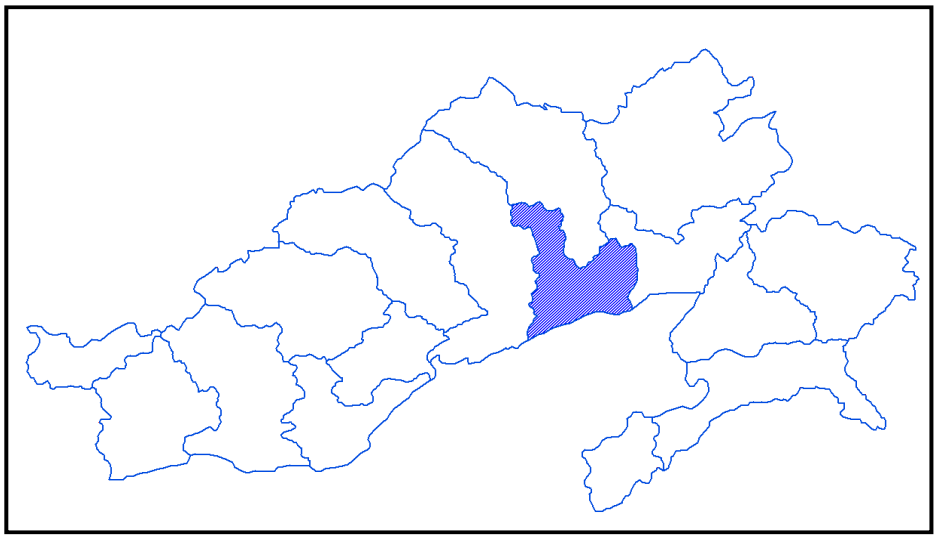
Technical Report Series: D **No:**

Ground Water Information Booklet
East Siang District, Arunachal Pradesh



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

EAST SIANG DISTRICT AT A GLANCE

Sl.No.	ITEMS	STATISTICS
1	**GENERAL INFORMATION**	
	i) Geographical area (sq.km.)	4005
	ii) Administrative Divisions (As on 31st March, 2011) Number of Tehsils/Block Number of Panchayat/villages/Circles	4 12
	iii) Population (As per 2011 census)	87,397
	iv) Average Annual Rainfall (mm)	2910.18
2	**GEOMORPHOLOGY**	High Mountainous peaks Irregular land forms
	Major physiographic units	Denudo structural hills, Structural hills, valley fills
	Major Drainages	River Siang
3	**LAND USE (sq.km.)**	
	a) Forest area (reserved forest)	46784
	b) Net area sown	20825
	c) Cultivable area	6085
4	**MAJOR SOIL TYPES**	Alluvial and residual soils
5	**AREA UNDER PRINCIPAL CROPS (As on 2010-2011, in sq.km.)**	172.9
6	**IRRIGATION BY DIFFERENT SOURCES (Areas and numbers of Structures)**	
	Dug wells	Nil
	Tube wells	12
	Tanks/ponds	
	Canals	
	Other sources (Hand pumps)	35
	Net irrigated area	
	Gross irrigated area	
7	**NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.3.2013)** No. of Dug wells No. of Piezometers	 Nil
8	**PREDOMINENT GEOLOGICAL FORMATIONS**	Archaean to Recent
9	**HYDROGEOLOGY**	Consolidated, semi-consolidated formation

