*Draft Report*

# केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय

भारत सरकार

Central Ground Water Board

Ministry of Water Resources, River Development and Ganga Rejuvenation

Government of India

**Report on**

# AQUIFER MAPPING AND MANAGEMENT PLAN

## Bhiknoor Mandal, Nizamabad District, Telangana

दक्षिणी क्षेत्र, हैदराबाद

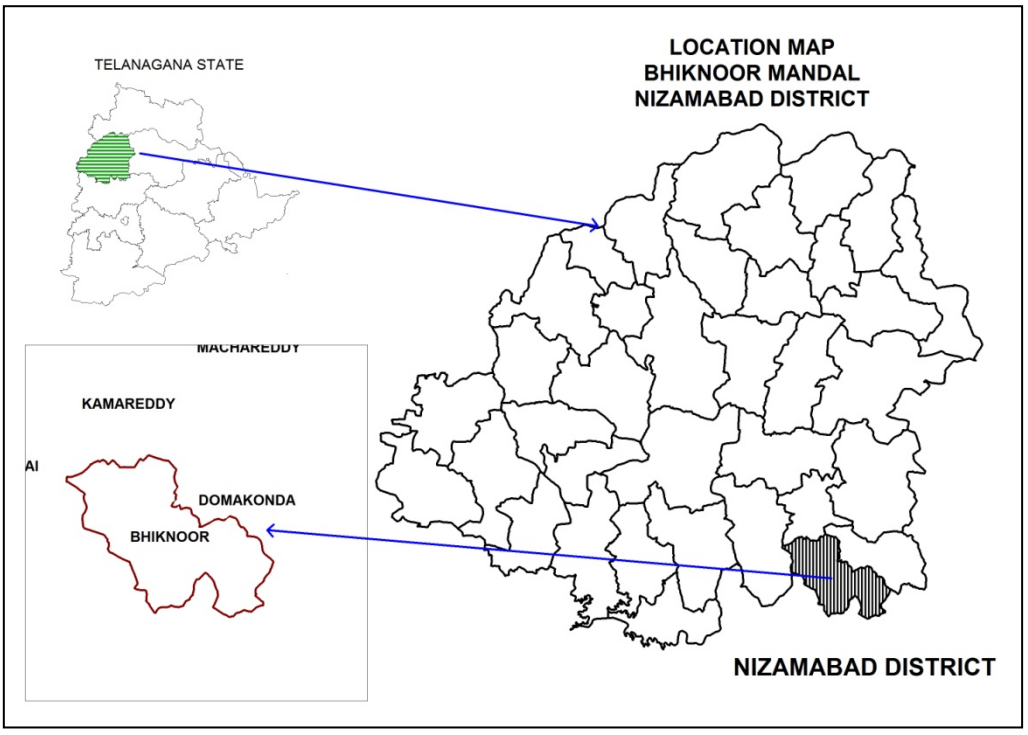
Southern Region, Hyderabad

# भारत सरकार
# जल संसाधन नदी विकास एवम् गंगा संरक्षण मंत्रालय
# केंद्रीय भूमिजल बोर्ड

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

## REPORT ON

### AQUIFER MAPS & MANAGEMENT PLANS
### BHIKNOOR MANDAL, NIZAMABAD DISTRICT, TELANGANA STATE




**CENTRAL GROUND WATER BOARD**
**SOUTHERN REGION**
**HYDERABAD**
**AUGUST-2016**

**REPORT ON**
**AQUIFER MAPS & MANAGEMENT PLANS**
**BHIKNOOR MANDAL, NIZAMABAD DISTRICT, TELANGANA STATE**

| | **SALIENT FEATURES** | | |
|---|---|---|---|
| 1 | Name of the Mandal/Area<br>Revenue Division<br>Location<br>**(Fig-1)** | **:** | **BHIKNOOR/192 Km$^2$**<br>**NIZAMABAD**<br>EL78$^0$17'48.67"- 78$^0$29'59.07"<br>NL18$^0$7'7.38"-18$^0$16'29.92" |
| 2 | No. of Revenue villages | : | **19** |
| 3 | District/State | : | **Nizamabad/Telangana** |
| 4 | Population /Density (2011 Census) | : | 59656/311 per Km$^2$ |
| 5 | Normal Rainfall (mm)<br><br>Actual Rainfall (2014-2015)(mm) | : | 984.1 -Monsoon: 777.0 mm (79%)<br>-Non-Monsoon:207.80 mm (21%)<br>625.6 |
| 6 | Agriculture (2014-15)(Ha): | : | Kharif season :<br>1. Net area sown: 4579<br>2. Maize: 1861(41%)<br>3. Paddy: 1240(27%)<br>4. Total oil seeds: 236(5%)<br>5. Total pulses: 190(4%)<br>6. Cotton: 106(2%)<br>7. Other crops: 940(21%)<br>Rabi season :<br>1. Net area sown: 3299<br>2. Maize: 1413(43%)<br>3. Paddy: 545(17%)<br>4. Total oil seeds: 239(7%)<br>5. Total pulses: 97(3%)<br>6. Total spices: 28(1%)<br>7. Other crops: 977(30%) |
| 7 | Irrigation (2014-15) (Ha) | : | Net area irrigated under<br>1. Gross irrigated area: 5395<br>2. Net irrigated area: 2193<br>3. Area irrigated more than once: 3202<br>• Ground water: 5395 |
| 8 | Existing and future water demands (MCM) | | Domestic & Industrial<br>• Existing:0.53<br>• Future (year 2025):2.31<br>Irrigation (Existing): 16.64 |
| 9 | Depth to water level (m bgl) | : | 14-32 m (Pre-monsoon)<br>14-36 m (Post-monsoon) |
