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A preliminary investigation on springs of Namsai district, Arunachal Pradesh, India

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Abstract
A study was conducted to identify and documentation of the natural springs in Namsai district, Arunachal Pradesh in the year 2020. A total of 171 villages of 5 circles of Namsai, district i.e. Namsai, Lekang, Lathao, Piyong and Chongkham were surveyed. Identified and documented 184 springs of different types from 134 villages. Of which, 19 were brooks, 116 were dhara, 09 naula and 40 were seeps. These springs as per their origin were also categorized as depression springs (144 nos.), joint/ fractured springs (31nos.) and contact springs (09nos.). The springs along with latitude, longitude, elevation, spring type, flow/ discharge (L/Sec), temperature (°C), pH, EC (µs), TDS (ppm), associated land, resource threat, degree of threat, scouring, conflicting issue, conflict type, stressors, ownership etc were determined and documented. The documentation of springs of Namsai district could effectively be used for future planning for rejuvenation of springs for water resource management in Namsai district of Arunachal Pradesh.

Keywords: springs, discharge, resource threats, conflict, LULC

Introduction

The ground-water and surface-water springs are a significant source of water for people around the world. Scarcity of water in mountainous regions has always been a matter of concern. People have been depending on rainfall and springs as source of water for their household and agricultural activities since time immemorial. The people settled in mountainous regions, still continue the practice of collecting water from natural springs as a source of potable water. However, increase in population and changes in land use pattern and habitat has led to topographic changes. In places where springs are available, they are often one of the most cost-effective ways to provide relatively pure water for consumption, hygiene and irrigation in mountainous regions like Arunachal Pradesh. Natural stressors (especially climate change) and improper watershed management have led to a decrease in discharge in many Himalayan springs [1]. The study conducted on springs in the Himalayan region revealed that due to the drying up of springs nearly 8,000 villages were facing acute water shortage [2]. The research findings of separate investigation also specified the possibility of managing the springs and small seepage canals properly in the Siwalik foothill regions of the Himalayas, water scarcity could be averted [3]. Therefore, issue like water scarcity with relation to drying up of springs is needed to be taken over to increase the understanding on climate change impact and spring hydrology particularly in the Himalayan region.

Apart from the above studies on springs a few other studies conducted in the western Himalayas had opine that spring discharges had direct correlation with rainfall patterns and catchment degradation. [4-10] Prime factors of the spring discharge were identified as the rainfall pattern and the recharge area characteristics [11, 12, 13].

Owing to the stresses with time, the springs have started drying up. As a result some of these perennial springs are turning into seasonal springs as most of them are rain-fed in nature. As such rejuvenation of spring has become inevitable to maintain water availability for the people in the mountainous regions. A few such works were reported from Nepal [14], Sikkim [15], and Uttarakhand [3] from the Indian Himalayan region. This study was undertaken for inventorization of springs in Namsai district, Arunachal Pradesh for identification and planning to revive these dying springs.

Materials and Methods

Study area

Namsai district is the youngest district of Arunachal Pradesh which was formed on November 25, 2014 after dividing Lohit district (Fig 1.). The district is located in between latitude 27°30' to 27°55'N and longitude 95° 52' to 96° 20' E. Namsai is sharing border with Lohit and Changlang to the east; Assam to the west; Lohit and Assam to the North, and the south border adjoins Changlang district. Namsai has a warm and temperate climate. The summers have much more rainfall compared to winter. The average annual temperature is 22.8 °C. Precipitation here averages 2728 mm. Maximum rainfall of 750-800 mm is recorded during July-August with a relative humidity of 80%. Maximum and minimum winter temperatures are 25° C and 10° C, respectively. During summer the temperature rises up to 35° C. The vegetation acquires the general characteristics of the

tropical wet semi-evergreen forest of Himalayan mountain ecosystem.

The people of the district mainly depend on agriculture. Tai-Khampti is the major tribe of Namsai district based on population. The land system of villages is of two types, i.e., individual and community land. It is observed that every household was allotted land for homestead, wet rice field and dry land cultivation on equality principle depending on the population of the family at the time of allotment. The remaining village land was earmarked for pasture and forest land belongs to the community under the customary ownership right of the Chauman (village headman). The rising inclination towards shift of land ownerships to private and prevalent customary rights of ownership of land vested in the Chauman has created inequality in land holdings.

Survey on natural springs in Namsai district of Arunachal Pradesh was carried out by the surveyors in different circles of Namsai district in the year 2020. Prior to survey, the secondary data such as list of villages and list of Gaon Burhas (village heads) of Namsai district were collected from district headquarters. Information such as source of potable and drinking water were also collected from PHED/Water Supply Department of Namsai district. Five (5) teams, each comprising of two members were engaged to survey, collect and fill the data in the prescribed format for each Circle i.e. Chongkham, Lathao, Piyong, Mahadevpur and Namsai. The physical characteristics of spring water were also analysed for it depends upon the characteristics of recharge area, soil, bedrock, depth of aquifer, precipitation, etc.

The physical characteristics of springs were also determined following the methods specified by National Mission on Himalayan Studies (NMHS), narrated below:-

Discharge of spring water

(*Flow/Discharge:* (L/sec)

Flow/Discharge was done following the standard Container/Stopwatch method [6, 12].

Where, discharge of spring water (*Q*) can be trapped into a container of known volume (*V*) in a observed time (*t*) for filling of the container. The flow thus can be calculated using the discharge equation:

$$Q=V/t \quad (1.1)$$

This method was frequently used at discharge pipes or other places where flow was captured into a container. (It is observed that by managing the geometry of the discharge pipe can be achieved more accurate discharge rate of water, because it may not be feasible to capture flow effectively while discharge rate is too high. It also will not work where outflow pipes are submerged)

Electric conductivity *(µS)*

Electric conductivity is measured to asses the ability of an aqueous solution to carry an electrical current. This ability is dependent on the amount of dissolved ions, and is therefore an indicator of total dissolved solids in the solution.

