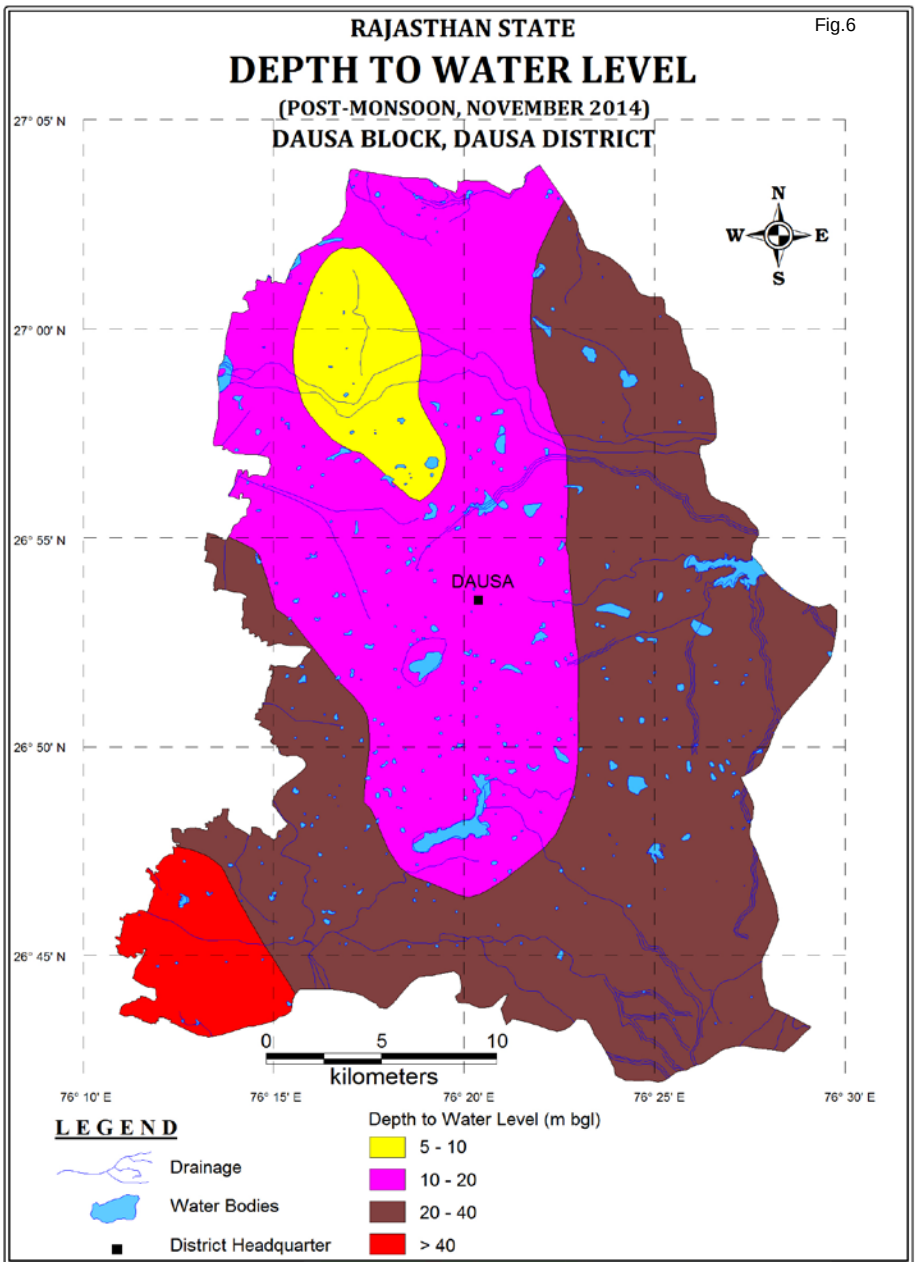

RAJASTHAN STATE
Fig.5
DEPTH TO WATER LEVEL
(PRE-MONSOON, MAY 2014)
DAUSA BLOCK, DAUSA DISTRICT
27° 05' N
27° 00' N
26° 55' N
26° 50' N
26° 45' N
N
W
E
S
DAUSA
0
5
10
kilometers
76° 10' E
76° 15' E
76° 20' E
76° 25' E
76° 30' E
LEGEND
Drainage
Water Bodies
District Headquarter
Depth to Water Level (m bgl)
5 - 10
10 - 20
20 - 40

