# GROUND WATER BROCHURE OF SITAPUR DISTRICT, UTTAR PRADESH

*By*
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# DISTRICT AT GLANCE

| | | | |
|---|---|---|---|
| **1.** | **GENERAL INFORMATION** | | |
| i. | Geographical Area (Sq. Km.) | : | 5743 |
| ii. | Administrative Divisions | | |
| | Number of Tehsils | : | 6 |
| | Number of Blocks | : | 19 |
| | Number of Villages | : | 2348 |
| iii. | Population (as on 2001 census) | | |
| | Male | : | 1714279 |
| | Female | : | 1472694 |
| | Total | : | 3186973 |
| iv. | Average Annual Rainfall (m) | : | 988.6 m |
| **2.** | **GEOMORPHOLOGY** | | |
| | Major Physiographic Units | : | Younger alluvial plain<br>Older alluvial plain |
| | Major Drainages | : | The Ghaghra, The Gomti river & their tributaries |
| **3.** | **LAND USE (ha.)** | | |
| a) | Forest area (ha) | : | 5805 |
| b) | Net area sown (ha) | : | 435397 |
| c) | Gross area sown (ha) | : | 640453 |
| **4.** | **MAJOR SOIL TYPES** | : | Bhur, Dumat and Matiyar |
| **5.** | **AREA UNDER PRINCIPAL CROPS (as on 2005-06)** | | |
| | Paddy (ha) | : | 149295 |
| | Wheat (ha) | : | 202629 |
| **6.** | **IRRIGATION BY DIFFERENT SOURCES**<br>(Areas and Number of Structures) (ha) | | |
| | Dugwells | : | Area 12963 ha, Nos. not available |
| | Tubewells Govt. | : | Area 3861 ha, Nos. 686 |
| | Tubewells Private | | Area 322503 ha, No. not available |
| | Ponds | : | Area 489 ha, Nos. not available |
| | Canals | : | Area 25823 ha, length 1092 km. |
| | Other Sources | : | Area 1285 ha, Nos. not available |

| | | | |
|---|---|---|---|
| 7. | **NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2007)** | | |
| | No. of Dugwells | : | 15 |
| | No. of Piezometers | : | Nil |
| **8.** | **PREDOMINANT GEOLOGICAL FORMATIONS** | : | Alluvium |
| **9.** | **HYDROGEOLOGY** | | |
| | Major water bearing formation | : | Sand of various grade mixed with silty clay & kankar. |
| | Pre-monsoon Depth to water level during 2007 (mbgl) | : | 2.50 to 9.39 |
| | Post-monsoon Depth to water level during 2007 (mbgl) | : | 2.05 to 9.13 |
| | Long term water level trend in 10 years (1998-2007) in m/yr | | |
| | Premonsoon : | | Rise 0.023-0.552 |
| | | | Fall 0.0102-0.1536 |
| | Postmonsoon : | | Rise 0.0075-0.1173 |
| | | | Fall 0.0152-0.2599 |
| **10.** | **GROUND WATER EXPLORATION BY CGWB (As on 31-3-2007)** | | |
| | No of wells drilled (EW, OW, PZ, SH, Total) | : | EW-3, OW-Nil, SH-Nil, PZ-2 |
| | Depth range (m) | : | 40.00 – 201.00 mbgl |
| | Discharge (litres per second) | : | 12.16-40.00 |
| | Storativity (S) | : | - |
| | Transmissivity ($m^2$/day) | : | 962 to 1800 $m^2$/day |
| **11.** | **GROUND WATER QUALITY** | | |
| | Electrical Conductivity | : | 230 to 1250 μs/cm at $25^0$C |
| | TH as $CaCO_3$ (mg/l) | : | 110 to 290 |
| | Fluoride (mg/l) | : | 0.12 to 0.50 |
| | Nitrate (mg/l) | : | 0.3 to 122 |
| | 'As' content and trace metals such as Cu, Fe, Zn, Mn, Na, Pb, Cr are within the limit of BIS | | |
| **12.** | **DYNAMIC GROUND WATER RESOURCES (As on 31.3.2004)-in HAM** | | |
| | Annual Ground Water Recharge | : | 230969.71 |
| | Net Annual Ground Water Availability | : | 211774.34 |
| | Gross Ground Water Draft | : | 132207.86 |

| | | | |
|---|---|---|---|
| | Net Ground Water Availability for Irrigation | : | 74669.89 |
| | Stage of Ground Water Development | : | 62.43% |
| | Allocation for Domestic & Industrial Requirement | : | 14689.76 |
| **13.** | **AWARENESS AND TRAINING ACTIVITY** | : | Nil |
| **14.** | **EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING** | : | Nil |
| **15.** | **GROUND WATER CONTROL AND REGULATION** | : | |
| **16.** | **MAJOR GROUND WATER PROBLEMS AND ISSUES** | : | Water logging along Sarda Sahai Canal |

# GROUND WATER BROCHURE OF SITAPUR DISTRICT, UTTAR PRADESH

*By*
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## 1.0 INTRODUCTION

Sitapur district covers an area of 5743 sq. km. and forms a part of Central Ganga Plain and is underlain by quaternary sediments. The district is divided with six tehsils namely Sitapur, Laharpur, Biswan, Mahmoodabad and Sidhauli & 19 blocks. The blocks are Pisawan, Maholi, Misrikh, Machhrehta, Gondlamau, Aliya, Hargaon, Parsendi, Khairabad, Laharpur, Behta, Raisa, Sakran, Biswan, Kasmanda, Sidhauli, Pahala, Mehmoodabad & Rampur Muthura (Plate-I). It is drained by river Gomti, Ghaghra & their tributaries. Total population is as per 2001 census is 3186973. The irrigation in the district is both by ground water and surface water. The total area irrigated by ground water structures is 339327 ha. and total area irrigated by canals, ponds & other sources is 27597 ha. The net area sown is 435397 ha.

The detailed ground water management studies in part of Sitapur district has been carried out by Shri A.V. Singh Scientist 'B' during the A.A.P. 1998-99.

## 2.0 CLIMATE & RAINFALL

The climate is sub-humid and it is characterised by a hot dry summer and a bracing cold season. The average normal rainfall is 288.60 mm. About 87% of rainfall take place from June to September. During monsoon surplus water is available for deep percolation to ground water.

There is a meteorological observatory at Hardoi, the records of which has been taken as representative meteorological condition for Sitapur district. January is the coldest month with minimum temperature of the order of $9^0$C. May and early June

form the hottest period of the year. The mean monthly maximum temperature is $31.7^0$C and mean monthly minimum temperature is $18.7^0$C.

During March to May the air is least humid with relative humidity high in the morning and less in the evening mean. Monthly morning relative humidity is 70% and mean monthly evening relative humidity is 53%.