| | **AQUIFER DISPOSITION** | : | |
| 10 | No of Aquifers | : | 2 |
| 11 | 3-D aquifer disposition and basic characteristics of each aquifer<br>**(3D: Fig-2a**<br>**Section Layout:2b**<br>**Sections: 2c & 2d)** | | **Geology-Granites**<br>**Aqufer-1 (Weathered Zone):**<br>Weathering varies from 12-22 m<br>Transmissivity(T): 6-181 m$^2$/day<br>Specific Yield (Sy):0.2 to 2 %<br>**Aquifer-2 (Fractured Zone):** |

| | | | |
|---|---|---|---|
| | | | Depth of fracturing varies from 25-45 m.<br>Transmissivity (T): 10-117 $m^2$/day<br>Specific storage (S):0.00001-0.02<br>Cumulative yield (Aq1 and Aq 2) (lps): 0.5 to 2 |
| 12 | Ground water Issues | : | • Geogenic contamination by fluoride.<br>• Sustainability of wells (3-4 hrs) |
| 13 | Ground water resource availability and extraction (MCM) | : | • Net GW availability :31.18<br>• Gross Ground Water draft for Irrigation:26.89<br>• Gross Ground water draft for domestic and industrial supply:0.53<br>• Gross GW draft:27.42<br>• Stage of ground water development: 88 %<br>• Category: Semi Critical |
| 14 | Ground water extraction | : | No of ground water extraction structures :8291<br>No of Dug Wells :468<br>No of Bore Wells :7823 |
| 15 | Chemical quality of ground water and contamination | : | **Pre-monsoon**<br>EC (µS/cm) min: 450 max:1100<br>$NO_3$ (mg/L): Min 35 and max :105<br>F (mg/L): Min :0.75 and Max:2.25<br>**Post-monsoon**<br>EC (µS/cm) min: 650 max:1400<br>$NO_3$ (mg/L): Min 35 and max 105<br>F (mg/L): Min 0.25 and Max 1.25 |
| 16 | **Ground Water Recharge Scenario** | : | **MCM** |
| 16.1 | Recharge from Rainfall (Monsoon) | : | 19.23 |
| 16.2 | Recharge from Other sources (Tanks and applied irrigation) (Monsoon) | : | 5.28 |
| 16.3 | Recharge from rainfall (Non-Monsoon) | : | 4.29 |
| 16.4 | Recharge from Other sources (Tanks and applied irrigation) (Non-Monsoon) | : | 7.65 |
| 16.5 | Total annual GW Recharge | : | 36.44 |
| 16.6 | Natural Discharge | : | 3.64 |
| 16.7 | Existing Minor Irrigation Tanks (nos) | : | 122 |
| 16.8 | Storage from existing tanks | : | 0.68 |
| 16.9 | Existing Artificial Recharge Structures (PT, CD and Farm ponds) | : | 74/78/1830 |
| 17 | Storage from existing AR Structures | : | 1.7 |