Fig: 6

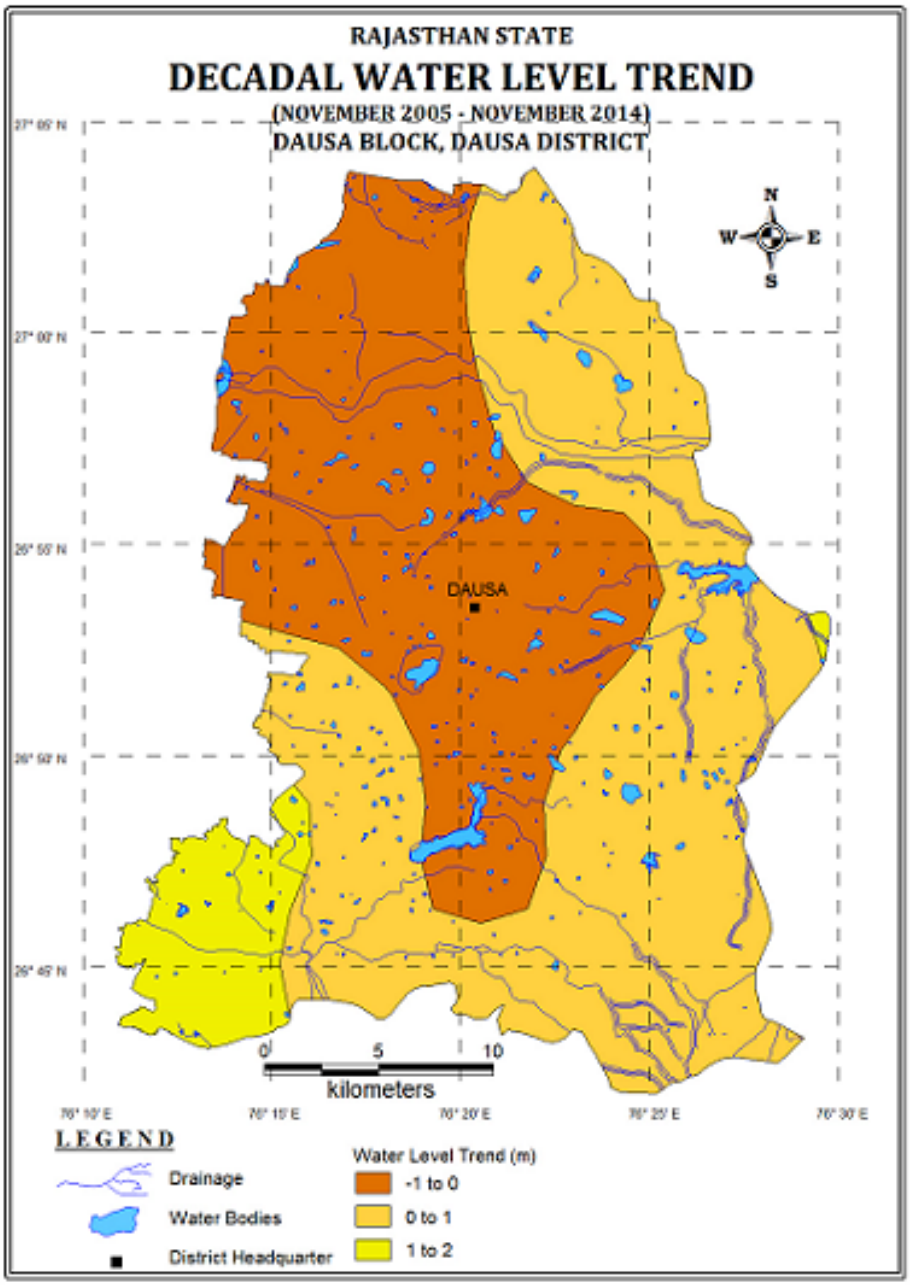


Water Level Trend:

All the hydrographs are showing declining water level trends over last 10 years. Water level trend shows average decline of 0.60 m/year during pre monsoon and 0.39 m/year during post monsoon has been observed.