During monsoon season the winds blow predominantly from east or southeast. The mean wind velocity is 5.6 km./hr. The potential evapotranspiration is 1494.00mm.

## 3.0 GEOMORPHOLOGY & SOIL TYPES

Being a part of Indo Gangetic alluvial plain the area is almost a flat terrain with master slope towards southeast. Geomorphologically the area can be divided into younger alluvial plain and older alluvial plain. The younger alluvial plain forms flat to gently sloping, low lying, undulating surface of large areal extent formed by river deposition and consisting of fluvial land forms such as oxbow lakes, paleo-channels etc. The younger refers to later cycle of deposition and constitute unconsolidated coarse to fine sand, silt and clay. The effect of high soil moisture is observed in the vicinity of canal.

The older alluvial plain is similar to younger alluvial plain but formed at earlier stage of depositional regimes, comprising older unconsolidated alluvium.

The paleo-channels are buried channels filled in with sand silt and clay of varying lithology, where as oxbow lakes are crescent shaped cut off meander with water and composed of unconsolidated alluvial materials.

The area is characterised by ravines. These are small, narrow, deep depressions dissected and irregular surface usually produced by surface run off. These occurs along Gomti river & its tributaries. The ravines comprises unconsolidated alluvial material of varying lithology mainly with fine sediments and developed in older alluvium (Plate-II).

The chief varities of soil are bhur or sand, dumat or loam and matiyar or clay. Bhur is formed along the high banks of rivers and streams, matiyar is found in depressions in the upland while dumat occurs in rest of the district.

# 4.0 GROUND WATER SCENARIO

## HYDROGEOLOGY:

The ground water occurrence and availability generally depends upon the water bearing properties of water bearing formation.

## WATER BEARING FORMATIONS, PROPERTIES AND OCCURRENCES:

The water bearing formation in the district is alluvium. The alluvium comprises sand, silt, clay & its admixture. Kankar is occasionally associated with clay. The interstices porespace between different grains is occupied by ground water. The interstices act as ground water conduct. Typically they are characterised by their size, shape irregularity and their distribution. The ground water occur under water table condition in shallow aquifer whereas the ground water in deeper aquifer occurs under semiconfined to confined condition. The shallow aquifer which is being tapped by dugwells occurs upto the depth of above 40 mbgl. The aquifer material is fine to medium sand. The kankar assorted with clay also occur occasionally.

## DEPTH TO WATER LEVEL:

The Central Ground Water Board has established number of hydrograph stations in Sitapur district. All these wells are periodically measured. Based on premonsoon water level data of May 2007, a depth to water map for premonsoon period 2007 has been prepared. The depth to water level in the district range from 2.50 to 9.39 mbgl. The major area of the district falls in the range of 2.50 to 6.00 mbgl (Plate-III).

In the western part the depth to water is measuring to the order of 8.00 to 9.00 mbgl (Qutabnagar 8.32 mbgl, Sitapur 9.39 mbgl).

During monsoon period the ground water recharge takes place and after monsoon the depth to water level is at the shallowest level. To study the distribution of water level during post monsoon period, the depth to water level map of November 2007 has been prepared. The depth to water level during postmonsoon period ranges from 2.05 m to 9.13 mbgl. The water level is shallow along the Sarda Sahayak Feeder

Canal. In major part of the area the depth to water level ranges between 2.00 to 4.00 mbgl (Plate-IV). The shallow aquifer gets fully recharged during monsoon period.

**WATER LEVEL FLUCTUATION:**

The pre & postmonsoon water level and fluctuation in shallow aquifer based on hydrograph measurements is summerised below (Table-1):

Table-1

**PRE-POSTMONSOON WATER LEVEL & FLUCTUATION DATA OF HYDROGRAPH STATIONS**

| Sl. No. | Name of Station | Block | Premonsoon DTW mbgl May 2007 | Postmonsoon DTW mbgl Nov 2007 | Fluctuation (m) |
|---|---|---|---|---|---|
| 1. | Biswan | Biswan | 3.26 | 2.85 | 0.41 |
| 2. | Biutmani | Biswan | 2.50 | 2.57 | -0.07 |
| 3. | Deo Kalia | Biswan | 6.35 | 5.68 | 0.67 |
| 4. | Dhondhi | Parsendi | 3.68 | 2.18 | 1.44 |
| 5. | Dularpur | | 6.26 | 5.74 | 0.52 |
| 6. | Hargaon | Hargaon | 4.93 | 2.95 | 1.98 |
| 7. | Jahangirabad | Biswan | 2.93 | 2.20 | 0.73 |
| 8. | Karauna | Gondalamau | 8.65 | 6.88 | 1.77 |
| 9. | Khamaria | Kasmanda | 2.98 | 2.36 | 0.62 |
| 10. | Kutubnagar | Misrikh | 8.32 | 7.74 | 0.58 |
| 11. | Madnapur | Mahmoodabad | 3.24 | 2.05 | 1.19 |
| 12. | Manpur Chowki | Biswan | 4.11 | 3.06 | 1.05 |
| 13. | Purwra Gosai | Mehmoodabad | 3.54 | 2.85 | 0.69 |
| 14. | Sitapur | Khairabad | 9.39 | 9.13 | 0.26 |
| 15. | Thawai | Aalia | 4.63 | 1.83 | 2.80 |
| | **AVERAGE** | | **4.98** | **4.00** | **0.976** |

Pre & postmonsoon water level fluctuation in shallow aquifer depends upon the quantity of water recharged and discharged during pre-postmonsoon period. The quantum of fluctuation is a direct function of above components. The water level

fluctuation during pre & postmonsoon ranges from –0.07 to 2.80 m with an average value of 0.976 m.

The low fluctuation in parts of Sitapur district gives a crude estimate that in Sitapur district the shallow aquifer is highly permeable in eastern part.

