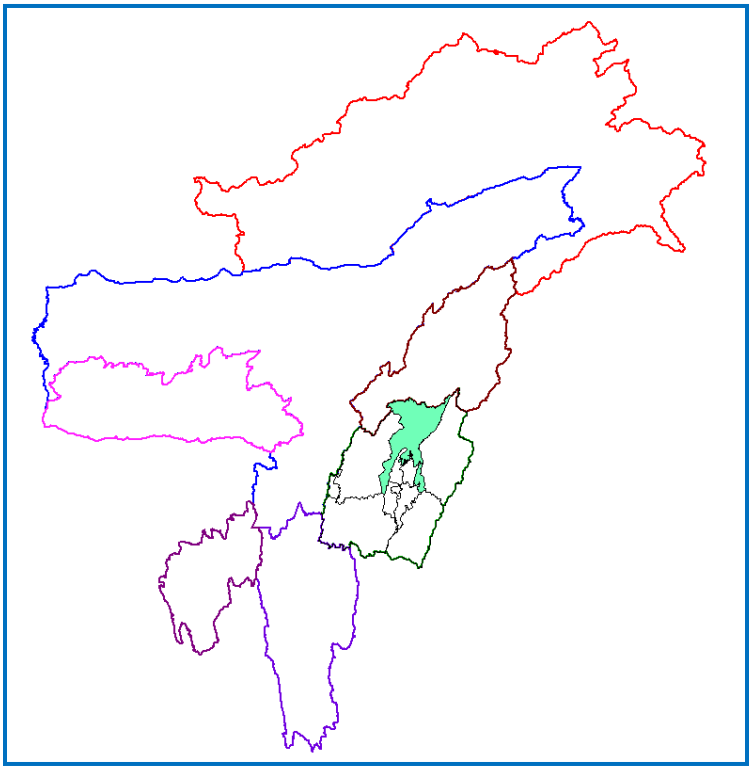
Technical Report Series: D

No:

Ground Water Information Booklet
Senapati District, Manipur



Central Ground Water Board
North Eastern Region
Ministry of Water Resources
Guwahati
September 2013

SENAPATI DISTRICT AT A GLANCE

Sl. No.	ITEMS	STATISTICS
1	GENERAL INFORMATION	
	i) Geographical Area (in sq.km)	3271 sq Km
	ii) Administrative Division (as on 31 March 2013) Number of Tehsil/CD Block Number of Panchayat/Villages	 Sub-division: 6; CD Block: 4 595
	iii) Population (as per 2011 Census)	156513 (as per 2011 census) excluding 3 subdivision
	iv) Average Annual Rainfall (mm)	671mm to 1454mm
2	GEOMORPHOLOGY i) Major Physiographic Units ii) Major Drainages	 Medium to high altitudes hilly terrain (Altitude varies from 1061 to 1788 mamsl)
3	LAND USE (sq.km) i) Forest Area ii) Net Area Sown iii) Cultivable Area	 NA
4	MAJOR SOIL TYPES	NA
5	AREA UNDER PRINCIPAL CROPS in sq.km (as on March 2011)	NA
6	IRRIGATION BY DIFFERENT SOURCES (sq.km) i) Dug Wells ii) Tube /Bore Wells iii) Tanks/Ponds iv) Canals (SLI+SFI) v) Other Sources, MIS vi) Net Irrigated Area vii) Gross Irrigated Area	 NA
7	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (as on 31-03-2013) –Dug wells	Nil
8	PREDOMINANT GEOLOGICAL FORMATIONS	Disang and Barail groups of rock of Upper Cretaceous to Eocene age.
9	HYDROGEOLOGY i) Major water Bearing Formations	 i. Semi-consolidated to