It was measured by using hand held EC meter [16, 17]. The EC meter was cleaned with distilled water using wash bottle and was wiped with tissue paper after each reading. It was also calibrated with different buffer solution time to time and maintained to have fresh batteries.

pH

pH is the measure of hydrogen activity, which indicates the acid/basic qualities of water. It was measured using a hand held pH meter [16, 17]. The pH meter was cleaned with distilled water using wash bottle and was wiped with tissue paper after each reading. Also calibrated with different pH buffers time to time and maintained to have fresh batteries.

Temperature (°C)

Water temperature is an important factor structuring aquatic communities, and may give insight into source of waters. This measurement was recorded in degrees Centigrade with a thermometer.

Brook length

Brook length was measured by using measuring tape/High resolution satellite data, in meters. It was measured using a measuring tape from the spring source (upstream limit of surface water) to the downstream limit of surface water.

Soil type

Information on soil type of the district was obtained from NBSS&LUP map (Fig 2). Geology and rock type information were collected from Geological Survey of India Map.

Chemical characteristics of spring water

Chemical characteristics of spring water provide information about quality of water for drinking or irrigation purpose and its contamination level. Other information such as associated land use/land cover, whether an area comes under forest land, agricultural land, wasteland/scrubland, built-up/settlement area, were obtained [6, 12]. Information on resource threat such as drought, runoff, nutrient load, recreational activity, industrial development and degree of threat, scouring/gully erosion, conflict type, stressors etc were determined [17]. Ownership of land either government, public or private was determined [18]. People used spring water both for drinking, washing clothes/sanitation, agricultural needs, power/industrial needs, etc. and were analysed the pH and EC values of water samples [16].