**LONG TERM WATER LEVEL TREND:**

The long term water level trend is because of change in storage resulting from difference between supply & withdrawal from ground water body. It causes levels to vary in time. Based on water level data of last one decade i.e. (1998-2007) has been worked out and summerised below (Table-2)

Table-2

**LONG TERM WATER LEVEL TRENDS OF HYDROGRAPH STATIONS**

| Sl. No. | Location | Block | Period | Premonsoon | | Postmonsoon | |
|---|---|---|---|---|---|---|---|
| | | | | *Rise (cm/yr.)* | *Fall (cm/yr.)* | *Rise (cm/yr.)* | *Fall (cm/yr.)* |
| 1. | Purwara Gosai | | 1998-07 | - | 0.092 | - | 0.149 |
| 2. | Jahangirabad | | 1998-07 | 0.023 | - | - | 0.0358 |
| 3. | Madnapur | | 1998-07 | - | 0.0278 | - | 0.0534 |
| 4. | Sitapur | | 1998-07 | - | 0.1536 | - | 0.1657 |
| 5. | Hargaon | | 1998-07 | 0.0552 | - | 0.0219 | - |
| 6. | Karauna | | 1998-07 | - | 0.1249 | 0.0581 | - |
| 7. | Deo Kalia | | 1998-07 | - | 0.1373 | - | 0.2201 |
| 8. | Bintmani | | 1998-07 | 0.0508 | - | - | 0.0152 |
| 9. | Kutubnagar | | 1998-07 | - | 0.2016 | - | 0.2599 |
| 10. | Manpur Chowki | | 1998-07 | - | 0.0102 | - | 0.0283 |
| 11. | Dularpur | | 1998-07 | - | 0.1098 | - | 0.0690 |
| 12. | Khamaria | | 1998-07 | - | 0.0096 | 0.0236 | - |
| 13. | Dhundhi | | 1998-07 | - | 0.1212 | - | 0.0445 |
| 14. | Thawai | | 1998-07 | - | 0.1391 | 0.1173 | - |
| 15. | Biswan | | 1998-07 | 0.0737 | - | 0.0075 | - |

The perusal of data shows that in general there is a decline in water level except few places where rise in water level is taking place. Hargaon & Biswan are

two places where rise in water level observed both in premonsoon & postmonsoon period. Both rise and decline is marginal.

**GROUND WATER MOVEMENT:**

Water level contour map has been prepared during the ground water management survey in part of Sitapur district (A.A.P.: 1998-99) Plate-V. The perusal of map shows that the ground water movement is towards main river at some places and at other places it is towards tributary of Gomti river. Thus it can be said 'the river Gomti' & its tributary are gaining river as they are getting water from ground water as base flow.

**GROUND WATER RESOURCES:**

The estimation of ground water resources is a basic pre requisite for sustainable development without causing adverse effect on the ground water regime. Quantification of ground water resource is often critical and no single comprehensive technique is yet defined which is capable for estimating accurate ground water resource. The present methodology is known as GEC 1997 methodology. Ground water department government of U.P. in consultation with Central Ground Water Board (NR) Lucknow has worked out the ground water resources of Sitapur district and are given in Table-3 & Plate-VI.

Table-3

**DYNAMIC GROUND WATER RESOURCES OF SITAPUR DISTRICT, U.P. (As on 31.03.2004)**

| Sl. No. | Assessment units-blocks | Annual ground water recharge (ham) | Net annual ground water availability (ham) | Existing gross ground water draft for all uses (ham) | Net ground water availability for future irrigation development (ham) | Stage of ground water development (%) | Category of block |
|---|---|---|---|---|---|---|---|
| *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* |
| 1. | Aliya | 10800.53 | 9720.48 | 9216.29 | 162.85 | 94.81 | Semi Critical |
| 2. | Behta | 9440.08 | 8496.08 | 6856.54 | 1385.59 | 80.70 | Safe |
| 3. | Biswan | 18840.12 | 16956.11 | 6636.24 | 10074.08 | 39.14 | Safe |
| 4. | Gondalamau | 10134.93 | 9628.18 | 7635.99 | 1709.38 | 79.31 | Semi Critical |
| 5. | Hargaon | 13139.89 | 11825.90 | 7056.79 | 4507.75 | 59.67 | Safe |

| Sl. No. | Assessment units-blocks | Annual ground water recharge (ham) | Net annual ground water availability (ham) | Existing gross ground water draft for all uses (ham) | Net ground water availability for future irrigation development (ham) | Stage of ground water development (%) | Category of block |
|---|---|---|---|---|---|---|---|
| 6. | Kasmanda | 11570.14 | 10413.12 | 5522.60 | 4685.98 | 53.04 | Safe |
| 7. | Khairabad | 10152.15 | 9644.54 | 6547.68 | 2854.35 | 67.89 | Safe |
| 8. | Laharpur | 16197.05 | 14577.35 | 6443.40 | 7895.30 | 44.20 | Safe |
| 9. | Machhrehta | 8941.93 | 8047.74 | 7049.38 | 737.27 | 87.59 | Safe |
| 10. | Mahmoodabad | 11441.42 | 10297.28 | 7761.24 | 2248.59 | 75.37 | Safe |
| 11. | Maholi | 11376.94 | 10239.24 | 6820.01 | 3166.64 | 66.61 | Safe |
| 12. | Misrikh | 12398.21 | 11158.39 | 7090.05 | 3805.75 | 63.54 | Safe |
| 13. | Pahala | 19278.40 | 17350.56 | 7650.26 | 9416.96 | 44.09 | Safe |
| 14. | Parsendi | 11888.58 | 11294.15 | 7951.80 | 3047.84 | 70.41 | Safe |
| 15. | Pisawan | 11739.99 | 11152.99 | 9025.33 | 1793.38 | 80.92 | Safe |
| 16. | Rampur Muthura | 9512.86 | 8561.57 | 6131.15 | 2203.34 | 71.61 | Safe |
| 17. | Rewsa | 12566.80 | 11938.46 | 5543.19 | 6189.96 | 46.43 | Safe |
| 18. | Sakran | 8858.84 | 8415.89 | 5904.96 | 2292.23 | 70.16 | Safe |
| 19. | Sidhauli | 12690.86 | 12056.32 | 5364.96 | 6492.65 | 44.50 | Safe |
| | **Total** | **230969.71** | **211774.34** | **132207.86** | **74669.89** | **62.43** | |

Allocation for domestic and industrial requirement supply upto next 25 years (year 2029) : 14689.76 ham.

In addition to above additional potential recharge in water logged and shallow water table areas has also been calculated and given in Table-4.