10	**GROUND WATER EXPLORATION BY CGWB (as on 31.3.2013)**	Nil
	No. of wells drilled (EW, OW, PZ, SH, Total)	
	Depth Range (m)	
	Discharge (litres per second)	
	Storativity (m^2/day)	
11	**GROUND WATER QUALITY**	Slightly alkaline
	Presence of Chemical constituents more than permissible limits	Except iron content which needs treatment before use for drinking purpose
	Type of water	
12	**DYNAMIC GROUND WATER RESOURCES (2009) in mcm**	
	Annual Replenish able Ground Water Resources	737.77
	Net annual Ground Water Draft	.71
	Projected Demand for Domestic and Industrial Uses upto 2025	0.96
	Stage of Ground Water Development	Safe (0.106%)
13	**AWARENESS AND TRAINING ACTIVITY**	
	Mass awareness programme organized Date Place	Nil
14	**EFFORTS OF ARTIFICIAL RECHARGE AND RAINWATER HARVESTING**	Nil
	Projects completed by CGWB (No. and Amount spent)	Nil
	Projects under technical guidance of CGWB	Nil
15	**GROUND WATER CONTROL AND REGULATION**	
	Number of OE Blocks	Nil
	No. of Critical Blocks	Nil
	No. of blocks notified	Nil
16	**MAJOR GROUND WATER PROBLEMS AND ISSUES**	

EAST SIANG DISTRICT

Introduction

East Siang district is located between 27°43'00" to 28°00'00" North latitudes and 94°42'00" to 95°35'00" East longitudes and falls in the Survey of India toposheet No. 82 L/15,82L/15,82L/16,82P/4,7,8 and 8i3 M/5 and 821/16. The district is bounded by Upper Siang district in the North , Dhemaji district of Assam in South, Dibang valley in the East and West Siang district in the West.

The East Siang district of Arunachal Pradesh covers geographical area 4005 sq.km.. The name of the East Siang is derived from mighty siang (T. SANGPO in Tibet) river joining river Brahmaputra in the plain of Assam. The population of the East Siang district is 87,397 males and females. East Siang in the district Head quarters, connected by road NH 52 A. The nearest Railway station is Murkongselek which is 35 km South of Pasighat.

Pasighat is the district headquarter, is one of the oldest towns in Arunachal Pradesh. British ruler established it in 1914 as a base camp for expedition of Abor Hills. Hills presently covering East Siang , West Siang , Upper Skiang distrticts. Agriculture is the main stay of the inhabitants of the district in which rice is the main crop. During the year 1980-81 and 1981-82 an area of 1200 sq km was covered by Shri G.C. Saha, Jr.Hg. J.K. Verma, Jr.Hg. during 1988-89 and Shri P.Kalita, Jr. Hg. Carried out by systematic hydrogeological survey. Shri Biplab Roy, Scientist ‘B; covered an area of 3000 sq km with flood plain mapping of Urban Pasighat area.

2. Rainfall and Climate

The East Siang district has cold mountainous climate in the north while tropical climate exists in the south where winter temperature drops up to 7° C and summer temperature goes up to 36°C. December and January are generally the coldest months and July-August are the hottest months. Copious rainfalls during monsoon and wind circulation during the winter are important feature of the climate. The average annual rainfall various from 150 to 460 mm. Rainfall occurs mostly throughout the year but maximum from April to September. The average rainfall in the district is 2910.18 mm.

3. Geomorphology and Soil Types

Geo morphologic ally the district has been divided into 3 major geomorphology units.

1. Denudo-structural hills
2. Structural hills
3. Piedmont alluvial plains

The Denudo structural hills occupy 1885.625 sq. km. of the area, which consists of moderate to high grade metamorphic rocks like schists's gneisses, quartzite's. This unit marked by hilly nature with steep slopes and this area is mainly run off zone.

Structural hills occupy about 793.75 sq.km. in the area and are less compact and are composed of coarse to medium grained sandstone, siltstone, conglomerate, clay of Siwalik Group and micacious and feldspathic sandstone of Gondwana group. Siwalik groups of rocks are less compact than Gondwana . Gondwana group acts as a run off zone while Siwalik group is the recharge zone.

Piedmont alluvial plain occupying about 1031250 sq.km. It is highly permeable and acts as a good water recharge zone.

4. Ground Water Scenario

The district can be divided into 3 district hydrogeological units, consolidated, semi-consolidated and unconsolidated. This unit Sela, Bomdilla groups, Mirki quartzites and Buxa formations occupy the consolidated formations major part of the area. The area is mainly acts as a run of zone . Only springs and streams are the source of water for the local villages. Springs discharge varies from 15 – 28 m/day.