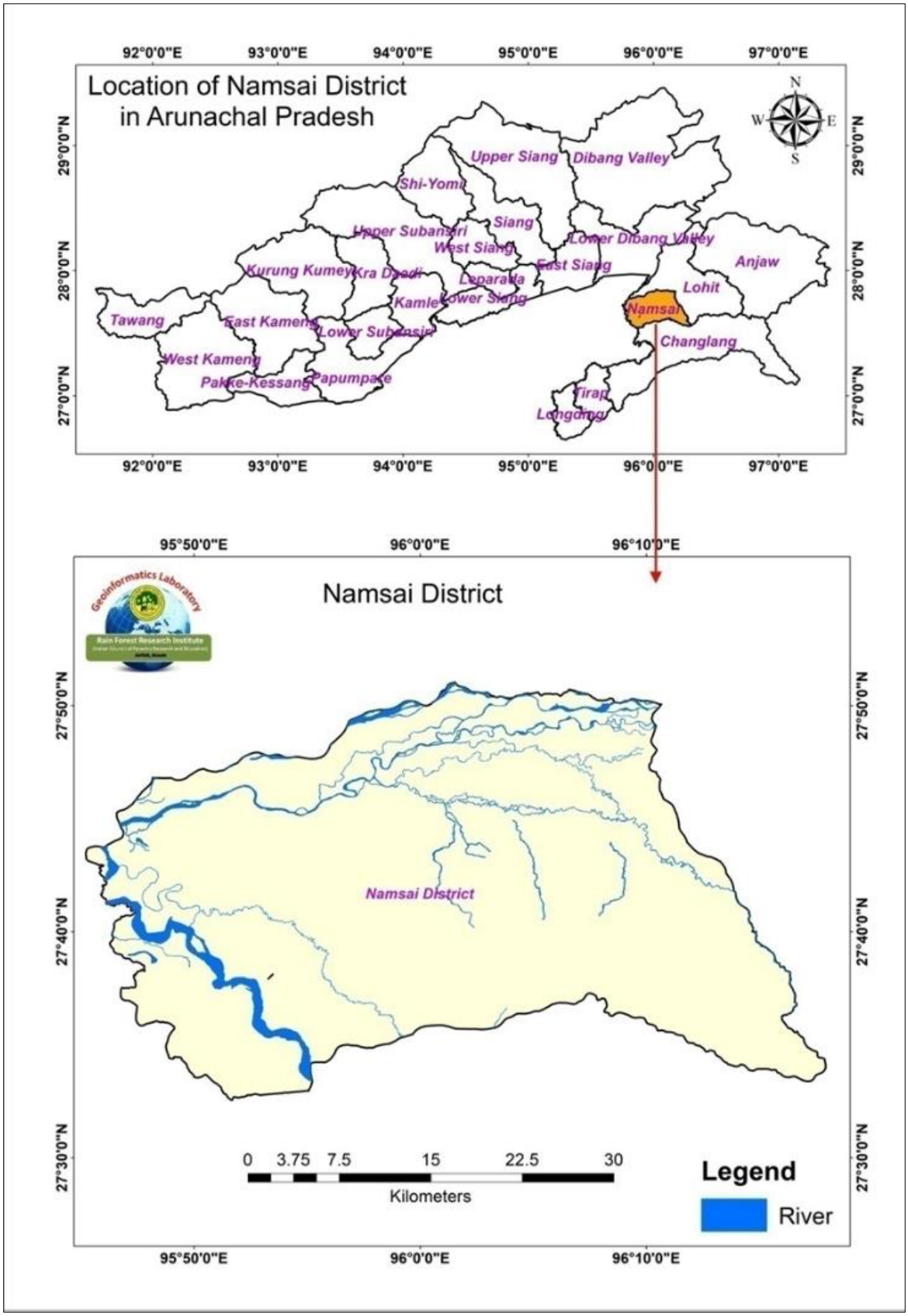

Fig 1: Location and river map of Namsai district, Arunachal Pradesh

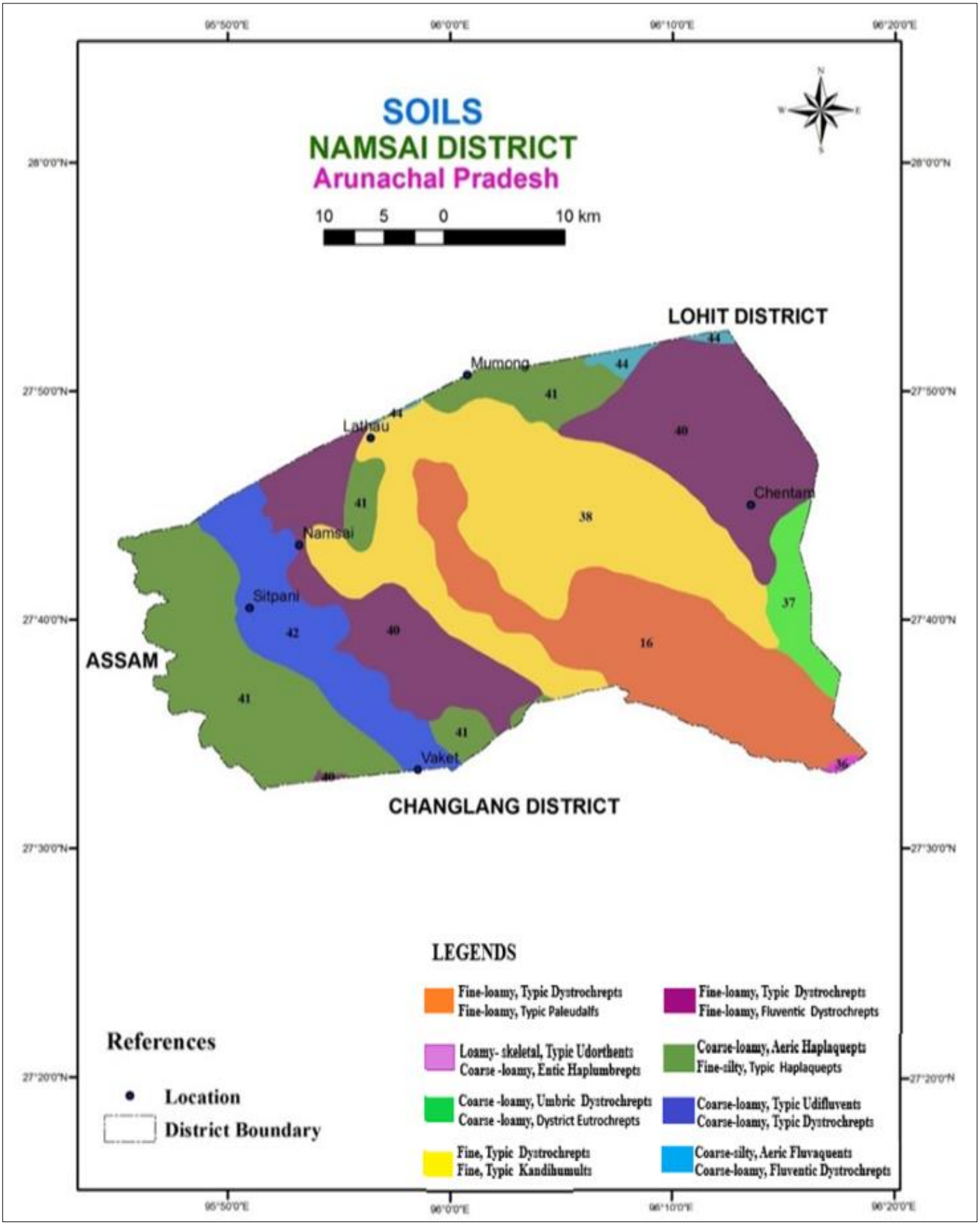

Fig 2: Soil map of Namsai, Arunachal Pradesh (Source: NBSS-LUP, Jorhat).

Results

The springs of different villages of Namsai district, Arunachal Pradesh along with spring code, Latitude, Longitude, Elevation, spring type, flow/ discharge (L/Sec), Temperature (°C), pH, EC (µs), TDS (ppm) etc are presented in table 1(depression springs), table 2 (joint spring) and table 3 (contact spring). During the entire survey period a total of 184 natural springs were identified and documented from surroundings of 134 villages of Namsai district. These springs were further categorized into depression springs (144), joint/ fractured springs (31) and contact springs (09). Of these springs 76 were located in Chongkham Circle, 31 in Lathao circle, 55 from Mahadevpur (Lekang) Circle, 11 in Namsai circle and 11 in Piyong Circle of Namsai district. Data shows that 184 natural springs of Namsai district included 19 brooks, 116 dhara, 9 naulas and 140 seeps. The survey also identified that Chongkham block possessed highest numbers of 76 springs in 44 villages, followed by Lekang block with 55 springs from 51 villages. Other blocks of the district such as Lathao recorded 31 springs from 19 villages and Piyong and Namsai blocks were having 11 springs from 10 villages each. Springs were distributed in different land uses of the district. Out of the 184 springs surveyed, 101 of them were associated with agricultural land, 45 were under built up settlement area, 28 were under village forests and 10 were under wasteland/scrubland area (Table 1-3). The distribution of spring sites revealed a wide range of elevation i.e. between 94 meters to 287 meters above MSL. Elevation of 65 springs were within the range of 94 - 152 meters above MSL, where as 80 springs were from 153 to 182 meters MSL and only 39 of these springs were located in between 183-260 meters above MSL. Comparatively discharge of water is high in dhara followed by brook and naula and less in seeps. Discharge of water from depression springs were recorded to range between 1 sec/L to 55 sec/ L. Discharge of water from contact springs were within the range of 8 to 15 sec/ L, whereas in joint / fractured category of springs exhibited better discharge/flow in the range of 1.5 to 15 sec/L of water. Most of the springs observed are rain-fed and seasonal. However, a few springs such as Lathao A (27°43′45.80″N, 96°10′27.08″E) and Lathao B (27°42′48.17″N, 96°13′18.08″E), Kunginju Tea Estate B (27°45′22.00″N., 95°55′31.22″E), Sapey Kung Tea estate- A (27°45′20.20″ N; 95°55′31.55″ E), Sapey Kung Tea estate –B (27°45′15.4″N; 95°55′31.4″E) of Lathao circle are perennial (Fig.3). Likewise, Nongtaw Khampti A, Nongtaw Khampti B of Piyong Circle and Tissue, Namliang Tea Garden of Chowkham Circle were few perennial springs of Namsai district (Fig. 4).