Table-4

**ADDITIONAL POTENTIAL RECHARGE IN SITAPUR DISTRICT**
**(As on 31.03.2004)**

| Sl. No. | Assessment Unit / Block | Potential recharge in water logged and shallow water table areas | Potential recharge in flood prone areas | Total annual additional potential ground water recharge |
|---|---|---|---|---|
| 1. | Aliya | 1881.60 | 0.00 | 1881.60 |
| 2. | Behta | 7784.00 | 0.00 | 7784.00 |
| 3. | Biswan | 4000.00 | 0.00 | 4000.00 |

| Sl. No. | Assessment Unit / Block | Potential recharge in water logged and shallow water table areas | Potential recharge in flood prone areas | Total annual additional potential ground water recharge |
|---|---|---|---|---|
| 4. | Gondalamau | 0.00 | 0.00 | 0.00 |
| 5. | Hargaon | 3072.00 | 0.00 | 3072.00 |
| 6. | Kasmanda | 201.60 | 0.00 | 201.60 |
| 7. | Khairabad | 72.00 | 0.00 | 72.00 |
| 8. | Laharpur | 7083.20 | 0.00 | 7083.20 |
| 9. | Machhrehta | 0.00 | 0.00 | 0.00 |
| 10. | Mehmoodabad | 1545.60 | 0.00 | 1545.60 |
| 11. | Maholi | 1008.00 | 0.00 | 1008.00 |
| 12. | Misrikh | 1536.00 | 0.00 | 1536.00 |
| 13. | Pahala | 960.00 | 0.00 | 960.00 |
| 14. | Parsendi | 5040.00 | 0.00 | 5040.00 |
| 15. | Pisawan | 400.00 | 0.00 | 400.00 |
| 16. | Rampur Muthura | 4648.00 | 0.00 | 4648.00 |
| 17. | Rewsa | 8187.20 | 0.00 | 8187.20 |
| 18. | Sakran | 3200.00 | 0.00 | 3200.00 |
| 19. | Sidhauli | 192.00 | 0.00 | 192.00 |
| | **Total** | **50811.20** | **0.00** | **50811.20** |

**GROUND WATER EXPLORATION:**

Three exploratory wells & 2 piezometer have been drilled in past by Central Ground Water Board. The depth of these wells reanges from 40.00 to 242.44 m. The hydrogeological details of these wells are summerised in Table-5. The depth drilled ranges from 40.00 to 242.44 m. The specific capacity ranges from 107.67 to 666.00lpm/m of drawdown. The transmissivity ranges from 962 to 1800 $m^2$/day. Two piezometer are in shallow aquifer and one in deep aquifer have been constructed in Laharpur.

In addition to above number of tubewells have been constructed by State Government. The depth of these wells generally range between 60.00 to 120.00 mbgl. These wells are constructed to meet the irrigational requirement.

**GROUND WATER QUALITY:**

In general the quality of ground water is good. The electrical conductance in Sitapur district ranges from 232 to above 1250 μs/cm at $25^0$C. The total hardness as $CaCO_3$ is 110 to 290 mg/l. Fluoride ranges between 0.12 and 0.50 mg/l and Nitrate is 0.3 to 122 mg/l. The high value occurring is local in nature. Phosphate is absent.

The 'As' content is within the limit of permissibility of BIS. The trace metals such as Cu, Fe, Zn, Mn, Na, Pb and Cr are under the limit of BIS.

Table-5

**HYDROLOGICAL DETAILS OF EXPLORATORY WELLS & PIEZOMETERS DRILLED IN SITAPUR DISTRICT, U.P.**

| Sl. No. | Location | Type of well | Drilled depth | Zones tapped (mbgl) | Yield (lpm) | Drawdown (m) | Sp. Capacity (lpm/m) | Transmissivity ($m^2$/day) | Category |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Biswan $27^0$29'00" $81^0$10'00" | EW | 168.60 | 34.00-40.00 | 730 | 6.78 | 107.67 | 962 | Alluvium |
| 2. | Khairabad Avas Vikas Colony | EW | 200.00 | 90.07-106.07<br>118.26-134.26<br>140.31-156.31 | 2080 | 3.12 | 666.00 | 1800 | Alluvium |
| 3. | Khairabad Town Hall | EW | 201.00 | 63.10-67.10<br>91.41-99.41<br>111.63-127.63<br>146.09-162.09 | 2400 | 5.21 | 460.65 | 1800 | Alluvium |
| 4. | Laharpur I | PZ1 | 242.44 | 72.00-98.00<br>84.00-90.00<br>114.00-120.00<br>138.00-150.00<br>174.00-180.00<br>192.00-198.00<br>224.00-230.00 | - | - | - | - | Alluvium |
| 5. | Laharpur II | PZ2 | 40.00 | 20.00-38.00 | - | - | - | - | Alluvium |

**STATUS OF GROUND WATER DEVELOPMENT (BLOCKWISE):**

The ground water in Sitapur district is being developed by state tubewells, private shallow tubewells, open wells and handpumps, state tubewells, private shallow wells, generally cater irrigation requirement whereas from handpumps water is drawn for drinking & domestic needs. Blockwise details of ground water abstraction structure for irrigation is as follows (Table-6):

Table-6

**BLOCKWISE DETAILS OF SOURCES OF GROUND WATER STRUCTURES**
**(As on 31.3.2007)**

| Sl. No. | Block | Govt. Tubewell | Pumpsets Filled on Shallow Wells | | | No. of Handpump | Remark |
|---|---|---|---|---|---|---|---|
| | | | *Electricity run* | *Diesel run* | *Others* | | |
| 1. | Pasawan | 116 | 180 | 9915 | 1 | 187 | |
| 2. | Maholi | 19 | 43 | 5686 | 2 | 105 | |
| 3. | Misrikh | 41 | 19 | 5151 | - | 108 | |
| 4. | Machhrehta | 47 | 10 | 6495 | - | 124 | |
| 5. | Gondalamau | 68 | 7 | 6652 | - | 128 | |
| 6. | Aalia | 30 | 13 | 6316 | - | 148 | |
| 7. | Hargaon | 44 | 12 | 5682 | - | 127 | |
| 8. | Persendi | 39 | 6 | 6059 | 2 | 103 | |
| 9. | Khairabad | 57 | 5 | 5653 | - | 113 | |
| 10. | Laharpur | 29 | - | 4462 | - | 81 | |
| 11. | Baheta | 21 | - | 3990 | - | 133 | |
| 12. | Rewsa | 10 | - | 7735 | - | 130 | |
| 13. | Sakram | 7 | - | 7110 | - | 99 | |
| 14. | Biswan | 23 | 9 | 8970 | 2 | 144 | |
| 15. | Kasmanda | 30 | 6 | 5239 | - | 106 | |
| 16. | Sidhauli | 18 | 4 | 6482 | - | 110 | |
| 17. | Pahala | 51 | 6 | 8749 | - | 141 | |
| 18. | Mahmoodabad | 26 | - | 9367 | - | 129 | |
| 19. | Rampur | 10 | - | 9278 | - | 105 | |
| | **Total** | **686** | **320** | **129031** | **7** | **2321** | |

## 5.0 GROUND WATER MANAGEMENT STRATEGY

**GROUND WATER DEVELOPMENT:**

Based on earlier surveys the ground water structure feasible, rigs suitable, depth of wells & discharge expected is as follows (Table-7):

Table-7

**GROUND WATER STRUCTURE FEASIBLE WITH DEPTH AND DISCHARGE**

| Formation | Wells Feasible | Rigs Suitable | Depth of Wells (m) | Discharge (lpm) |
|---|---|---|---|---|
| Alluvium | Dugwells / Handpumps | Mannual / hand boring set | 10-30 | 50-100 |
| Alluvium | Shallow Tubewells | Rotary Rigs (Direct / Reverse | 50-100 | 500-1000 |
| Alluvium | Deep Tubewell | Rotary (Direct) | 100-300 | 1000-2000 |

The Sitapur district comprises alluvial areas. The cultivation of the district are having small land holding. The fragmented nature of land holding creates & hardship to an individual farmers to develop the ground water resource economically. The strategy to be adopted is as follows:

Farmers may be educated and awareness may be created among them about benefits from irrigation. Benefits from irrigation are normally thought in terms of production. Benefits can be assessed in terms of its livelihood intensity, the use of households enabled by irrigation to gain adequate and secure livelihood, seasonal spread of employment and income and in giving a better quality of life.