	ii) Pre-monsoon Depth to Water Level iii) Post-monsoon Depth to Water iv) Long term Water Level Trend in 10 yrs (1997 –2006) in m/yr	consolidated ii. Nil iii. Nil
10	GROUND WATER EXPLORATION BY CGWB (as on 31-03-2013)	Nil
11	GROUND WATER QUALITY i) Presence of Chemical Constituents more than Permissible Limit (e.g. EC, F, Fe, As) ii) Type of Water	NA
12	DYANMIC GROUND WATER RESOURCES (as on March 2009) in mcm i) Annual Replenishable Ground Water Resources ii) Net Annual Ground Water Draft iii) Projected demand for Domestic and Industrial Use upto 2025 iv) Stage of Ground Water Development	GEC'97 could not be adopted and ground water resources of the district could not be calculated because hill slopes are more than 20% as per GEC'97.
13	AWARENESS AND TRAINING ACTIVITY i)MassAwarenessProgrammes Organized ii) Place iii) No of Participants	Nil
14	EFFORTS OF ARTIFICIAL RECHARG AND RAINWATER HARVESTING i) Projects Completed by CGWB (No & amount spent) ii) Projects Under technical Guidance of CGWB (Numbers)	Nil
15	GROUND WATER CONTROL AND REGULATION i) Number of OE Blocks ii) Number of Critical Blocks iii) Number of Blocks Notified	Nil
16	MAJOR GROUND WATER PROBLEMS AND ISSUES	

1.0 INTRODUCTION

The district is located between 93^0 29'to 94^0 15', East Longitude and24^o 37'to 25^o 37' North Latitude. The district is bounded on the south by lmphal East and West districts, on the East by Ukhrul district, on the west by Tamenglong district and on the north by Phek district of agaland.

As per the Census 2011, projected total population is 156513(excluding 3 sub divisions) with 80230males and 76283 females. The total geographical area of the district is 3271 sq.km with a population density of 87 persons per sq. km.

The district was earlier known as Manipur North district which came into existence w.e.from 14 Novemberl969 with its headquarters at Karong. Later the district headquarter was shifted to Senapati on 13 December 1976. The district came to be known as Senapati district w.e.from 15 July 1983.

1.1 Location & Accessibility

The district occupies 92 km of NH 39, which connects the border State of Nagaland in the north lmphal to the south end. l-T road, Maram-Paren road, Tadubi-Tolloi-Ukhrul road, Maram-Ngari-Kachai road, Karong-Purul-Liyai road, Senapati-Khongdei-Phaibung road are other important roads in the district.

1.2 Administrative set up

The district is divided into six sub-divisions, viz. 1. Tadubi (Mao Maram), 2. Paomata, 3. Purul, 4. Kangpokpi, 5. Sapermeina (Saitu-Gamphazol) and, 6. Saikul and 14 S.D.C circles. The major inhabitant tribes include Paomai, Mao Maram, Zeliangrong,Thangal, Tangkhul, Kipgen, Haokip, Gangte, Sitlou, Kom, Maring etc.

2. O Climate and Rainfall

The district is under humid sub-tropical climate. The soil is moderately fertile with clay loamy soil with little patches of clay and loam. The main crops are rice, maize, potato, cabbage and tomato. The predominant cropping pattern is single cropping. The cultivation is partly jhumming, partly terraced and to some extent there is wetland cultivation. The average annual rainfall is 1454 mm

3.0 Physiography

The district is endowed with kaleidoscopic landscape of blue hills, green valleys, serpentine streams and rivers flowing through mountains and deep gorges. The district is at an altitude varying from 1061 m to 1788 m above sea level. The hills run along the north south direction and gradually slope down towards south and meet the lmphal valley.

4.0 Agriculture

Rich varieties of flora and fauna adorn the land. Agriculture is the main occupation of the people and terrace cultivation is generally practiced by the people. Paddy, Maize, Cabbage, Potato, cereals are the main crops of the District. 8070 of the area is covered by forest and remaining 20 % is arable land.

Table.2: Production and Average Yield of Cereal Crops and horticultural products in Senapati district, Manipur

District/State	Rice			Maize		
	Area (in (000 ha)	Production (000 ha)	Yield (kg/ha)	Area (000 ha	Production (000 ha	Yield (Kg/ha)
Senapati	24.11	53.87	2234.34	1.44	4.28	2972.22

HORTICULTURAL PROFILE OF SENAPATI DISTRICT

Major Horticultural Crops	
Fruits	Passion Fruits Pineapple
Vegetables	Cabbage, pea, French Bean
Root and Tuber crop	Tapioca
Spices	Chillies, Ginger

5.0 Ground Water Scenario

No ground water exploration work is carried out till date by CGWB in the district. But in view and facts by the study of geology and hydrogeology in the district, the area shows feasibility for the exploration of ground water though construction of dug well, dug cum bore wells and some tube wells through Manual, DTH-rig and Direct Rotary Rigs respectively. Fracture formations and aquifer zones may be encountered in the district. In fact there is great variation in both vertical and lateral lithology, even over small distances. Rainwater harvesting structures for example construction of check dams etc are suitable for artificial recharge for the augmentation water in the district. Spring water is also one of the main sources of water supply for the population of the district.