As per the Decadal Water level trend (from November, 2005 to November, 2014), the declining trend is visible in the block. The fall in the range of -1 to 0, 0 to 1 and 1 to 2 m/ year in ground water level is prevalent in the block. The map of Decadal Water Level Trend is shown in **fig. 7**

Fig: 7



Subsurface Hydrogeology

As inferred from borehole data of the Dausa Block; Alluvium, Quartzite & Gneiss form the aquifers. However, the ground water in hard rocks only occurs in shallow weathered parts or fractures due to absence of primary porosity. The depth of drilling ranges from 24 to 203.70 mbgl and the average discharge ranges from 0.08 to 8.38 lps. Transmissivity value varies between 11.96 to 62 m^2/day and Storativity value is 0.0013.The quality of ground water in Dausa block is affected by high salinity & fluoride contamination.

Dynamic Ground Water Resource

The status of ground water resources of the block is presented in table 1. The annual Net Ground water Availability in the block is 5514.80ham and Annual Ground water draft is 7760.26ham. Stage of Ground water development has reached 140.72%.

Table 1: Ground Water Availability, Utilization and Stage of Development Dausa Block, Dausa District (As on 31.3.2011)

Natural Discharge During Non Monsoon Period	612.75 ham
Net Annual Ground Water Availability	5514.80 ham
Annual Ground Water Draft	7760.26 ham
Net Ground water Availability for Future Irrigation Use	0 ham
Stage of Ground Water Development	140.72%
Source: Ground Water Resource Assessment 31.03.2011	

Need for artificial recharge and water conservation plan

The present artificial recharge and water conservation Plan aims to mitigate the problems of continuous decline in water levels over the area through techniques of artificial recharge utilizing surplus rainwater based on scientific manner for optimal results. The broad scope of the recharge plan is as follows:

- Establishing efficacy of integrated approach through various artificial recharge and water conservation techniques. Intervention is proposed in cluster mode basis wherever feasible to have a better impact.
- Enhancing water use efficiency for controlling excessive ground water draft, especially for irrigation purposes.
- Ensuring sustainability of ground water abstraction structures and improvement in quality of ground water.

Surface water availability

As per the studies carried out by Water Resources Department, Govt of Rajasthan there is hardly any surplus water available for further development at 75% dependability. However, after taking into account the availability of source water in the basins of Rivers flowing in the State proportionate amount of surplus runoff available in particular block by particular sub basin was calculated.

Accordingly about 1.7071 MCM has been considered for recharge plan in the block. Optimum utilization of rainwater runoff depends on availability of land, feasible conditions, etc. Surface water availability, allocation and number of structures are presented in table 2.

Table 2: Source water for artificial recharge and number of recharge structure

District	District code	Block	Block code	Area of Block (Sq.km.)	Potential area suitable for recharge (Sq.km.)	Type of Aquifer	Area feasible for artificial recharge (Sq km)
DAUSA	RJ12	**DAUSA**	RJ1202	943.760	894.740	alluvium	647.100
DAUSA	RJ12	**DAUSA**				hard rock	247.640

Table 2 (contd): Source water for artificial recharge and number of recharge structure

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)	Sub Basin	Surplus available in the block (in Mm3)	Surplus water used in Recharge Shaft (RS)	No. of RS (0.03 MCM/RS)
0.080	24.510	21.510	1113.530	Morel	1.7071	1.7071	57
0.020	12.000	9.000	44.575		-	-	-
					1.7071	1.7071	57

Feasible Artificial Recharge and water conservation structures

A wide spectrum of techniques is in vougue, which are being implemented to recharge the ground water reservoir, conserve the utilizable rainfall and enhance the water use efficiency. Based on prevailing field conditions, out of total block area of 943.76 sq km practically 894.74 sq km area is feasible for implementing recharge measures. Based on available information about the area such as ground water scenario, hydrogeology, hydrology, topography, rainfall pattern, drainage, soil cover, utilizable rainfall etc. scope for various interventions has been studied and assessment of suitable areas, tentative design and costs of structures has been worked out in the present plan.

Identification of feasible areas

Dausa block is having ground water level between 20 & 40m below ground level and as per dynamic ground water resource estimation, the block is over exploited with stage of ground water development at 140.72%. The Dausa block is feasible for recharge due to presence of permeable zone above water table, favorable land slope and availability of water from rainfall.

Generally the Artificial recharge structures suitable in this type of area are Check dams/ Anicuts/ Percolation tanks and Recharge Shafts/ Recharge wells. Since the ground water levels are quite deep in the block, the structures like ani-cuts and Check dams are not suitable and also their construction is regulated. Considering these aspect the proposal for Recharge Shaft/ Recharge wells have been firmed up in the present Plan as the most suitable structures in Dausa block.