Because of considerable under utilisation of the potential created there is a need of farmers organisation at minors levels to involve the farmers for better utilisation of resources. For benefits the authorities have to give more attention to cropping pattern, rate structures, reliability and stability of water supplies.

Conjunctive use of surface and ground water may be promoted for maximising the gains.

Efforts should be made for developing cooperative institutions for ground water management using pilot approach.

**WATER CONSERVATION AND ARTIFICIAL RECHARGE:**

The ground water development of the district is only 62.43%. Moreover there is an additional potential of 50811.20 ham in addition of 74669.89 ham ground water available for future irrigation.

The water based industries may be established in the area as there is sufficient water available on long run basis.

## 6.0 GROUND WATER RELATED ISSUES & PROBLEMS

Water logging along Sarda Sahayak Canal is a fore dominant phenomenon in the district. A battery of tubewells may be constructed along the canals and water pumped may be discharged into canal. It will increase the water availability to tail end users. It will also help in minimising the salt encrustation in the area.

More emphasis should be given for utilising ground water for irrigation. The canals / distributaries / minors / channels should be lined if unlined.

## 7.0 AWARENESS & TRAINING ACTIVITY

In past no mass awareness programme & water management training programme has been taken up. However such programmes may be taken up in future.

## 8.0 AREAS NOTIFIED BY CGWA/SGWA

As plenty of water is available there is no need for notification of the area.

## 9.0 RECOMMENDATIONS

At present irrigation for cultivation is done in percentage of gross sown area. Thus the irrigation facility needs improvements with available resource including

additional potential an area of about 208800 ha. can be irrigated (considering 60 cm as crop water requirement). Following steps may be taken up:

(i) Fallow land and cultivable waste land should be brought under irrigation by cultivating the area both in Kharif & Rabi season.

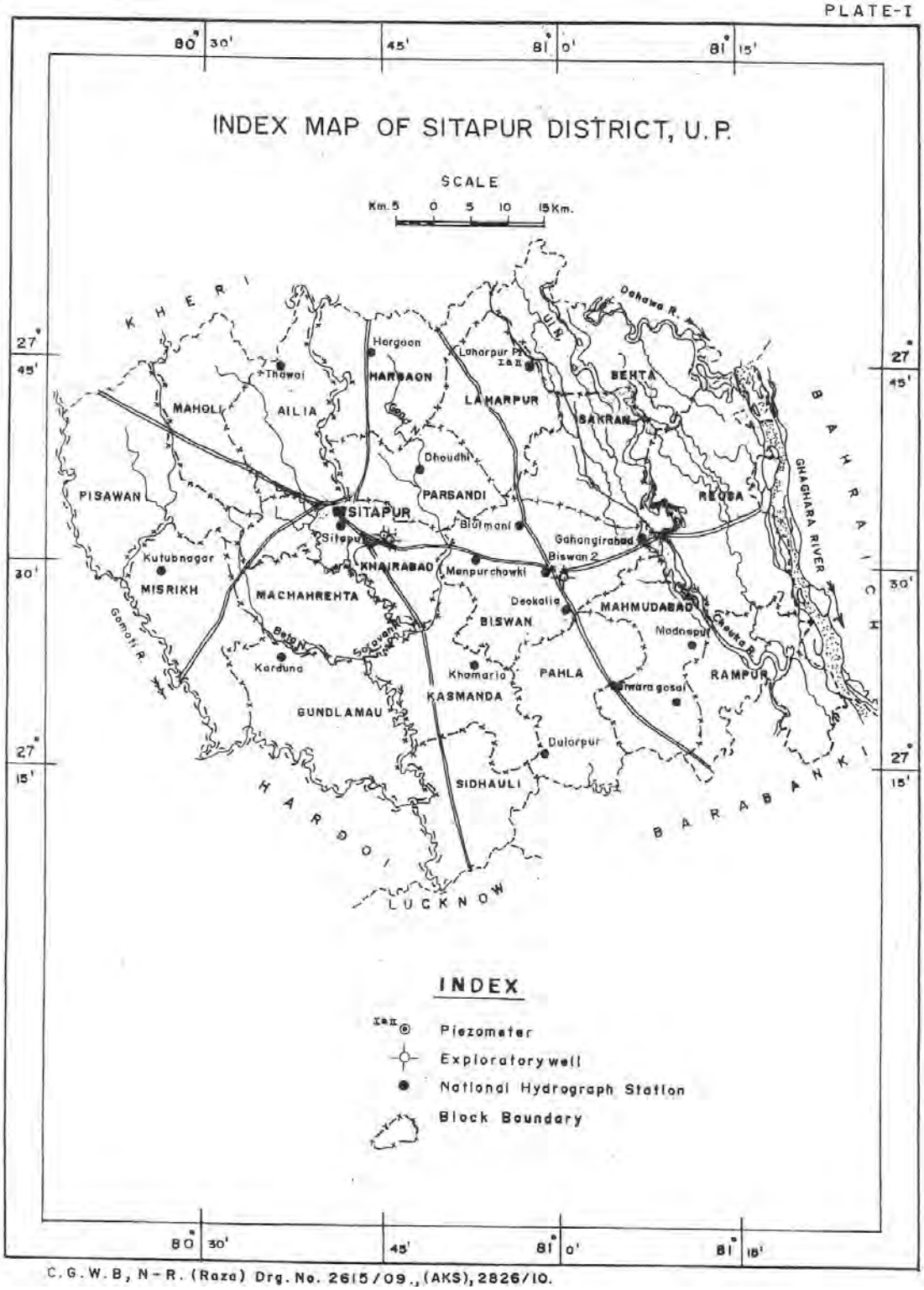
(ii) More forest plantation may be developed along canals and in ravinous part.

(iii) Effective regulatory measures & mobilisation of community participation be encouraged.

(iv) Conjunctive use of surface water and ground water should be promoted for maximising the gains.