5.1 Yield Potential of Aquifers

The detailed studies and investigation of the local geology and hydrogeology in the district, the following types of structures for the exploitation of ground water can be deciphered.

i. Tube wells up to a depth of more than 100 m with a discharge range from 50 to 100 liters per minutes are suitable in the southern fringes of the district towards the borders of Imphal East and west districts.

ii. Dug wells of 10 to 15 meter depth can be constructed in the total western region of the district along Kangpokpi, Senapati valley, and Saparmeina etc with expected discharge up to 10 liters per minute.

iv. Dug wells and dug cum bore well structures up to a depth of 2O to 60 metre is suitable in the north western fringes of the district. The aspected discharge range is up to 8 litres per minute.

5.0 Ground Water Resources

The district is totally covered by hills with slopes more than 20%. So, the methodology of GEC'97 could not be adopted for the computation of dynamic ground water resources in the district. Since the poor quality ground water is only a localized phenomenon, the block-wise poor quality area has been taken as nil. The sub-unit demarcation into command and non- command has not been carried out since the data for the same are not available

6.0 Ground Water Quality

As the district is mainly hilly, biological contamination of drinking water supply combined with scanty quantity has been a major cause of most of the ill health. People used the available surface water for drinking and domestic purposes from any source due to shortages of safe drinking water.

7.0 Status of Ground Water Development

Ground water augmented through springs and streams are used for drinking and irrigation purpose only in the district. As there is no sources of ground water supply in the district, ground water utilization for the same may be considered as negligible. The development of ground water in the district negligible. **Dynamic ground water resource of Senapati district could not be calculated due to non availability of data.**

8.0 Ground Water Management Strategy

Rainwater harvesting for the augmentation and recharge of rainwater in a scientific manner by constructing recharge structures in individual and community level are suitable in the district. Construction of check dams is also suitable for the augmentation of surface water. Spring water is also one of the main sources of water supply for the population of the district. Ponds are the most prevalent traditional water harvesting structures in the State. Hence, even today, a large majority of the population depends on ponds to meet their water requirements.

Rainwater harvesting is suitable for meeting the domestic water requirements of the area. This is due to the –

i. heavy and widespread precipitation

ii. many houses already have GI sheet-covered slopping roofs, and installing the simple structure required will be easy
iii. most of the residential houses are small, owner-occupied houses
iv. people are familiar with this concepts, and
v. The relatively pollution free atmosphere.

However, the available storage structures are small in capacity. This is an area that NGOs are best suited to address.

9.0 Water Conservation and Artificial recharge

Individual and community pond with the practice of roof top rainwater harvesting (old age method) are also very common in the area for water conservation through artificial recharge. As per earlier reports and present study, following design criteria is recommended.

9.1 Shallow Domestic Wells

Open wells and filter point wells are feasible in all area of the district. In unconsolidated sediments ring well may be constructed by excavating down to the saturated horizon. Cement or earthen rings placed one above another with weep holes in the bottom rings are likely to hold sufficient quantity of water. Depth may be range from 10 to 20 m depending upon the topographic elevation. Expected discharge-will be 0.5 to 3.0 cubic meters per day.

Bamboo as pipe and screen are very much within the reach of small and marginal farmers, as bamboo is locally available in the district. This type of well will be low cost and long lasting. Expected discharge will be 3 to 5 cubic meters per day.

9.2 Tube well for irrigation Purpose

Deep tube wells are feasible in most of the valley parts of the district. These tube wells are expected to tap the granular zones occurring beyond 30 mbgl. Diameter of casing pipe, when used as housing pipe, need to be decided base on the anticipated discharge. Housing pipe should be large enough to accommodate the pump. For avoiding corrosion and clogging of well screen, the entrance velocity should be less than 2 cm/sec.