The ground water potential of the semi consolidated formations consisting of coarse grained sand stone, silt stone, conglomerate etc. slopes of this area is vary from mainly 15 to 20 percent and so mainly this area acts as a recharge zone. Ground water occurs under confined to semi-confined condition. Discharge of tubewells varies from 300 – 500 lpm in this area.

In the area of un-consolidated formations and occupies SE part of the district. N-S south flowing Siang river divides entire piedmont plain. In the eastern part of the river Siang, the upper terraces consist mainly of boulder. All the river dried up during the lean period indicating high permeability of the underlying formations. This area acts as recharge zone.

4.1 Depth to water level :

Central Ground Water Board established six monitoring stations (GWMS) to know the behaviour of water table and the quality of water. The gwms depth to water levels observed that 1.50 to 11.13 m bgl.

4.2 Ground water resources

The dynamic ground water resource of the district has been estimated based on methodology recommended by GEC-1997. The annual replenish able ground water resources 737.77MCM, net annual ground water draft is only 0.71mcm. Project demand for domestic and industrial uses upto 2025 is 0.96 mcm. The stage of ground water development is thus negligible and the district can be categorized as safe.

4.3 Ground water quality

Central Ground Water Board, NER laboratory analysed 17 water samples in the year 2004-2005. The analysis indicates that the ground water must be alkaline ranging in PH values 7.3 to 8.5. The ground

water of the district ha low to moderate EC is less than 260 µmhos/cm at 25°C. The iron content in most of the sources is within permissible limit. However, the area is suitable for drinking and irrigation also.

4.4 Status of ground water development

The status of the ground water development in East Siang district, all villages are provided with drinking water. The northern part of Pasighat-Mebo township is hilly and only spring development (discharge is 15-28 m/day) is feasible for all this part. Presently four perennial streams are tapped in the upstream to cover urban Pasighat water supplies by PHED. Out of four sources, bulk requirement is met from "Balek source" but practically this source is not position to meet even 50% of the requirement of the dry period. To overcome this scarcity, it is required to construct a number of deep tubewells so that during dry period ground water can be supplied to fulfill the total requirement.

5. Development of Ground Water management Strategy

5.1 Groundwater development

The problem of ground water development in the district varies depending upon topographic and geologic conditions. Most of the area is occupied by Denudo structural hills. The rock are very hard and compact with steep slopes. These act as a run off zone. The only scope for the ground water development in this area through the improvement of the springs. These springs can be developed for drinking and local irrigation purpose. Local perennial springs can be developed by constructing water collection points. The method of development of springs is by construction of concrete sump near the mouth of the spring and widening the fracture or joint, through which it is emerging. The collection sump should be well protected from surface pollution.

The upper reach of the piedmont alluvial plain consists of Quaternary unconsolidated deposits of boulder, pebble etc. and forms recharge zone. Ground water development is possible by shallow/deep ground water structures in selected areas. Construction of dug wells of 2-3 diameter and 10-25 m deep in the boundary formation are expected to yield 25-30 m/day.

It is essential to ensure some control on ground water development in any area for efficient working of neighbouring wells without causing mutual interference while pumping.

5.2 Water conservation and artificial recharge

The entire district is occupied by rugged terrain and it is having hilly and valley portion. There is a limited scope of ground water development in hilly terrain and the scope of recharge in hilly terrain requires a rigorous study in comparison to the density of population. Rainwater can be harvested for drinking water supply.

6. Groundwater Related issues and Problems

There is no such problem related to ground water. Sometimes some locates iron content in ground water is more than permissible limit, otherwise ground water is fresh and potable and may be used for domestic, irrigation and industrial needs.

7. Awareness and Training Activity

7.1 Mass awareness programme (MAP), Water Management Training Programme (WMTP) by CGWB

So far no mass awareness programme and Water Management Training Programme has been conducted in this district.