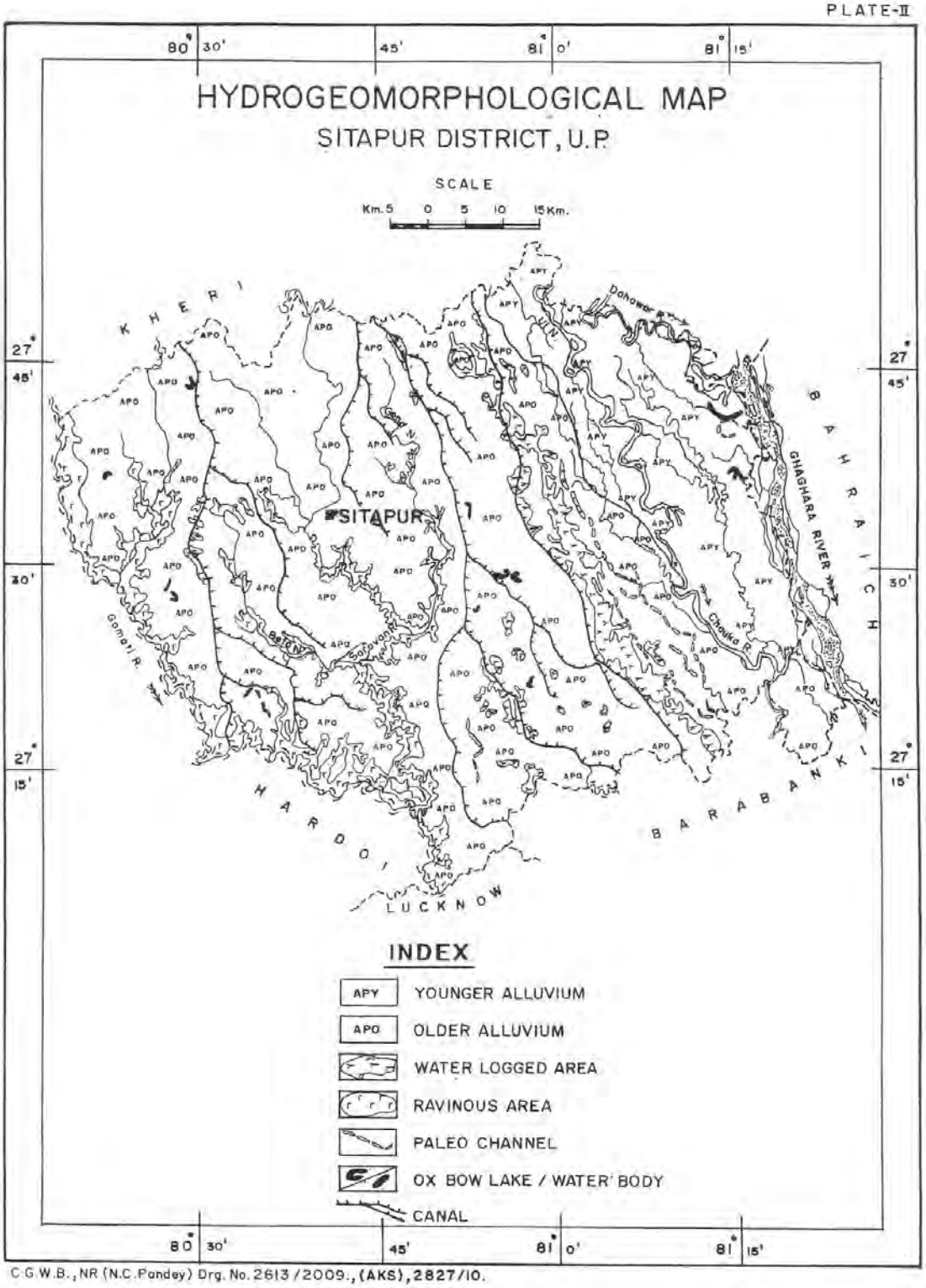
(v) Crops requiring more water may be promoted wherever necessary to provide conservation of ground water resources.

PLATE-I




C.G.W.B, N-R. (Raza) Drg. No. 2615/09., (AKS), 2826/10.

PLATE-II




C.G.W.B., NR (N.C. Pandey) Drg. No. 2613/2009., (AKS), 2827/10.