9.3 Surface and Sub-surface Irrigation

a. Surface irrigation

Block Name	Village Name	Sl. No of well	Lifting Device	HP of lifting Device	Average pumping during peak season lhours/day)	Gross Irrigation Potential created in Ha	Gross Irrigated during (in Ha)
Kangpokpi	Kanglatombi	20	Diesel Pump	2	8	1	1
Kangpokpi	Kanglatombi	17	Diesel Pump	2	8	2	1
Kangpokpi	Kanglatombi	18	Diesel Pump	2	8	1	1

b. Sub-Surface irrigation

District	No of Blocks	No of Villages	Shallow Tube llUells	Surface Flow Scheme	Surface Lift Scheme
Senapati	5	31	3	32	0

Table 3 : Village Wise details of surface Flow Irrigation Scheme in Senapati District

Block name	Village Name	Sl.No. of Scheme	Gross Irrigation Potential Created (in Ha)	Gross irrigated area(in ha)
Kangpokpi	Bongmol	1	80	48
Kangpokpi	Charhajar	32	58	37
Kangpokpi	G.Songlung	3	50	30
Kangpokpi	Gorkha Tapori	26	20	12
Kangpokpi	Kangchup	7	200	120
Kangpokpi	Koubru Lekha	27	50	30
Kangpokpi	Kalapahar	30	60	36
Kangpokpi	Khumanom	10	60	36
Kangpokpi	Kanglatombi	4	80	48
Kangpokpi	Motbung	2	400	240
Kangpokpi	Mayangkhang	9	100	60
Kangpokpi	Makui	13	40	24

Kangpokpi	Makui	20	60	36
Kangpokpi	Naibet	23	40	24
Kangpokpi	Saparmeina	22	40	24
Kangpokpi	T.Khullen	25	80	48
Kangpokpi	Yaikhongpao	31	60	36
Paomata	Chingmaikhulen	12	40	24
Paomata	Chingmaikhulen	14	30	18
Paomata	Chingdonglok	16	20	12
Paomata	Tungam	19	30	18
Paomata	Tungam	17	60	36
Saikhul	Ankhumbung	18	40	24
Saikhul	Gangoikoi	5	60	36
Saikhul	Hortan	29	24	14
Saikhul	Ichailamlan	21	200	120
Saikhul	Kongbal Kuki	8	60	36
Saikhul	Maojang	11	40	24
Saikhul	Saichang	24	20	12
Saikhul	Sinamkom	28	80	48
Saikhul	Thangalsurung	6	40	24
Tadubi	Makham	1	100	60

10.0 Recommendations

Groundwater is important in the rural areas for irrigation and domestic supply. Existing hydro geological set up indicate that there is some few scope for the development of groundwater by way of constructing ground water abstraction structures in a planned way for profitable ground water development in the district.

The development of ground water for water supply is highly recommended with strong attention to be paid to the water quality, availability and recharge rate in such area.

The following steps are important for regulating the inflow of rivers, streams etc with sedimentation and siltation check in such hilly terrains

