GROUND WATER PROSPECTS MAP

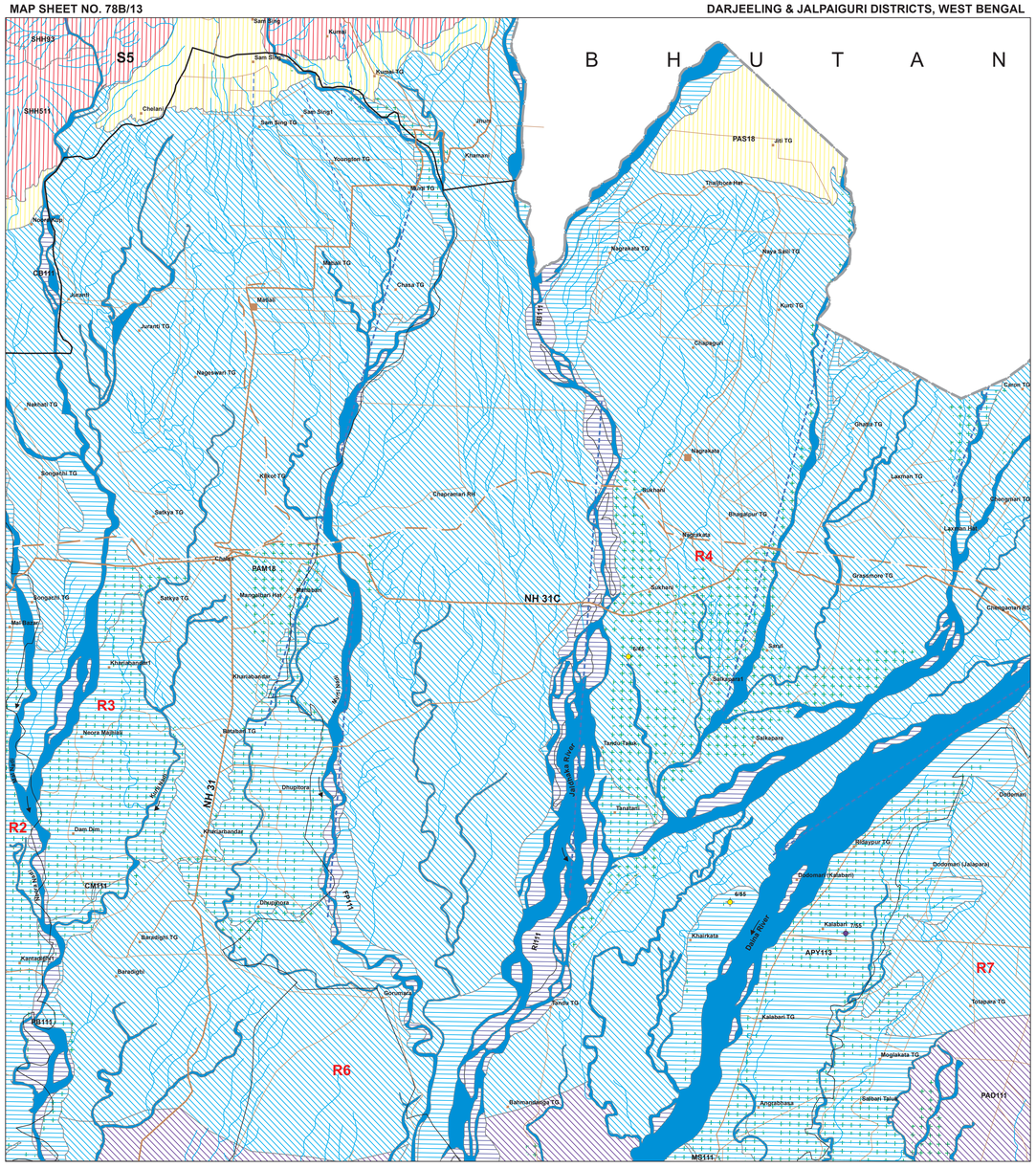
(PREPARED FROM SATELLITE IMAGE INTERPRETATION WITH LIMITED FIELD CHECKS)

Kilometers
0 1 2 3 4 5

SCALE - 1 : 50,000

MAP SHEET NO. 78B/13

DARJEELING & JALPAIGURI DISTRICTS, WEST BENGAL



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DATA USED : IRS - P6 LISS III FCC dated February 2009,March 2009 & Nov 2011, GROUND TRUTH & WELL OBSERVATION during February-March 2011, Published GSI & SOI maps.