7.2 Participation in exhibition, mela, fair etc. ground water related exhibition

7.3 Presentation and Lectures delivered in public form/radio/TV – Nil

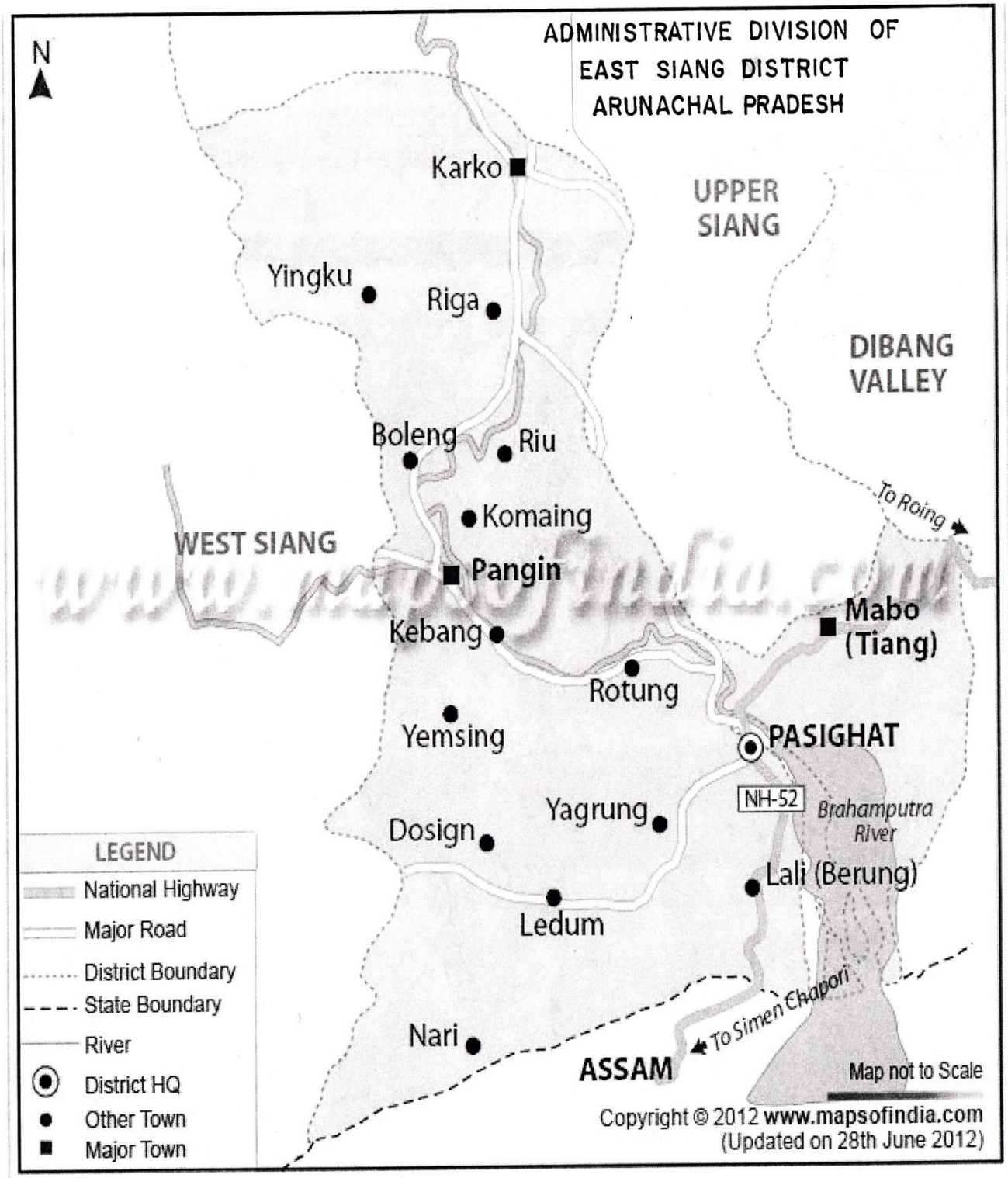
8. Areas noted by CGWB, CGWA - Nil

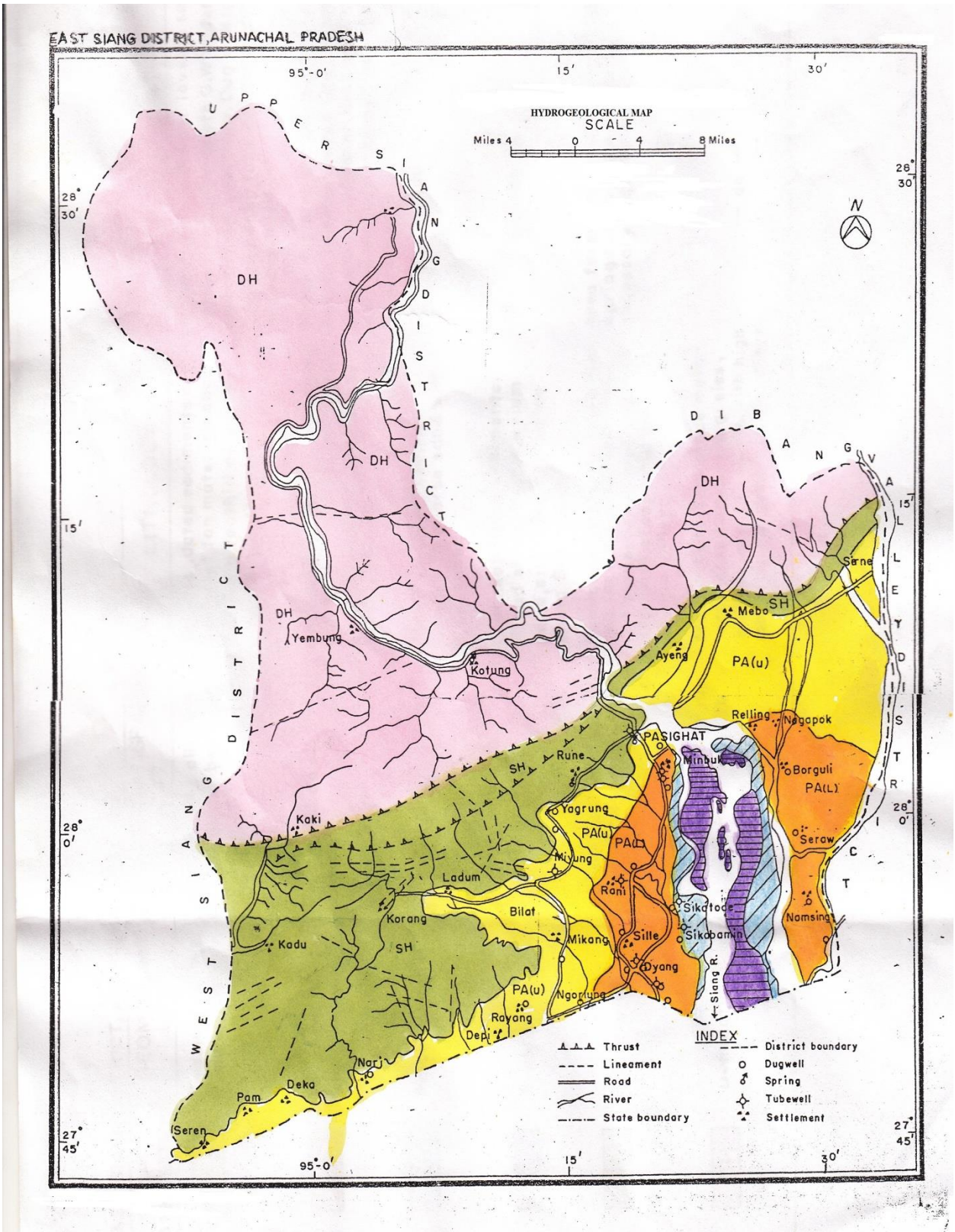
9. Recommendations

The area is mostly comprised of consolidated , semi consolidated and unconsolidated formations. Major part of the formation is in North and Sela and Bomdilla group of rocks occupy central form of the district. Ground water prospect is very much limited in these units, the predominant alluvial plain, due to high permeability which act as a good recharge zone. Construction of dug wells and shallow tubewells are feasible in this area.