Details of Ground Water Recharge Measures

1. Existing Village Pond with recharge shaft/wells

Almost all the villages in the State of Rajasthan have one or two village ponds & other ponds. With time, these ponds get silted & hardly any water percolates downward. Also, any excess water coming into the pond goes away as a run off due to limited storage capacity. This surplus runoff can very well be utilized for recharging the ground water and also for enhancing conservation of water that can be further used for irrigation, thereby saving ground water withdrawal. Since natural recharge from these ponds is limited due to siltation and ground water levels are deep, the most effective ground water structure considered under the Plan is Recharge Shaft/ Recharge well constructed within the pond itself.

The above mentioned recharge well has been designed in a manner that maximum surplus water would likely to be utilized for recharge as well as sufficient water is retained in the pond for local use.

The model design of recharge well has been worked out in consultation with Ground Water Department, Government of Rajasthan and presented in Fig 8. The major features required are:

1. The well should have sufficient diameter for recharge- 10 to 12 inch diameter well with bottom screen/ opening just above the highest ground water level.
2. The well should have screen/ opening at the top, which should be at least 1.5m above the bed level of the pond.
3. The upper opening should be surrounded with filter pack comprising graded filter media of medium, coarse sand & gravel, so that the Recharge well does not get silted.

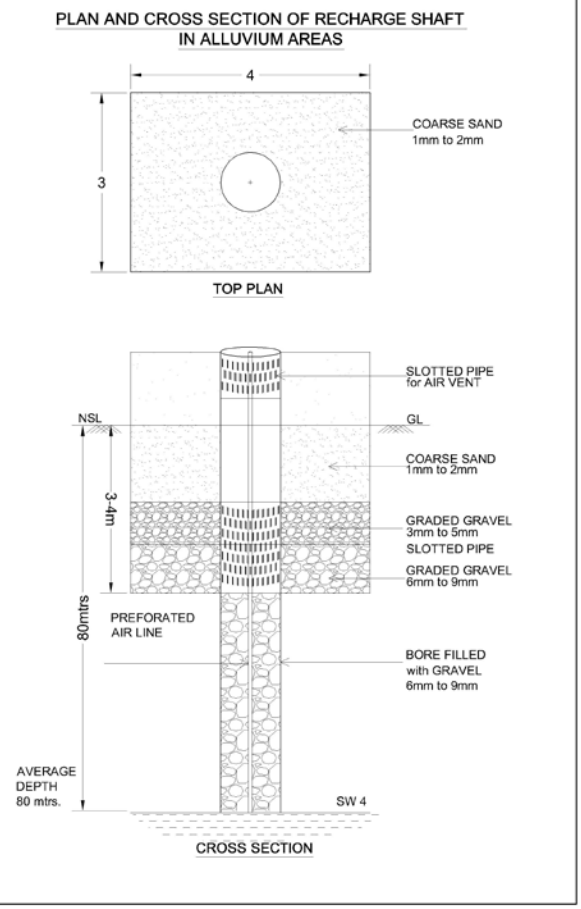
The opening for inflow to the well has been proposed at 1.5m above Bed level of pond. This is necessary to ensure that the pond retains sufficient water for use by local

consumers. However, this may necessitate further deepening of pond itself so that the pond is 3-4 m deep. A Single well as discussed above would be suitable for a pond upto area of about 5ha. Therefore, more number of such Recharge wells is envisaged for larger ponds.

Criteria for number of shafts

Village ponds having area <1 ha and > 25 ha has not been considered for construction of recharge shafts, one recharge shaft is proposed for pond area between 1 to 5 ha; 2 for 5 to 7.5 ha, 3 for 7.5 to 10 and 4 shafts for >10 ha.