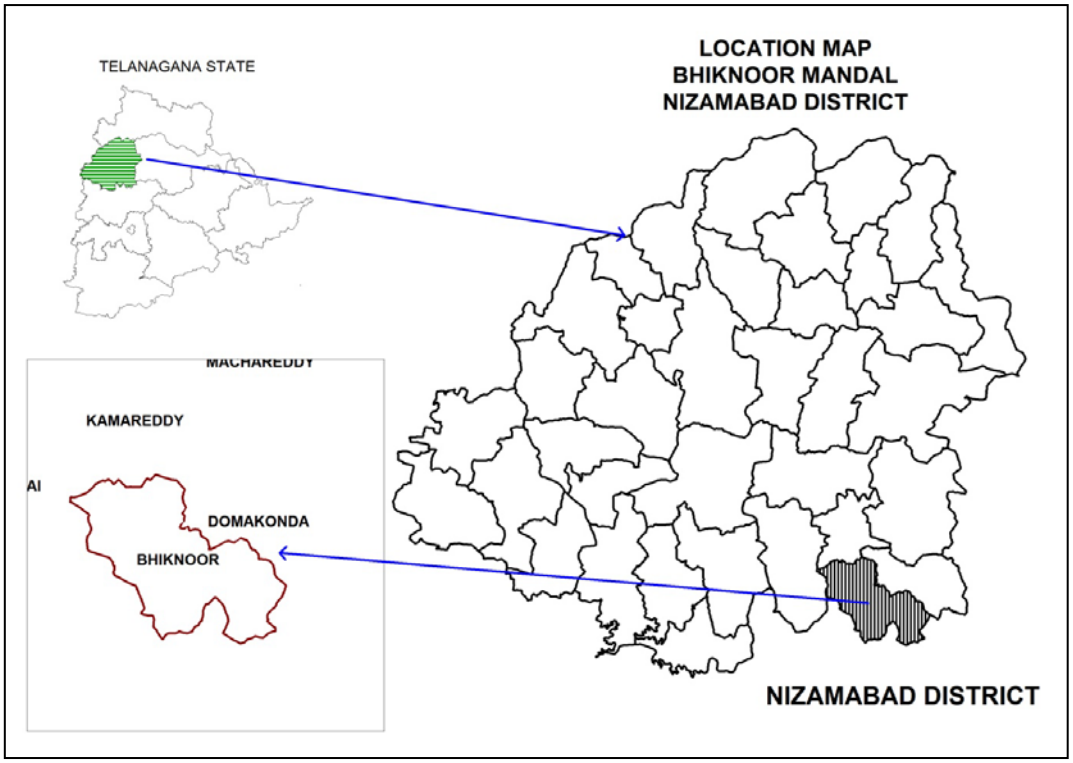



**Fig-1: Location Map of Bhiknoor Mandal.**

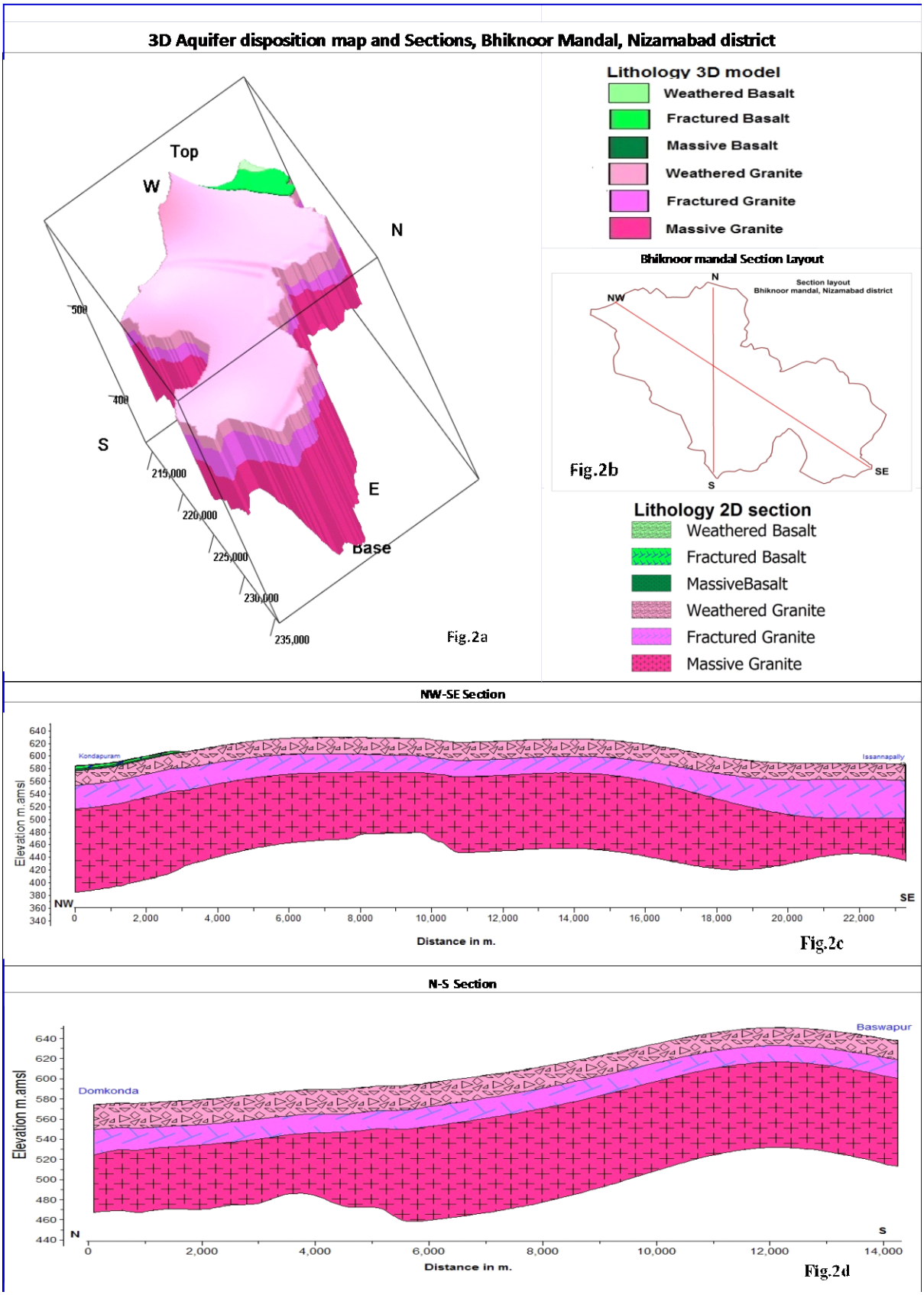



**Fig-2(a-d): 3 D map and Sections.**

**GW MANAGEMENT STRATEGIES, BHIKNOOR MANDAL, NIZAMABAD DISTRICT**

| | | | |
|---|---|---|---|
| **A** | **WATER RESOURCE AVAILABILITY** | | |
| | • Ground water (as per GEC 2012-13) | : | 31.18 MCM |
| | • Surface Water (as per 2014-15 irrigation data) | : | - |
| | • Total water availability | : | 31.18 MCM |
| **(a)** | **Ground Water Resource Enhancement (Table-1)** | | |
| | **Supply side Interventions** | | |
| 1 | Aquifer wise space available for recharge and proposed interventions | : | 11-33 m |
| 2 | Volume of Un-saturated zone (upto 3mbgl) | : | 4386.8 MCM |
| 3 | Recharge Potential (MCM) (Sy 1.1%) | | 87.7 MCM |
| 4 | Utilizable Yield (MCM) available for ARS | : | 5.67 MCM |
| 5 | No. of Check dams (CD's) / Mini percolation tanks (MPT's) recommended | : | 144 (66 CDs +78 PTs) |
| 6 | Total Cost of ARS | : | 11.1 Cr |
| 7 | Expected Ground Water Recharge through ARS | : | 2.8MCM |
| 8 | Water Conservation Measures (WCM) (Farm Ponds) | : | 260 |
| 9 | Total Cost of WCM | : | 0.65 Cr |