It was observed that pH value of depression springs of the district ranged from 4.9 to 8.5. However, pH value of 31 joints springs ranged from 5.5 to 7.4 and in nine (9) contact springs pH range varied between 5.7 and 6.8. Two depression springs recorded pH value of water below 5 (acidic). Water samples of 30 depression springs recorded pH value ranging from 5.5 to 6.0; in eighty seven (87) depression springs pH of the water ranged from 6.1 to 7.0, and 25 springs recorded pH from 7.1 to 8.5 (Alkaline).The safe pH range for human consumption is 6.5 to 8.5 (15.10500:1012, according to the WHO). Among the springs surveyed, 105 springs had pH in safe range and 79 springs had acidic water.

Data on electrical conductivity (EC) of spring water ranged from 27- 413 µS. EC of water for 10 springs ranged within 15 - 40 µS, whereas, 63 springs recorded EC ranging from 41-100 µS. Highest EC range (101- 200 µS)was recorded for 81 springs. EC ranging above 200 µS was recorded for 30 springs (Table 1, 2 &3). The EC range is within the WHO standard of safe drinking water (400 µS) in all the springs.

Water temperature for the springs is presented in Table 1, 2 & 3. Over all, the water temperature of springs ranged from 14.7°C to 34°C. Water temperature below 20° C was recorded in 23 springs, whereas 163 springs recorded temperature within the range of 20° C - 30 ° C. Only 2 springs recorded for water temperature above 30° C. Data like TDS, spring type, associated land, resource threat, degree of threat, scouring, conflicting issue, conflict type, stressors, ownership etc are presented in Table 4. Eight (8) different soil types occur in Namsai district, Arunachal Pradesh (NBSS-LUP; Fig 2). These soil types are 1. Fine-loamy+Typic Dystrochrepts, Fine-loamy+Typic Paleudalfs 2. Loamy-skeletal Typic Udorthents; Coarse–loamy, Entic Haplumbrepts 3. Fine-loamy, Typic Dystrochrepts; Fine-loamy, Fluventic Dystrochrepts 4. Fine-loamy, Typic Dystrochrepts Fine-loamy, Fluventic Dystrochrepts 5. Coarse-loamy, Aeric Haplaquepts Fine-silty, Typic Haplaquepts 6. Aeric Haplaquepts Fine-silty, Typic Haplaquepts 7. Coarse-loamy, Typic Udifluvents Coarse-loamy, Typic Dystrochrepts and 8. Coarse-silty Aeric Fluvaquents Coarse-loamy, Fluventic Dystrochrepts.

Lathao A

Lathao B

Kunginju Tea Estate B Sapey Kung Tea estate -B

Fig 3: A few perennial springs in Lathao Circle of Namsai district, Arunachal Pradesh

Nongtaw Khampti A, Piyong Circle Nongtaw Khampti B, Piyong Circle

Namliang Tea Gerden, Chowkham Circle Tissue, Chowkham Circle

Fig 4: A few perennial springs of Piyong and Chowkham Circle Namsai district

Data on resource threat among the springs of the district revealed that nutrient load was the major threat which affected 71 springs followed by drought affecting 45 springs. Runoff affected 39 springs, 29 had other reasons. Information on various uses of spring water was evaluated and it was found that 89 springs were used for agricultural purposes, 39 springs were used for washing and sanitation, 37 springs were used for only drinking purpose, 17 were used for drinking, washing & sanitation and 2 were used for both drinking and agricultural purpose.

Data were analysed for establishment of correlation between elevation and spring water temperature and also elevation and flow / discharge. However, no significant correlation could be established. Although, there is a positive correlation between pH and EC, (coefficient(r) = 0.2119) of the spring water, it is too weak linear positive correlation. EC and TDS values of the spring water showed a strong positive correlation ('r' value 0.983061).

Discussion

This study has generated baseline information on springs distribution, spring type, threats and spring uses along with land use land cover information in the form of associated land. The district occurs three types of springs based on the classification of springs, i.e. depression springs and Joint/Fracture springs and contact springs [19]. Many natural as well as human activities can intensify to contaminate spring water in the form of soluble and insoluble particles and microbes, which degrade water quality. For example nutrient load was recorded for many of the springs of the district identified mostly where in the catchment agricultural and habitat/ settlement were located. The physical properties of spring water may vary depending upon the features of recharge area, soil, bedrock, depth of aquifer, precipitation, etc [20, 21]. Physical characteristics are the dominant factors influencing water supply in a watershed. The springs of the district can be categorized as warm springs (water temperature below 21^{O}C) and thermal springs (water temperature more than 21^{O}C) [19]. In an another study carried out on change in land use/land cover (LULC) observed a drastic influence recharge and discharge of spring water [22]. As an ample change in LULC took place in last decades in Namsai district, GIS study may also help to find out significant change in discharge and recharge of spring water in future on the basis of base line data generated by this study.