Fig 8



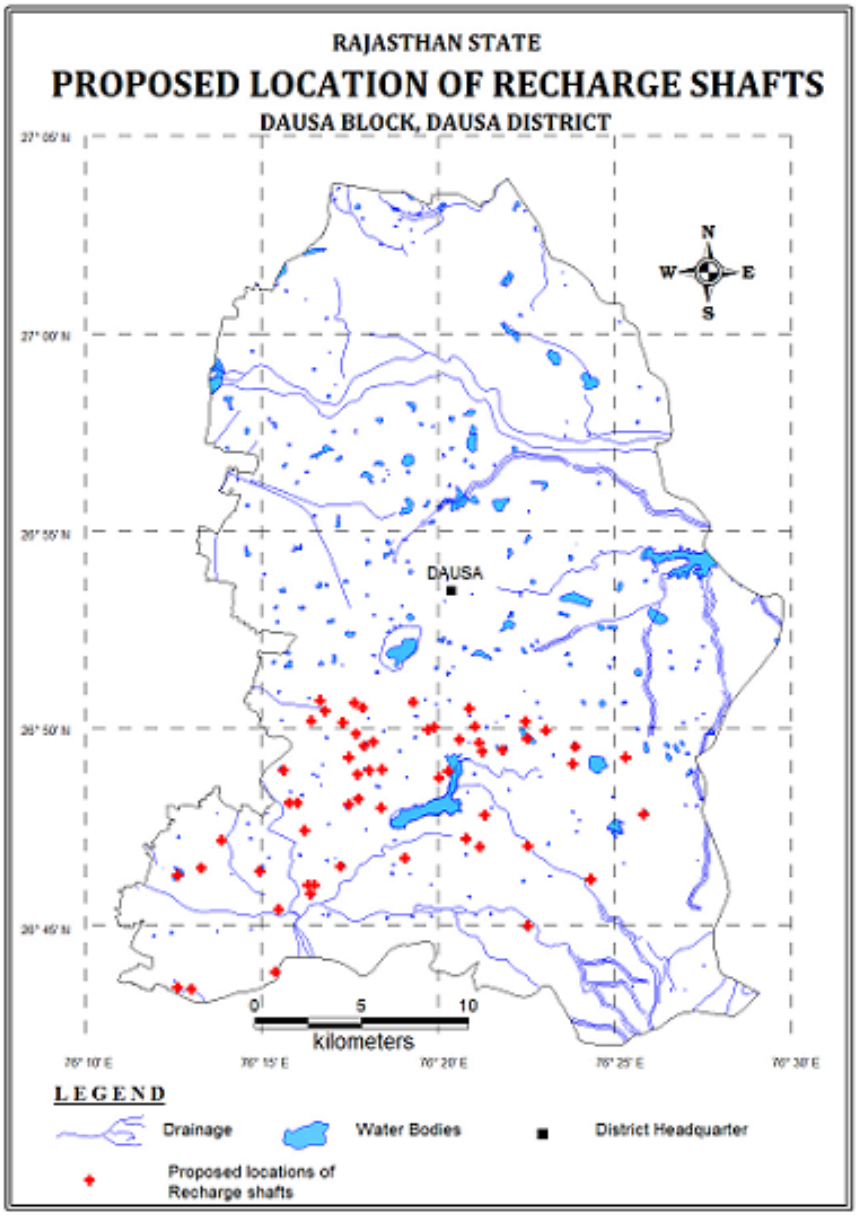
The tentative location of villages for construction of recharge shaft/well in existing village pond and their cost estimates are shown in Fig 9 and Table 3. The plan proposes construction of 57 recharges shafts/ wells in 57 identified existing village ponds at an estimated cost of 285 lacs.