| 10 | **Mission Kakatiya-** Repair & Renovation of existing Tanks | : | 0.31 MCM (29tanks) |
| 11 | Proposed tanks to be taken up in phased manner | | 93 tanks (@0.01 MCM) |
| 12 | Expected GW Recharge under **Mission Kakatiya** | : | 0.09 MCM(30 % of capacity) |
| 13 | **Mission Bhagiratha** (Providing drinking water needs to the entire population) @ 100 lpcd/person (rural) and 135 (urban) from surface water source from outside the mandal area (**From River Krishna**) | : | 2.18 MCM/year |
| 14 | Net Saving of Ground water from **Mission Bhagiratha** | : | 1.31MCM/year |
| **(b)** | **DEMAND SIDE INTERVENTION** | | |
| 15 | Existing Micro Irrigation Intervention & Gross area irrigated | : | 208 Micro irrigation units/192.41 ha |
| 16 | Proposed Micro Irrigation | : | 1900 ha in 19 Villages @ 100 ha in each NC village. |
| 17 | Cost for micro-irrigation | : | 11.4 Cr@ 0.60 lakhs per ha. |
| 18 | Expected ground water saving from micro-irrigation | : | 3.8 MCM of water is expected to be conserved. |
| **(c)** | **REGULATION & COMMUNITY INTERVENTIONS** | | |
| 19 | Regulation and control | : | • WALTA-Act to be implemented in true spirit.<br>• Regulation of power supply in 2 |