Designed & Developed by Hydrogeology Division, NRSC, ISRO

L E G E N D

MAP UNIT (HYDROGEOMORPHIC UNIT) REPRESENTED IN THE MAP WITH ALPHANUMERIC CODE (COLOUR INDICATES YIELD RANGE AND HATCHING INDICATE DEPTH RANGE)	GEOLOGICAL SEQUENCE / ROCK TYPE (REPRESENTED IN THE MAP WITH NUMERIC CODE)	GEOMORPHIC UNIT / LANDFORM (REPRESENTED IN THE MAP WITH ALPHABETIC CODE)	DEPTH TO WATER LEVEL PRE / POST- MONSOON (AVERAGE IN METERS) / NO. OF WELLS OBSERVED	RECHARGE CONDITIONS BASED ON AVAILABILITY OF WATER (RAINFALL & OTHER SOURCES)	GROUND WATER PROSPECTS: AQUIFER MATERIAL	TYPE OF WELLS SUITABLE	DEPTH RANGE OF WELLS (SUGGESTED) MIN - MAX (IN METERS)	YIELD RANGE OF WELLS (EXPECTED) (in LPM or m^3 / day)	HOMOGENEITY IN THE UNIT & SUCCESS RATE OF WELLS (PROBABILITY) VERY HIGH HIGH MODERATE LOW	QUALITY OF WATER POTABLE (P) NON - POTABLE (NP) (INDICATE REASONS IF NON POTABLE)	GROUND WATER IRRIGATED AREA (APPROX . RANGE IN PERCENTAGE)	RECHARGE STRUCTURES SUITABLE & PRIORITY	REMARKS (PROBLEMS / LIMITATIONS)
CB111	Shuugaon Formation (Present Day Depositis) — Alluvium (Sand Dominant) (111)	Channel Bar (CB)	No Well Observed	Excellent	LS	TW	5- 10 m	400-500 LPM	Very High	P	Nil	Not Required	Highly productive shallow aquifer with good recharge from the river base flow.
BB111		Braid Bar (BB)	No Well Observed	Excellent	LS	TW	5-10 m	400-500 LPM	Very High	P	Nil	Not Required	Groundwater prospects very high with high recharge potential. Recharge structures not required.
PB111		Point Bar (PB)	No Well Observed	Very Good	LS	RW TW	5-10 m	300-400 LPM	Very High	P	Nil	Not Required	Groundwater prospects very high with high recharge potential. Recharge structures not required.
RI111		River Island (RI)	No Well Observed	Very Good	LS	TW	5-10 m	400-500 LPM	High	P	Nil	Not Required	Highly productive aquifer in shallow depth.Good recharge
CM111		Cut-off Meander (CM)	No Well Observed	Very Good	LS	RW TW	10-20 m	300-400 LPM	Very High	P	Nil	Not Required	Highly productive shallow aquifers with good recharge.
MS111		Meander Scar (MS)	No Well Observed	Very Good	LS	RW TW	10-15 m	200-250 LPM	High	P	Nil	Not Required	Highly productive shallow aquifers with good recharge.
FP111		Flood Plain (FP)	No Well Observed	Very Good	LS	TW	<30 m	250-350 LPM	Very High	P	Nil	Not Required	Receives good recharge and forms shallow aquifer.Overall quality of the water is potable.
PAD111		Piedmont Alluvium Deep (PAD)	No Well Observed	Good	LS	TW	60-80 m	400-500 LPM	Moderate	P	10	Not Required	Good ground water prospect at greater depth as the principal aquifer occurs below PAM.
APY113	Jalpaiguri Fm (EP-LH Holocene)	Alluvium (Sand and Silt) (113)	Alluvial Plain Younger (APY)	8 / 5 / 2	Good	LS	TW	25-30 m	200-250 LPM	High	P	65	Not Required	Highly productive aquifer at shallow depth with good recharge.
PAS18	Samsing Formation (LLP-Holocene-EHolocene)	Alluvium (Gravel Dominant) (18)	Piedmont Alluvium Shallow (PAS)	No Well Observed	Good	LS	TW	5 - 10m	50-100 LPM	Low to Moderate	P	Nil	Not Required	Moderate ground water prospect at shallow depth along piedmont slope.
PAM18			Piedmont Alluvium Moderate (PAM)	6 / 5 / 1	Good	LS	TW	40-60m	100-200 LPM	Low to Moderate	P	35	Not Required	Good ground water prospect at modarate depthalong piedmont slope.
SHH511	Siwalik (Pliocene - Eocene)	Sandstone & Conglomerate (511)	Structural Hill Highly Dissected (SHH)	Essentially run-off zone. Drinking water sources primarily from springs and river/stream water. Limited prospects along intermontane valleys.									
SHH93	Daling Gr/Reyang Fm (Proterozoic)	Phyllite (93)	Structural Hill Highly Dissected (SHH)										