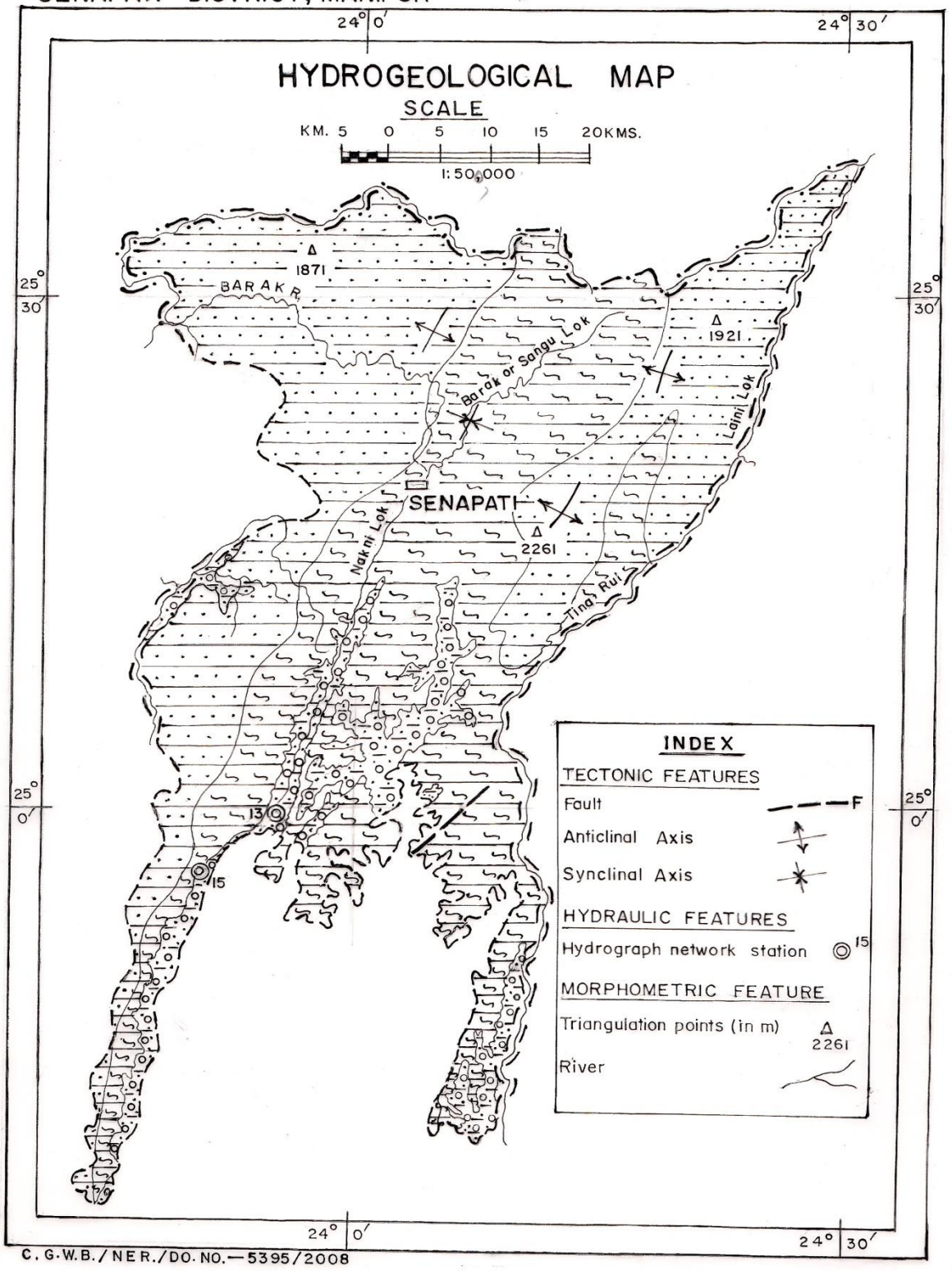
i. Construction of check dams throughout the catchment and ridge at suitable places in the area.

ii. Development of suitable plantations over the denuded and barren hill slopes at the maximum possible scale and speed.

iii. Encouraging terrace cultivation in the hill slopes and proper guidance of Jhum Cultivation. Construction of contour canals, subsurface dykes, gully plugging, terracing etc should be taken up. This step should be taken up urgently as the ratio of settled land in proportion to Jhum land under rice in the hill districts has been deteriorating over times, resulting in rapid land degradation in the hills and floods in the valley areas

iv. Local irrigation practices should be encouraged so that the plentiful water resources can be harnessed. Lifting water by pumping along river levees for irrigation purposes should also be encouraged.

SENAPATI DISTRICT, MANIPUR



C. G.W.B. / NER. / DO. NO. — 5395 / 2008

SENAPATI DISTRICT, MANIPUR

LEGEND

	AGE	FORMATION	LITHOLOGY	HYDROGEOLOGICAL CONDITIONS	GROUND WATER PROSPECTS
UNCONSOLIDATED	QUATERNARY	RECENT ALLUVIUM	Sand, gravel, pebbles, silt and clay 	Moderately thick unconfined to Semi-confined multi-layered aquifer system within the drilled depth of 100 m.	Moderate yield prospects of 10–30 m^3/hr. of 10–15 m. drawdown
SEMI-CONSOLIDATED	OLIGOCENE	BARAIL	Bedded sand stone intercalated with hard shale and massive sand-stone. 	Ground water restricted to secondary porosity in weathered residum joints, fractures and fissures.	Mostly run-off zone. Low yield prospects restricted to intermontane valleys.
	EOCENE	DISANG	Hard and compact sand-stone, shale and lime stone 		

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