Table 1: Depression Springs identified from Namsai district, Arunachal Pradesh

Sl No	Village/ Spring code	Latitude	Longitude	Elevation (ft)	Spring type	Flow lit./sec	EC (µs)	pH	Temp °c	TDS (ppm)	Associated Land.
1	Chesing Wingko/ (266594)	27°36′57.56″N	95°58′07.57″E	488	Dhara	l4.5	205	6.6	21	101	Agricultural Land
2	Jenglai/(266592)	27°36′36.07″N	95°59′39.62″E	530	Dhara	l2	37	6.3	19	17	Agricultural Land
3	Lekang Khamti/(266590)	27°34′11.93″N	95°59′18.13″E	625	Dhara	9.4	128	6.5	22	64	Forest
4	New Chesing Winkgo/(266595)	27°36′57.56″N	95°58′07.57″E	488	Dhara	23	120	6.5	23	57	Forest
5	Piyong Kachari/(266584)	27°35′56.33″N	95°55′21.90″E	552	Dhara	2.25	42	7.6	19.4	20	Forest
6	Alubari/(266493)	27°49′37.56″N	96°00′44.14″E	450	Dhara	11	353	6.9	23	176	Forest
7	Alubari ghat/(266495)	27°50′36.10″N	96°1′19.56″E	483	Seep	11	120	7	25	60	Forest
8	Alubari ghat/(266495)	27°50′21.44″N	96°1′24.31″E	538	Brook	11	147	8.5	33	71	Forest
9	Alubari Main Wood/(266494)	27°48′45.29″N	96°1′15.74″E	536	Dhara	2.0	337	7.3	28	168	Agricultural Land
10	Dadum Jona/ (266574)	27°43′51.20″N	95°51′09.36″E	594	Dhara	3.0	180	6.37	26	84	Agricultural Land
11	Dadum Jona/(266574)	27°43′53.54″N	95°51′05.15″E	544	Brook	l3	86	6.2	26	42	Agricultural Land e
12	Dumsai/266628	27°36′01.40″N	95°48′48.38″E	485	Dhara	10	118	6.6	22	59	Agricultural Land
13	Jona IV/266573	27°45′29.66″N	95°51′51.77″E	574	Dhara	4.0	205	6.3	27	103	Agricultural Land
14	Jona I/266570	27°44′42.40″N	95°53′13.52″E	361	Dhara	3.0	53	6.2	24	26	Waste land
15	Jona I/266570	27°44′22.63″N	95°52′33.78″E	577	Dhara	8.0	90	6.4	29	45	Agricultural Land
16	Jona III/266572	27°44′10.07″N	95°49′34.82″E	571	Dhara	8.0	273	7.3	29	138	Agricultural Land
17	Jona III/266572	27°43′31.48″N	95°50′21.12″E	591	Dhara	13	56	6.02	28	25	Agricultural Land
18	Kaupatani/266626	27°37′09.48″N	95°48′24.34″E	473	Dhara	14	32	6.3	19	16	Agricultural Land
19	Napatia/266491	27°50′02.11″N	96°00′45.04″E	528	Seep	10	161	6.7	24	78	Forest
20	Napatia/ 266491	27°49′43.32″N	96°0′54.58″E	518	Dhara	10	181	7.1	27	98	Forest
21	Adivasi Chuk/266644	27°34′52.72″N	95°49′58.80″E	454	Dhara	15	72	6.4	25	36	Agricultural Land
22	Boka Beel/ 266623	27°34′22.33″N	95°52′58.26″E	488	Dhara	13	207	6.9	23	100	Agricultural Land
23	Dharampur/266612	27°40′57.36″N	95°49′06.02″E	462	Dhara	14	147	6.823	24	73	Agricultural Land
24	Dirak Miri/ 266610	27°42′00.65″N	95°46′32.52″E	455	Dhara	12	190	7	22	95	Agricultural Land
25	Eraloni/ 266625	27°37′48.94″ N	95°48′26.53″E	494	Dhara	10	169	6.3	25	84	Agricultural Land
26	Kumari Adivasi/266645	27°35′30.91″N	95°50′34.87″E	474	Dhara	10	144	6.5	22	72	Forest
27	Mokokham/266565	27°44′19.39″N	95°51′45.25″E	544	Dhara	10	179	7	28	92	Agricultural Land
28	Munglang(A)/266579	27°44′57.12″N	95°53′29.04″E	587	Seep	5.0	160	6.2	29	84	Wasteland
29	Munglang (B)/266579)	27°45′01.84″N	95°53′45.24″E	591	Dhara	5.0	160	6.2	29	84	Wasteland/Scrubland
30	Nangshya CP Camp/266577	27°47′32.93″N	96°01′44.40″E	516	Dhara	6.0	258	6.5	28	127	Wasteland/Scrubland
31	Nangshya CP Camp/266577	27°43′44.47″N	95°48′56.16″E	574	Dhara	7.0	36	6	24	19	Agricultural Land
32	New jaipur/ 266575	27°42′59.80″N	95°50′59.96″E	534	Dhara	12	86	6.1	25	31	Forest
33	Sulungtoo/266562	27°44′12.91″N	95°54′14.62″E	537	Seep	2.0	49	5.8	24	25	Agricultural Land
34	Tengapani/ 266569	27°46′38.64″N	95°57′42.88″E	660	Naula	12	79	7.3	27	39	Forest