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

S No	Village	Long	Lat	Pond area (ha)	Formation	No of Shafts	Unit cost (Rs in lac)	Total cost (Rs in lac)
1	Alooda	76.375	26.829	21.697	Soft_rock	1	5	5
2	Rajwas	76.375	26.836	2.260	Soft_rock	1	5	5
3	Alooda	76.384	26.832	2.487	Soft_rock	1	5	5
4	Alooda	76.398	26.826	10.140	Soft_rock	1	5	5
5	Shyalawas	76.422	26.821	2.183	Soft_rock	1	5	5
6	Alooda	76.397	26.818	3.104	Soft_rock	1	5	5
7	Shyalawas	76.430	26.797	7.617	Soft_rock	1	5	5
8	Thikariya	76.355	26.797	2.934	Soft_rock	1	5	5
9	Baragaon	76.334	26.813	1.738	Soft_rock	1	5	5
10	Dehlari	76.338	26.815	1.435	Soft_rock	1	5	5
11	Beeghawas	76.343	26.829	1.721	Soft_rock	1	5	5
12	Ganglyawas	76.351	26.834	2.819	Soft_rock	1	5	5
13	Chawand	76.348	26.842	1.621	Soft_rock	1	5	5
14	Thikariya	76.353	26.827	2.908	Soft_rock	1	5	5
15	Thikariya	76.354	26.823	5.829	Soft_rock	1	5	5
16	Alooda	76.364	26.824	7.224	Soft_rock	1	5	5
17	Nangal Govind	76.278	26.845	3.821	Soft_rock	1	5	5
18	Singwara	76.273	26.837	1.472	Soft_rock	1	5	5
19	Chak Dharanwas	76.280	26.841	1.383	Soft_rock	1	5	5
20	Googolao	76.288	26.836	2.101	Soft_rock	1	5	5
21	Googolao	76.297	26.842	1.799	Soft_rock	1	5	5
22	Googolao	76.294	26.844	1.571	Soft_rock	1	5	5
23	Jairampura	76.294	26.831	2.273	Soft_rock	1	5	5
24	Baniyana	76.291	26.821	2.925	Soft_rock	1	5	5
25	Baniyana	76.295	26.814	3.762	Soft_rock	1	5	5
26	Baniyana	76.291	26.801	3.527	Soft_rock	1	5	5
27	Baniyana	76.296	26.804	1.957	Soft_rock	1	5	5
28	Baniyana	76.301	26.816	6.100	Soft_rock	1	5	5
29	Baniyana	76.298	26.826	3.411	Soft_rock	1	5	5
30	Jairampura	76.303	26.828	2.660	Soft_rock	1	5	5
31	Matwas	76.307	26.816	2.694	Soft_rock	1	5	5
32	Matwas	76.306	26.800	3.334	Soft_rock	1	5	5
33	Beeghawas	76.328	26.833	1.409	Soft_rock	1	5	5
34	Kherla Khurd	76.331	26.834	4.701	Soft_rock	1	5	5
35	Hingotiya	76.322	26.845	2.594	Soft_rock	1	5	5
36	Dhigariya	76.260	26.816	5.723	Soft_rock	1	5	5
37	Kota Patti	76.263	26.802	3.634	Soft_rock	1	5	5
38	Kota Patti	76.267	26.802	1.421	Soft_rock	1	5	5
39	Purbiyawas	76.231	26.786	2.552	Soft_rock	1	5	5
40	Lawan	76.221	26.775	2.622	Soft_rock	1	5	5

41	Lawan	76.210	26.771	16.705	Soft_rock	1	5	5
42	Purbiyawas	76.249	26.773	7.626	Soft_rock	1	5	5
43	Mandera Sunarpura	76.258	26.757	1.701	Soft_rock	1	5	5
44	Delas	76.273	26.764	5.296	Soft_rock	1	5	5
45	Dugrawata	76.272	26.767	1.947	Soft_rock	1	5	5
46	Chak Dehlas	76.275	26.767	3.994	Soft_rock	1	5	5
47	Dublya	76.270	26.790	2.238	Soft_rock	1	5	5
48	Barh Bidarkha	76.287	26.775	2.842	Soft_rock	1	5	5
49	Ramthala	76.318	26.778	1.789	Soft_rock	1	5	5
50	Gurha Keeratwas	76.217	26.723	2.790	Soft_rock	1	5	5
51	Gurha Keeratwas	76.210	26.724	1.451	Soft_rock	1	5	5
52	Jailampura	76.256	26.731	2.575	Soft_rock	1	5	5
53	Raniwas	76.346	26.787	3.680	Soft_rock	1	5	5
54	Raniwas	76.353	26.784	2.146	Soft_rock	1	5	5
55	Alooda	76.376	26.784	2.134	Soft_rock	1	5	5
56	Dharanwas	76.405	26.770	1.774	Soft_rock	1	5	5
57	Chharera	76.376	26.750	7.254	Soft_rock	1	5	5
	Total					57		285

Fig: 9


RAJASTHAN STATE
PROPOSED LOCATION OF RECHARGE SHAFTS
DAUSA BLOCK, DAUSA DISTRICT
N
W
E
S
DAUSA
0
5
10
kilometers
LEGEND
Drainage
Water Bodies
District Headquarter
Proposed locations of Recharge shafts

Conservation Measures

As mentioned earlier the present Plan occurs on integrated approach of interventions, which includes both recharge measures as well as conservation of water while the recharge interventions have been discussed. The proposed conservation measures discussed below includes revival, repair of existing water bodies, etc.

A. Revival, repair of water bodies

The existing ponds and tanks in 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.

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. The monitoring system should be designed judiciously to monitor impact of these structures individually as well as collectively. Demarcation of the zone of influence of the artificial recharge structure is one of the main objectives of monitoring.