PLATE-III

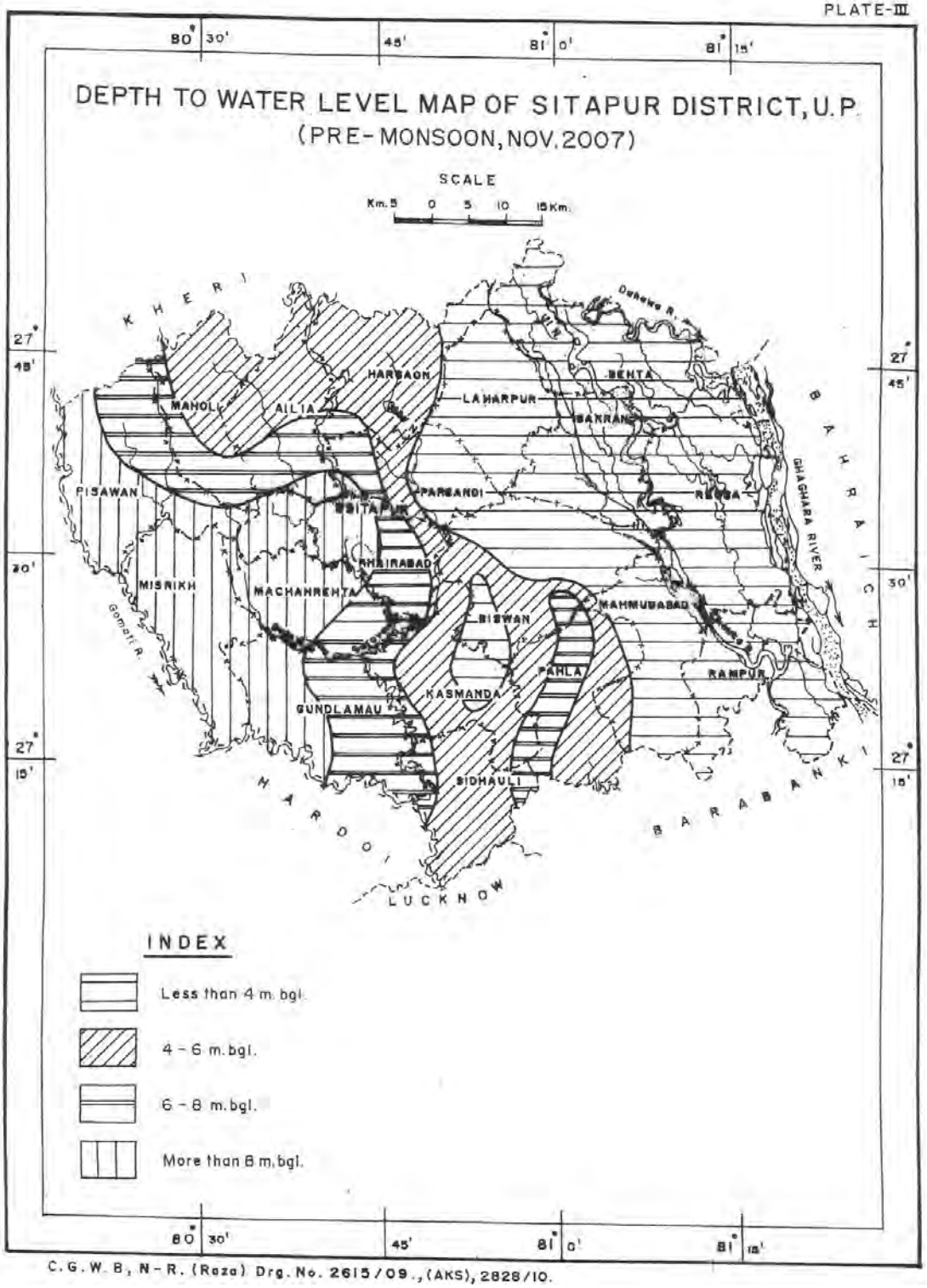



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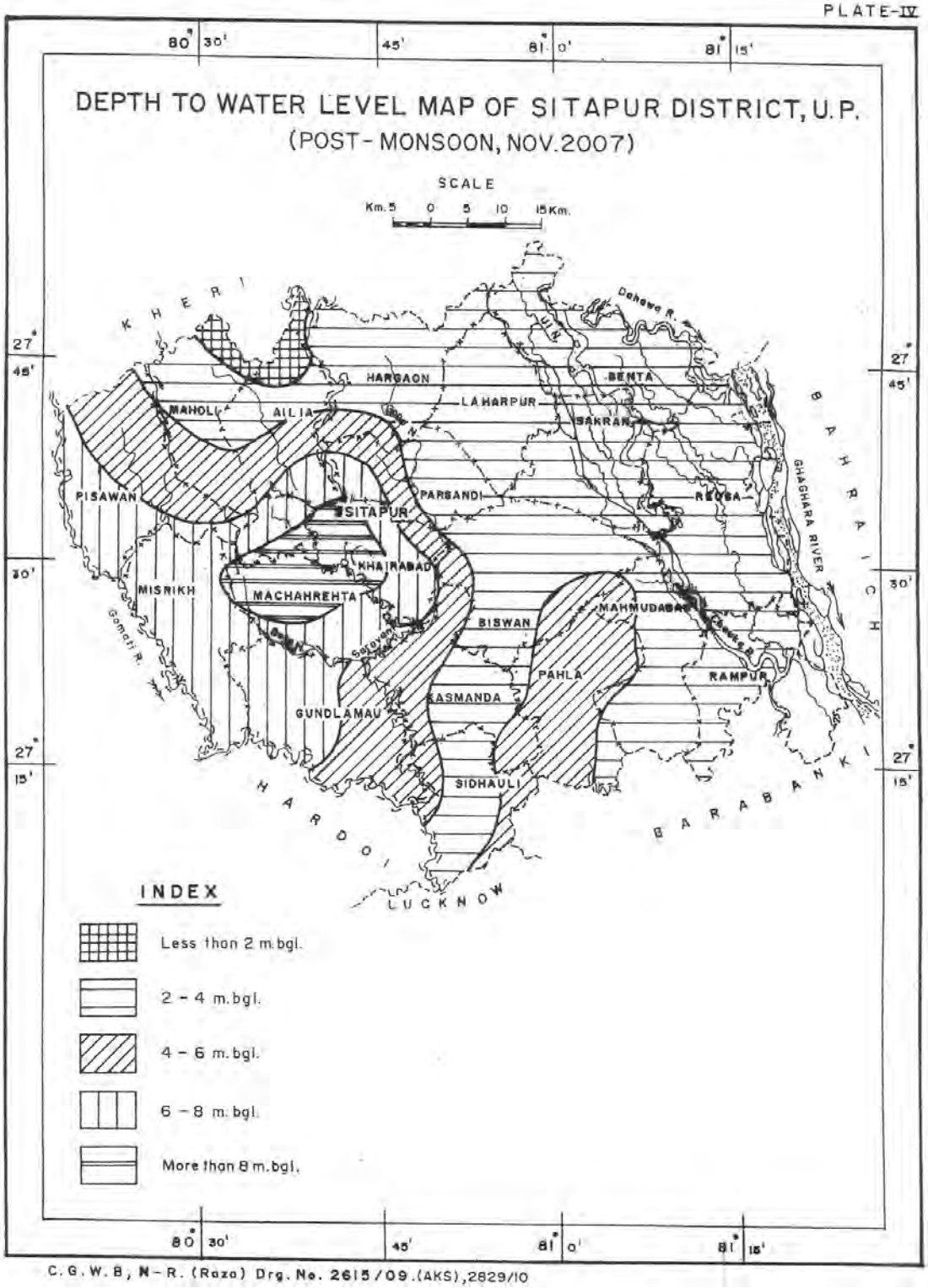
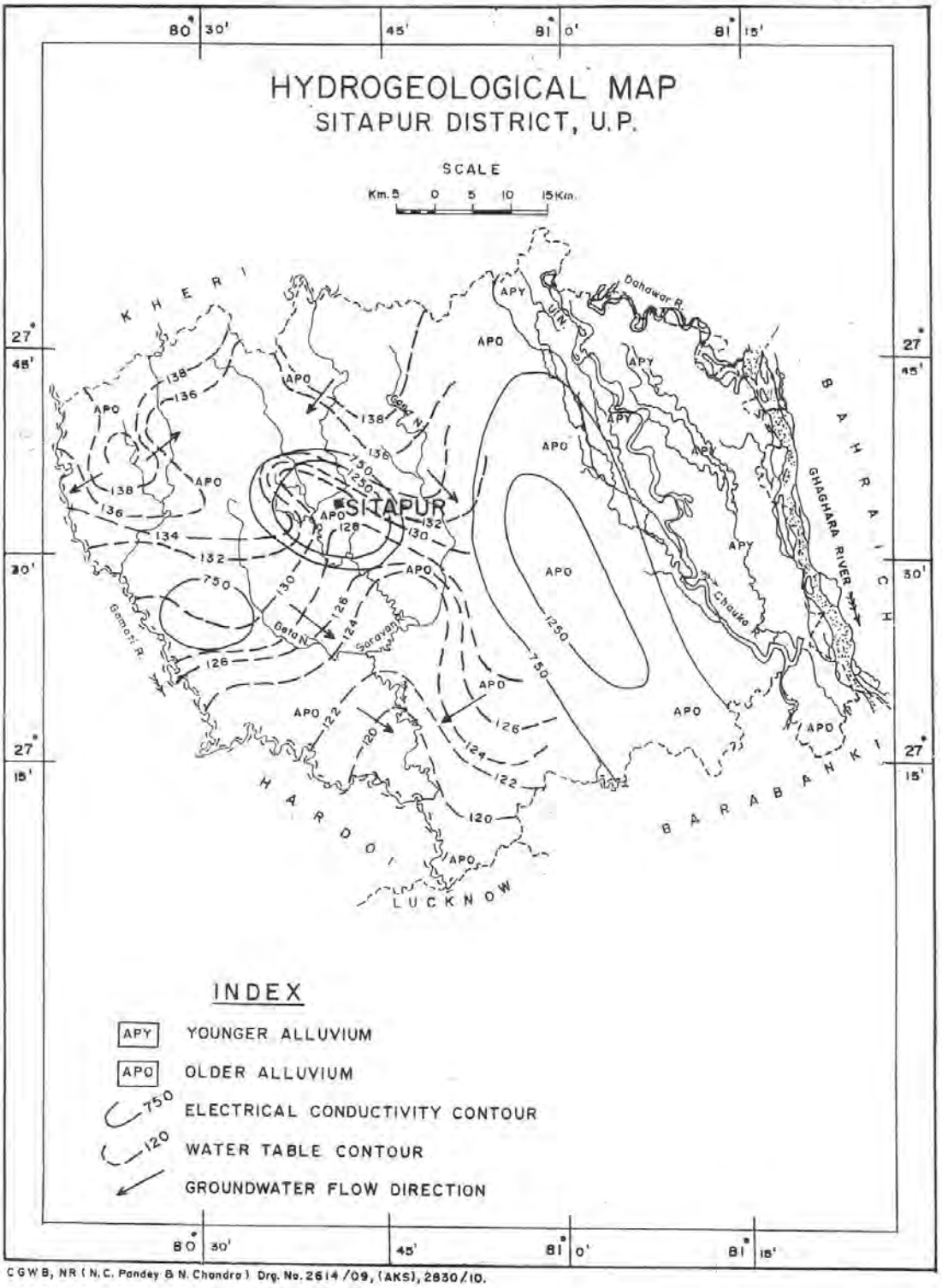
PLATE-IV