35	Tengapanimukh/266578	27°44′08.56″N	95°48′44.57″E	541	Brook	3.0	130	7	24	65	Wasteland/Scrubland
36	Tengapanimukh A/266578	27°43′50.99″N	95°48′19.30″E	538	Dhara	7.0	108	6.1	24	54	Agricultural Land
37	Enthem/ 266543	27°40′22.58″N	95°54′27.07″E	470	Dhara	55	111	7.9	29	58	Agricultural Land
38	Kaisu/ 266547	27°40′07.57″N	95°55′09.41″E	458	Dhara	40.5	70	6.5	27	33	Agricultural Land
39	Kaissu L Camp/ 266558	27°41′15.79″N	95°54′37.73″E	474	Brook	17	68	5.48	14.8	34	Agricultural Land
40	Manfaiseng (B)/266552	27°42′30.89″N	95°55′22.37″E	513	Dhara	45	48	6.5	26.7	25	Agricultural Land
41	Manfaiseng (A)/266552	27°42′30.89″N	95°55′24.89″E	513	Dhara	54	44	6.3	29		Agricultural Land
42	Manhofai/266548	27°41′48.84″N	95°55′28.49″E	482	Naula	8.0	58	6.5	34	29	Agricultural Land
43	Manna II/266545	27°41′26.34″N	95°55′36.66″E	471	Seep	37	62	6.6	20	31	Agricultural Land
44	Nanam Khimiyang II/266551	27°42′19.62″N	95°55′24.71″E	479	Dhara	30	54	4.9	30	27	Agricultural Land
45	New Jenthu A/266531	27°42′25.09″N	95°50′46.39″E	469	Dhara	38	59	6.5	25.8	29	Agricultural Land
46	Pathar Gaon/ 266544	27°40′38.14″N	95°54′46.08″E	490	Seep	45.2	70	6	30	33	Agricultural Land
47	Marua/266499	27°47′24.00″N	96°8′24.00″E	610	Dhara	7.3	199	7.2	24	93	Forest
48	Chakma II, A/266517	27°49′36.70″N	96°2′46.25″E	512	Seep	3.23	317	6.6	24	158	Built up/Settlement
49	Chakma II,B/266517	27°49′36.26′′N	96°02′46.39″E	561	Brook	1.27	282	7	25	140	Builtup/settlement
50	Chakma III, A/266518	27°49′41.92″N	96°2′46.61″E	551	Dhara	2.40	192	7.5	28	86	Agricultural Land
51	Chakma III, B/266518	27°49′39.76″N	96°2′49.92″E	515	Seep	7.90	333	7.1	26	166	Agricultural Land
52	Chongkham I A/266521	27°48′14.80″N	96°1′12.07″E	467	Dhara	2.40	144	7.9	29	70	Agricultural Land
53	Chongkham I B/266521	27°48′21.06″N	96°1′20.53″E	529	Seep	10.4	144	7.7	26	72	Agricultural Land
54	Chongkham II/266522	27°48′21.10″N	96°1′42.85″E	536	Seep	7.03	160	7.7	26	80	Agricultural Land
55	Chongkham III B/266523	27°48′18.36″N	96°3′40.72″E	594	Dhara	9.0	167	7.6	26	81	Built up/Settlement
56	Chongkham IV/266524	27°48′54.40″N	96°2′16.19″E	519	Brook	4.9	162	6.9	26	81	Built up/Settlement
57	Lower Silatoo Miri/ 266635	27°35′40.52″N	95°51′17.42″E	496	Dhara	18	67	6.2	23	33	Agricultural Land
58	Nongkhon/ 266630	27°36′13.32″N	95°50′31.81″E	453	Dhara	12	68	6.6	21	34	Agricultural Land
59	Nongkhon II/ 266631	27°36′07.60″N	95°49′58.76″E	519	Dhara	17	56	6.2	23	26	Agricultural Land
60	Nongkhon tinali/ 266632	27°35′49.85″N	95°49′43.68″E	458	Dhara	16	62	6.3	24	33	Agricultural Land
61	Silatoo Miri/266634	27°35′07.66″N	95°51′39.53″E	500	Dhara	12	70	6.2	18	36	Agricultural Land
62	Waisali/ 266619	27°39′25.27″N	95°49′07.00″E	474	Dhara	10	278	6.6	20	168	Agricultural Land
63	Lekang HQ/266656	27°38′25.40″N	95°48′18.61″E	488	Dhara	11	86	5.8	26	42	Agricultural Land
64	Mahadevpur-I /266657	27°38′16.80″N	95°51′22.72″E	481	Dhara	14	160	7.1	22	79	Agricultural Land
65	Mahadevpur-III /266659	27°37′56.50″N	95°49′21.36″E	483	Dhara	13	177	7	25	89	Agricultural Land
66	Mahadevpur-IV/ 266660	27°36′46.19″N	95°50′09.60″E	500	Dhara	10	62	6	24	31	Agricultural Land
67	Mahadevpur-II/266658	27°37′43.32″N	95°48′53.21″E	491	Dhara	7.l	170	6	24	84	Agricultural Land
68	Nongkhon Satghoria/ 266633	27°35′44.48″N	95°51′03.17″E	475	Dhara	7.0	47	6	22	26	Agricultural Land
69	Philobari/266641	27°36′22.14″N	95°52′17.33″E	505	Dhara	9.0	184	6.5	17	93	Agricultural Land
70	Sanga Pathar A/266629	27°36′42.23″N	95°49′29.50″E	503	Dhara	15	49	6.2	25	25	Agricultural Land
71	Sanga Pathar- B/266629	27°36′19.73″N	95°49′03.90″E	485	Dhara	11	36	5.6	23	17	Agricultural Land
72	Hati Mara Beel/266621	27°35′55.25″N	95°54′29.92″E	523	Dhara	11	149	7.2	21	74	Agricultural Land
73	Kakani/266640	27°35′57.91″N	95°52′11.93″E	502	Dhara	15	44	6.2	22	22	Agricultural Land
74	Kharira Chuk/266613	27°41′21.48″N	95°48′53.89″E	415	Dhara	12	173	6.6	24	86	Agricultural Land
75	Khowji/266647	27°34′58.04″N	95°51′08.01″E	472	Dhara	12	49	6.6	19	24	Agricultural Land
76	Krishnapur/266618	27°39′35.82″N	95°48′44.93″E	515	Dhara	14	230	7.4	19	140	Agricultural Land
77	Krishnapur satghariya/266614	27°40′19.96″N	95°49′49.69″E	443	Dhara	11	230	4.8	23	116	Agricultural Land
78	Kumari Khamti/ 266643	27°34′36.66″N	95°50′06.40″E	489	Dhara	19	67	6.5	19	33	Agricultural Land
79	Lekang Gohain Gaon/ 266608	27°41′05.93″N	95°47′52.19″E	457	Dhara	12	206	6.6	22	102	Agricultural Land
80	Mahaloni/266617	27°38′50.17″N	95°48′25.49″E	480	Dhara	13	56	6.5	19	23	Agricultural Land
81	Mohong deori/266650	27°33′15.59″N	95°51′53.82″E	483	Dhara	10	34	5.7	19	17	Agricultural Land
82	Man Paleng/266655	27°33′52.13″N	95°54′02.92″E	524	Dhara	7	27	5.8	17	14	Agricultural Land
83	Murthy Camp/266661	27°37′48.00″N	95°51′06.26″E	481	Dhara	16	168	5.8	26.8	84	Agricultural Land
84	New Mohong/ 266648	27°33′51.52″N	95°51′46.33″E	490	Dhara	8	149	6.1	20	74	Agricultural Land
85	Nockte Chuk/ 266639	27°35′02.44″N	95°52′17.04″E	465	Dhara	10	182	6.7	19	91	Agricultural Land
86	Embong/266510	27°44′02.72″N	96°10′26.72″E	453	Seep	4.7	125	6.4	24	62	Agricultural Land
87	Emphum(A)/ 266507	27°47′35.99″N	96°8′50.00″E	643	Dhara	2.53	180	6.5	21	94	Forest
88	Emphum (B)/266507	27°45′43.42″N	96°8′39.26″E	617	Seep	7.6	194	6.4	22	97	Forest
89	Empong (A)/ 266503	27°47′26.05″N	96°7′12.68″E	597	Naula	1.2	175	6.9	23	87	Agricultural Land
90	Gunanagar II A/ 266497	27°48′47.92″N	96°3′13.68″E	552	Brook	4.53	111	6.0	25	56	Built up/Settlement
91	Gunanagar II B/ 266497	27°48′28.84″N	96°4′33.28″E	545	Seep	1.67	197	6.7	23	98	Built up/Settlement
92	Injo A/ 266513	27°39′28.51″N	96°15′45.25″E	809	Seep	3.84	33	6.2	21	16	Forest
93	Injo B/ 266513	27°39′47.23″N	96°15′38.02″E	856	Dhara	6.15	32	6.1	21	16	Forest
94	Insa A/ 266512	27°40′54.88″N	96°14′33.86″E	881	Brook	1.45	84	5.6	23	43	Forest