It is proposed to utilize the existing data available with the Government of Rajasthan and CGWB baseline data. For assessment of the impact of proposed measures additional data will be generated by construction of the piezometer at suitable and strategic sites.

It is proposed to construct 57 piezometer, one in each village in the vicinity of proposed recharge structure, at suitable location for monitoring of water levels. The depth of the piezometer may vary from 60 to 80 mbgl. This will help in assessing the impact of the project implementation.

Since the implantation of the Plan involves institutional framework, it is proposed to constitute State Level Technical Coordination Committee (SLTCC) and District Level Technical Coordination Committee (DLTCC) for proper monitoring and review of the implementation of the Plan.

Financial Outlay of the Plan

The total estimated cost of the Plan is 3.3516 cr, which includes Rs 2.85 cr for ground water recharge activities, 0.342cr for ground water monitoring (Piezometer construction) and Rs 0.1596 cr towards operation and maintenance charges. The tentative cost estimates of the various activities of the Plan are shown in Table 4 & 5.

The tentative cost for different activities is given in table 5. The unit rates are as followed by the Govt. of Rajasthan (BSR). The total estimated cost of the project is **Rs 3.3516 Crores**.

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)
Alluvium – 2.85

Table 5: Tentative cost of different activities

Feasible Artificial Recharge & Water Conservation structures/ activities	Tentative Design	Quantity (in nos. or area in sq. m)	Rainwater harvested (mcm)	Tentative unit cost (in Rs lakh)	Total tentative cost (in Rs lakh)	Expected Annual GW recharge/ conservation (mcm)
Recharge Structures/ Activities						
Recharge shaft within the pond /tanks	Alluvium – Depth 80m, Dia: 10-12" with filter pit	57	1.7071	5	285	1.195
Sub total					285	1.195
Impact assessment & Monitoring						
Piezometer	Up to 80 m bgl	57		0.6	34.2	
Impact assessment will be carried out by implementing agency						
O & M - 5% of total cost of the scheme					15.96	
TOTAL					**335.16**	

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

Time Schedule

The project is to be implemented in two years, however impact assessment will be carried out for five years**.** A time schedule for different activities is given in table 6.

Table 6: Time Schedule

Steps	1st phase	2th Phase	3rd Phase	4th Phase	5th Phase	6th Phase	7th Phase	8th Phase
Constitution of State Level Technical Coordination Committee (SLTCC) and District Level Technical Coordination Committee (DLTCC)								
Arranging meeting of SLTCC for provision available under the scheme, request to implementing agencies for submission of DPR Scrutiny, recommendations & approval of AR Projects / Schemes in DLTCC & SLTCC Forwarding the DPR to Central Ground Water Board (CHQ), New Delhi for approval and issuing of sanction from the Ministry Meeting of TCC(CHQ) and release of sanction of funds								
Construction of artificial recharge structures & Monitoring of water levels in the area locally								
Completion and Utilisation certificate								
Impact Assessment and submission of report								

Expected Benefits or outcome of the Plan

Ground water recharge and water conservation Plan of Dausa block, Dausa envisages gainful utilization of 1.195 MCM of surplus monsoon runoff for recharging of depleted aquifer system.

With the additional recharge and water conservation interventions as proposed in the Plan, it is anticipated that with enhanced recharge and reduction in ground water draft, the stage of ground water development will reduce to 137.73 % from the existing

140.72%. The projected status of ground water resources and utilization scenario is presented in table 7.

Table 7: Projected Status of Groundwater Resource & Utilization

Net G.W. Availability (mcm)	Additional Recharge from RWH & conservation (mcm)	Total Net G.W. Availability after intervention (Ham)	Existing G.W Draft for all purpose (ham)	Saving of Ground water through projects (ham)	Net GW draft after interventions (ham)	Present stage of G.W. development (%)	Projected stage of G.W. Dev. (in %)
55.148	1.195	56.343	77.6026	-	77.6026	140.72	137.73

- The implementation of the project would result in additional recharge. The other tangible/ non-tangible benefits of the project are:

- Recharging the ground water will help in arresting the rapid decline in ground water resources and will also ensure improvement in quality of ground water by way of dilution.
- Proposed structures and measures will also enhance the ground water potential and would ensure sustainability of ground water resources.
- Surface runoff water stored or harnessed can be used as supplemental irrigational resources and will reduce the stress on the ground water.
- Besides, it will also help in reducing the amount and spate of storm water being drained by river and controlling soil erosion.