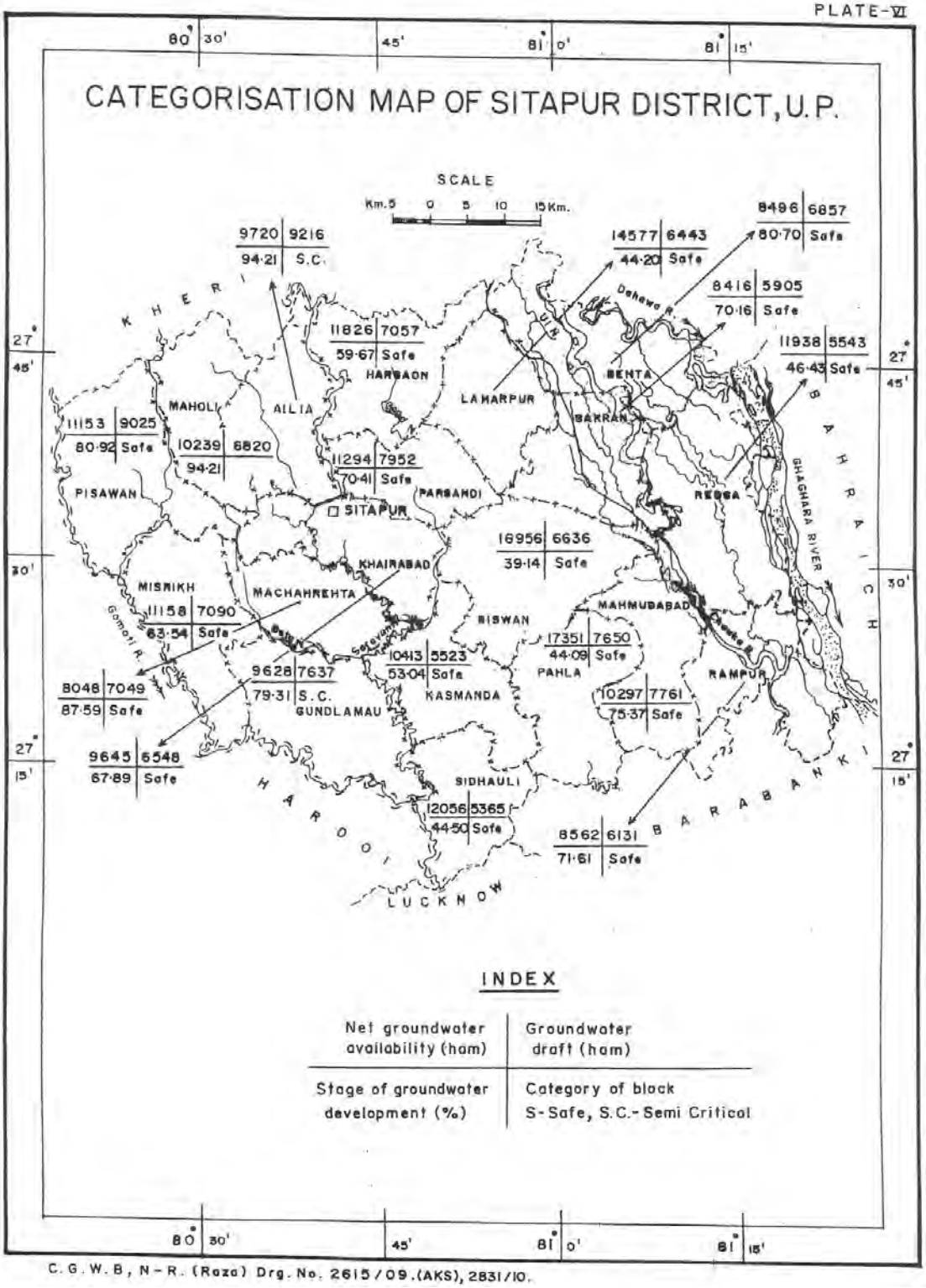

C.G.W.B, N-R. (Raza) Drg. No. 2615/09.(AKS),2829/10

PLATE-V




CGWB, NR (N.C. Pandey & N. Chandra) Drg. No. 2614/09, (AKS), 2830/10.

PLATE-VI




C.G.W.B, N-R. (Raza) Drg. No. 2615/09.(AKS), 2831/10.