95	Insa B/ 266512	27°40′53.47″N	96°14′34.51″E	943	Seep	32	70	5.8	22	34	Forest
96	Kherem/ 266498	27°48′32.36″N	96°7′53.98″E	560	Seep	4.5	169	6.6	22	85	Built up/Settlement
97	Kherem B/ 266498	27°48′45.25″N	96°7′48.90″E	645	Naula	3.08	170	6.7	24	84	Built up/Settlement
98	Lathao A/ 266511	27°43′45.80″N	96°10′27.08″E	412	Brook	4.63	72	5.6	23	36	Forest
99	Lathao B/ 266511	27°42′48.17″N	96°13′18.08″E	419	Seep	5.09	151	5.6	23	79	Forest
100	Adi Ningroo/ 266587	27°38′29.72″N	95°54′19.55″E	501	Dhara	7.5	41	6.1	22	27	Forest
101	Winseng Nongtaw/ 266602	27°35′41.82″N	95°59′59.51″E	533	Dhara	13	185	6.5	24	92	Agricultural Land
102	Dhonekhona A/ 266532	27°42′51.77″N	95°49′49.87″E	426	Dhara	2.5	91	5.9	26	39	Agricultural Land
103	Manmaw/ 266500	27°47′32.71″N	96°7′36.08″E	646	Dhara	6.8	193	6.7	23	96	Agricultural Land
104	Manmaw/ 266500	27°45′43.42″N	96°8′39.26″E	617	Dhara	15	237	6.5	21	117	Agricultural Land
105	Sapey Kung Tea B/ 266564	27°45′15.44″N	95°55′31.37″E	587	Seep	3.27	85	5.6	25.6	42	Built up/Settlement
106	Lonka village/ 266528	27°14′37.32″N	96°9′47.30″E	590	Brook	3.23	37	5.9	25	18	Built up/Settlement
107	Lonka village/ 266528	27°32′03.12″N	96°9′04.68″E	663	Brook	9.5	42	6.4	23	19	Built up/Settlement
108	Mabira/ 266487	27°47′53.41″N	95°58′04.55″E	481	Seep	8.7	286	7.2	22	143	Forest
109	Mabira/ 266487	27°49′20.92″N	95°58′40.42″E	499	Dhara	2.01	298	7.0	23	150	Forest
110	Mankao/ 266504	27°47′36.38″N	96°7′32.74″E	607	Brook	7.6	134	6.5	25	68	Agricultural Land
111	Mankao/ 266504	27°47′36.60″N	96°7′39.58″E	620	Dhara	6.08	162	6.7	22	80	Agricultural Land
112	Mankong Seng A/ 266527	27°47′32.93″N	96°1′44.44″E	516	Naula	5.91	88	6.8	24	44	Built up/Settlement
113	Mankong Seng B/ 266527	27°47′31.62″N	96°1′51.31″E	608	Dhara	2.29	142	7.2	28	71	Built up/Settlement
114	Manphaktan/ 266520	27°48′24.16″N	96°2′57.52″E	522	Seep	6.07	93	6.6	26	48	Built up/Settlement
115	Marau camp/ 266499	27°46′48.00″N	96°8′24.00″E	610	Seep	5.0	191	6.9	23	99	Built up/Settlement
116	Momong A/ 266488	27°47′52.98″N	95°59′36.71″E	310	Dhara	0.68	161	7.2	25	80	Built up/Settlement
117	Momong B/ 266488	27°48′32.87″N	95°59′40.60″E	358	Naula	3.09	158	7.5	25	79	Built up/Settlement
118	Nalog A/ 266489	27°48′13.54″N	96°0′18.14″E	410	Seep	6.9	205	6.6	23	102	Forest
119	Nalog B/ 266489	27°48′24.12″N	96°4′30.00″E	497	Dhara	4.3	132	6.7	22	66	Forest
120	Namgo B/ 266509	27°45′31.64″N	96°9′48.60″E	672	Naula	9.8	170	6.77	22	89	Built up/Settlement
121	Namgo model A/ 266526	27°44′56.90″N	96°10′43.43″E	758	Dhara	1.26	88	6.4	24	39	Built up/Settlement
122	Namgo model B/ 266526	27°44′31.34″N	96°10′50.95″E	684	Seep	1.42	120	6.0	22	62	Built up/Settlement
123	Namgo A/ 266509	27°45′32.33″N	96°9′48.89″E	686	Dhara	1.63	167	6.0	22	83	Built up/Settlement
124	Namliang tea garden/ 266492	27°47′24.11″N	96°3′40.82″E	539	Naula	2.40	162	6.9	23	80	Built up/Settlement
125	Namliang tea garden/ 266492	27°47′23.89″N	96°3′41.44″E	588	Seep	8.9	160	7.0	24	76	Built up/Settlement
126	Namliang A/ 266490	27°47′33.11″N	96°3′21.64″E	555	Seep	3.40	159	6.8	23	77	Built up/Settlement
127	Namliang B/ 266490	27°47′38.90″N	96°3′14.62″E	552	Brook	5.60	245	6.7	24	109	Built up/Settlement
128	Tenga pani area A/ 266525	27°46′30.47″N	96°9′16.27″E	663	Dhara	3.42	170	7.3	21	77	Agricultural Land
129	Tenga pani area B/ 266525	27°46′27.01″N	96°9′09.14″E	650	Brook	1.67	155	7.3	22	77	Agricultural Land
130	Tingwa camp/266515	27°44′15.25″N	96°11′08.74″E	730	Dhara	1.23	131	5.8	22	65	Built up/Settlement
131	Tissue A/ 266502	27°46′27.01″N	96°9′09.04″E	659	Seep	5.3	181	7.3	24	90	Built up/Settlement
132	Tuling camp A/ 266514	27°39′35.57″N	96°15′42.05″E	856	Dhara	4.23	53	5.5	23	26	Built up/Settlement
133	Tuling camp B/ 266514	27°39′47.63″N	96°15′38.16″E	512	Seep	2.40	62	5.5	22	32	Built up/Settlement
134	Ekorani/ 266615	27°39′55.01″N	95°47′09.06″E	481	Dhara	8	58	6.2	26	29	Agricultural Land
135	New Silatoo/ 266636	27°34′47.28″N	95°51′25.49″E	481	Dhara	12	142	5.7	21	71	Agricultural Land
136	Old Mohong/ 266651	27°33′32.98″N	95°52′33.78″E	517	Dhara	4	56	6.3	22	28	Agricultural Land
137	Old Mohong-I/ 266652	27°33′00.00″N	95°52′12.00″E	537	Dhara	18	43	6.5	17	21	Agricultural Land
138	Old Mohong-II/ 266653	27°33′24.95″N	95°53′19.14″E	504	Dhara	11	157	7.2	19	77	Agricultural Land
139	Old Mohong-III/ 266653	27°33′24.95″N	95°53′19.14″E	514	Dhara	6.0	54	5.8	24	26	Agricultural Land
140	Padumoni/ 266616	27°39′27.68″N	95°46′30.79″E	462	Dhara	7.0	68	5.6	23	34	Agricultural Land
141	Raja Beel/ 266611	27°42′17.42″N	95°46′41.12″E	472	Dhara	8.0	55	6.4	21	27	Agricultural Land
142	Rangali Beel/ 266609	27°41′45.71″N	95°47′44.02″E	448	Dhara	15	161	5.8	23	81	Agricultural Land
143	Sikari Chuk/266622	27°33′04.25″N	95°54′19.80″E	530	Dhara	9.0	47	6.4	20	24	Agricultural Land
144	Singi Beel/266646	27°35′06.04″N	95°49′31.44″E	480	Dhara	12	80	6.3	24	40	Agricultural Land