Following are the main recommendation of these areas to develop the springs.

1. The sumps of the collection structure should be well protected from surface contamination.
2. Geophysical surveys should be carried out in the valleys underlain by the semi-consolidated tertiary etc. It can be helpful for construction of dug wells and shallow tubewells in this area.
3. Roof Top Rainwater harvesting should be practiced in the hilly area and surplus rain water can be conserved to mitigate the drinking water problem during lean period when springs discharge drops considerably.


ADMINISTRATIVE DIVISION OF
EAST SIANG DISTRICT
ARUNACHAL PRADESH
N
Karko
UPPER
SIANG
Yingku
Riga
DIBANG
VALLEY
Boleng
Riu
To Roing
Komaing
WEST SIANG
Pangin
Kebang
Mabo
(Tiang)
Rotung
Yemsing
PASIGHAT
NH-52
Brahamputra
River
Yagrung
Dosign
Lali (Berung)
Ledum
Nari
To Simen Chapori
ASSAM
Map not to Scale
LEGEND
National Highway
Major Road
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
Copyright © 2012 www.mapsofindia.com
(Updated on 28th June 2012)


EAST SIANG DISTRICT, ARUNACHAL PRADESH
HYDROGEOLOGICAL MAP
SCALE
Miles 4 0 4 8 Miles
N
95°-0'
15'
30'
28° 30'
28° 0'
27° 45'
UPPER SIANG DISTRICT
DIBANG VALLEY DISTRICT
WEST SIANG DISTRICT
DH
SH
PA(u)
PA(L)
Yembung
Kotung
Kaki
Kadu
Korang
Ladum
Bilat
Mikong
Rune
Yagrung
Miyung
Rani
Sille
Dyang
Ngorung
Rayang
Depi
Nari
Deka
Pam
Seren
Ayeng
Mebo
Serne
Relling
Nagapok
PASIGHAT
Minhuk
Borguli
Serow
Sikatode
Sikabamin
Namsing
Siang R.
INDEX
Thrust
Lineament
Road
River
State boundary
District boundary
Dugwell
Spring
Tubewell
Settlement

EAST SIANG DISTRICT, ARUNACHAL PRADESH

LEGEND

MAP ANNOTATION	GEOMORPHIC UNIT	LITHOSTRATIGRAPHIC UNIT	LITHOLOGY	FEASIBILITY OF GROUND WATER DEVELOPMENT
PA(u)	Piedmont Alluvial Plain (upper)	Quaternary alluvium resting over bed rock	Unconsolidated sediments consisting of fan materials occuring allong foothill of siwalick mountain	Water table of deeper level in some places at shallow depth G.W under un-confined condition. Dug well upto 20m and deep tube well (>50) recommended
PA(L)	Piedmont Alluvial Plain (lower)	— do —	Unconsolidated sediments inter colation of fan materials and river alluvium. Coarse sand, pebble and silt	Water table at shallow depth and deeper in some places. Ground water potential is abundant. Ring well as well as shallow tube well can supply required water
	Palaeo channel	— do —	Unconsolidated sediments. Medium to coarse sand with clay lenses	— do —
	Flood plain	— do —	Unconsolidated sediments. Broad stretch of alluvium sand, silt & clay occuring along Siang river	— do —
SH	Structural hill	Siwaliks & Gondwanas Mid-Miocene to Lower Palaeozoic	Semiconsolidated to consolidated formation of sand stone silt stone, conglomarate, shale etc. with steep hills and narrow valleys	Area forms run of zone. Perennial springs available to meet necessary requirement
DH	Denudational hill	Bomdilla & Sela group Lower Palaeozoic to Pre-Cambrian	Moderate to high grade metamorphites consisting gneiss, schists, quartzites etc. with high mountain ranges & narrow valleys.	— do —