F____F / ____ / — — -

These are fault / fracture zones, which generally act as conduits for movement of ground water in hard rocks. Along these zones, the yields are significantly higher and wells are likely to be sustainable for longer duration. However, the inferred fractures need to be confirmed by detailed ground surveys.

D____D /Q____Q / P____P
D— — -D /Q— — -Q / P____P

These are dykes, quartz reefs and pegmatite veins, which generally act as barriers for ground water movement.

N.B.-The depth range and yield range of wells may vary within the unit because of certain inhomogeneities. Fractures/Lineaments which are clearly observed / inferred from the satellite image are indicated on the map. There could be some obscured fractures which also influence the ground water prospects. Locations of the recharge structures shown in the map are tentative. This map is useful for narrowing down the target zones,and exact location on the ground for wells and recharge structures should be identified based on follow-up ground hydrogeological/geophysical surveys.

GROUND WATER PROSPECTS INFORMATION

YIELD RANGE OF WELLS	COLOUR CODE	DEPTH RANGE OF WELLS: SHALLOW < 30 METERS	MODERATE 30 - 60 METERS	DEEP > 60 METERS
> 800 LPM	VIOLET			
400 - 800 LPM	INDIGO			
200 - 400 LPM	BLUE			
100 - 200 LPM	GREEN			
50 - 100 LPM	YELLOW			
30 - 50 LPM	ORANGE			
20 - 30 LPM	BROWN			
10 - 20 LPM	PINK			
Prospects restricted to valley portions only (Hills, Plateaus etc.)	RED			
Run-off zone/ Barrier for G.W. movement		(Inselberg / Ridge / Dyke etc.)		

HYDROLOGICAL INFORMATION

DESCRIPTION	SYMBOL
CANAL / TANK IRRIGATED AREA	
GROUND WATER IRRIGATED AREA	
RIVER / STREAM (with sand)	
WATER BODY / SPRING	
CANAL	
RAIN GUAGE STATION (With average annual rainfall in mm)	800
RECHARGE STRUCTURES SUGGESTED	
PERCOLATION TANK	CHECK DAM
NALA BUND	RECHARGE WELL
DESILTING OF TANK	RECHARGE PIT
SUBSURFACE DYKE	RECHARGE SHAFT
SOIL CONSERVATION MEASURES	STORAGE TANK