| | | | |
|---|---|---|---|
| | | | spells @ 4 hours/spell to increase bore well/GW sustainability.<br>• As mandatory measures power connection may be given to only those farmers who are adopting micro irrigation for all new bore well to be constructed. |
| **(d)** | **OTHER INTERVENTIONS SUGGESTED** | : | • Participatory Ground Water Management with community and women participation.<br>• Paddy cultivation during rabi season should be reduced and to be shifted to ID Crops and drought resistant crops. If necessary some regulatory rules may be framed and implemented.<br>• In the existing ground water areas sharing of ground water amongst the users to be encouraged to increase the sustainability of wells by reducing well interference.<br>• The bore well owner should be suitably compensated for the cost of well by funding to farmers for adopting micro irrigation practices by the Govt. |
| **(e)** | **EXPECTED RESULTS AND OUTCOME** | | |
| 20 | Total Cost of Interventions (Excluding Mission Kakatiya and Bhagiratha) | : | 23.15 Cr |
| 21 | Likely benefit of Interventions | : | ~8 MCM ground water can be saved from the above interventions. The stage of Ground water development may likely to be come down by 18 % (from 88 % to 70%). |

**Table-1: Village wise list of Artificial Recharge Structures Recommended.**

| S.No | Village | Unsaturated thickness upto 3 m. bgl (m.) | Village Recharge potential MCM (upto 3 m.bgl) | 20% of Run off for AR MCM | Proposed CD's | Proposed PT's | Total cost | Expected GW Recharge in MCM |
|---|---|---|---|---|---|---|---|---|
| | **Priority-1** | **m** | **MCM** | **MCM** | **NO.** | **NO.** | **Lakhs** | **MCM** |
| 1 | Anthampalle | 32 | 2.0 | 0.1 | 0 | 0 | 0 | 0.1 |
| 2 | Bagirthipalle | 11 | 1.3 | 0.2 | 0 | 2 | 20 | 0.1 |
| 3 | Baswapur | 15 | 4.2 | 0.5 | 7 | 7 | 105 | 0.2 |
| 4 | Mallupalle | 19 | 1.8 | 0.2 | 1 | 1 | 15 | 0.1 |
| 5 | Ryegatlapalle | 16 | 0.8 | 0.1 | 0 | 1 | 10 | 0.0 |
| | **Priority-1(Total)** | | | | **8** | **11** | **150** | **0.5** |
| | **Priority-2** | | | | | | | |
| 1 | Bhiknur | 33.11 | 17.4 | 0.9 | 14 | 15 | 220 | 0.4 |
| 2 | Gurjakunta | 17 | 0.4 | 0.0 | 0 | 0 | 0 | 0.0 |
| 3 | Jangampalle | 24 | 9.6 | 0.7 | 11 | 11 | 165 | 0.3 |
| 4 | Kachapur | 30 | 7.7 | 0.4 | 6 | 5 | 80 | 0.2 |
| 5 | Kancherla | 26 | 2.6 | 0.2 | 1 | 2 | 25 | 0.1 |
| 6 | Laxmidevipalle | 32 | 1.2 | 0.1 | 0 | 0 | 0 | 0.0 |
| 7 | Peddamallareddy | 31 | 11.8 | 0.6 | 8 | 10 | 140 | 0.3 |
| 8 | Peddapalle | 22 | 0.8 | 0.1 | 0 | 0 | 0 | 0.0 |
| 9 | Pondurthi | 20 | 3.5 | 0.3 | 3 | 3 | 45 | 0.1 |
| 10 | Rajempet | 18 | 3.1 | 0.3 | 0 | 3 | 30 | 0.1 |
| 11 | Rameswarpalle | 32 | 3.0 | 0.2 | 0 | 1 | 10 | 0.1 |
| 12 | Talmadla | 25 | 6.2 | 0.4 | 6 | 7 | 100 | 0.2 |
| 13 | Tippapur | 29 | 10.4 | 0.6 | 9 | 10 | 145 | 0.3 |
| | **Priority-2** | | | | **58** | **67** | **960** | **2.3** |
| | **Total (P-1&P-2)** | | | | **66** | **78** | **1110** | **2.8** |