WELLS OBSERVED DURING FIELD VISIT

YIELD RANGE IN LPM	BORE / TUDE WELL	YIELD RANGE IN m^3/day	DUG WELL / RING WELL
> 800 LPM	15/70	> 400 m^3 / day	8/15
400 - 800 LPM	15/70	200 - 400 m^3 / day	8/15
200 - 400 LPM	15/70	100 - 200 m^3 / day	8/15
100 - 200 LPM	15/70	50 - 100 m^3 / day	8/15
50 - 100 LPM	15/70	25 - 50 m^3 / day	8/15
30 - 50 LPM	15/70	15 - 25 m^3 / day	8/15
20 - 30 LPM	15/70	10 - 15 m^3 / day	8/15
10 - 20 LPM	15/70	5 - 10 m^3 / day	8/15
< 10 LPM	15/70	< 5 m^3 / day	8/15

Colour inside well symbol indicates yield range. The figures on the top right hand side of well indicate the depth to water level and depth of well in meters

DUG - CUM- BORE WELL; HAND PUMP WELL; ARTESIAN WELL; OBSERVATION WELL OF G.W DEPT. / C.G.W.B.

STRUCTURAL INFORMATION

DIPS	BEDDING	SCHISTOSITY/ FOLIATION
GENTLE (< 15)		
MODERATE (15 - 45)		
STEEP (45 - 80)		
SUB - VERTICAL TO VERTICAL (> 80)		

ANTICLINE / ANTIFORM; SYNCLINE / SYNFORM; TREND LINE; ESCARPMENT; LITHOLOGY / GEOMORPHIC UNIT BOUNDARY

	MINOR	MAJOR
FAULT	F F	F F
THRUST	T T	T T
FRACTURE / LINEAMENT		
FRACTURE / LINEAMENT (Inferred)		
SHEAR ZONE (Confirmed / Inferred)	S S	S/S S
DYKE (Confirmed / Inferred)	D D	D/D D
QUARTZ REEF (Confirmed / Inferred)	Q Q	Q/Q Q
PEGMATITE VEIN (Confirmed / Inferred)	P P	P/P P

Lithologic contacts are inferred at places & Geomorphic boundaries are gradational

BASE MAP INFORMATION

SYMBOL	DESCRIPTION
NH - 34	NATIONAL HIGHWAY
SH - 12	STATE HIGHWAY
	METALLED ROAD
	OTHER ROAD
	RAILWAY
	CITY / VILLAGE
	HABITATIONS : NON - COVERED (NC) PARTIALLY COVERED (PC)

BOUNDARY : INTERNATIONAL; STATE; DISTRICT; BLOCK

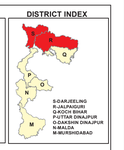
OTHER INFORMATION

Rainfall : 3102 mm
Nearest Rain gauge Station : Jalpaiguri
(Source IMD)

LOCATION INFORMATION

STATE INDEX

DISTRICT INDEX



S-DARJEELING
R-JALPAIGURI
Q-COOCH BIHAR
P-UTTAR DINAJPUR
G-DAKSHIN DINAJPUR
N-MALDA
M-MURSHIDABAD

BLOCK INDEX

R1 - GOKULNATHAN
R2 - MATIALI
R3 - MATIALI
R4 - NAGRAKATA
R5 - MADARIHAT
R7 - DHUPGURI

MAPSHEET INDEX

78A12	78A16	78E4
78B9	78B13	78F1
78B10	78B14	78F2

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W.B. STATE COUNCIL OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
GOVERNMENT OF WEST BENGAL
4TH FLOOR, BIKASH BHAVAN
SALT LAKE, KOLKATA 700 091

TECHNICAL GUIDANCE & QUALITY CHECK
NATIONAL REMOTE SENSING CENTRE
INDIAN SPACE RESEARCH ORGANISATION (ISRO)
DEPT. OF SPACE, GOVT. OF INDIA
BALANAGAR, HYDERABAD - 500 625

PARTICIPATING ORGANIZATIONS
PHED, GOVT. OF WEST BENGAL
GEOINFORMATICS & REMOTE SENSING CELL
W.B. STATE COUNCIL OF SCIENCE AND TECHNOLOGY,GOWB
STATE WATER INVESTIGATION DIRECTORATE, GOWB

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