Table 2: Joint/Fault Springs identified from Namsai district, Arunachal Pradesh

Sl No	Village/ Spring code	Latitude	Longitude	Elevation (ft)	Spring type	Flow liter/sec	EC (µs)	pH	Temp°c	TDS (ppm)	Associated Land.
1	Nongtaw Shyam/ 266605	27°35′09″N	96°01′34.20″E	625	Dhara	l5	138	6.5	24.5	60	Forest
2	Jona II/ 266571	27°35′50.89″N	95°51′50.57″E	574	Brook	3.0	120	6.5	24	60	Wasteland/Scrubland
3	Manmaw/ 266500	27°47′32.71″N	96°07′36.08″E	646	Dhara	6.8	193	6.7	23	96	Agricultural Land
4	Manmaw/ 266500	27°45′43.42″N	96°08′39.26″E	617	Dhara	15	237	6.5	21	117	Agricultural Land
5	Pankhao/ 266501	27°46′57.02″N	96°08′44.94″ E	610	Seep	5.0	191	6.9	23		Built up/Settlement
6	Chakma 1/ 266516	27°48′34.11″N	96°04′48.00″ E	516	Seep	5.6	143	6.9	24	72	Built up/Settlement

7	Chongkham HQ/ 266519	27°48′48.35″N	96°02′43.26″ E	594	Dhara	4.02	220	6.8	26	110	Built up/Settlement
8	Silatoo Khamti/ 266638	27°35′00.96″N	96°52′22.48″ E	506	Dhara	15	180	6.6	19	91	Agricultural Land
9	Empong B/ 266503	27°48′30.74″N	96°07′31.44″ E	600	Brook	l2.9	139	6.7	28	69	Agricultural Land
10	Gunanagar I A/ 266496	27°49′0091″N	96°05′35.38″ E	564	Seep	4.14	173	7.03	26	86	Built up/Settlement
11	Gunanagar I B/ 266496	27°49′08.09″N	96°04′14.77″ E	545	Dhara	5.06	149	7.4	26	74	Built up/Settlement
12	Khainalah A/ 266567	27°45′51.77″N	95°57′53.93″ E	647	Seep	11	255	6.35	14.7	127	Built up/Settlement
13	Khainalah B/ 266567	27°45′00.48″N	95°58′41.63″ E	673	Dhara	9.0	306	6.91	14.7	154	Built up/Settlement
14	Kunginju Tea A/ 266566	27°45′20.20″N	95°55′31.55″ E	528	Seep	14	52	5.5	24.6	27	Wasteland land
15	Kunginju Tea B/ 266566	27°45′22.00″N	95°55′31.22″E	591	Dhara	4.0	92	6.0	24.9	46	Wasteland/Scrubland
16	Madhubon A/266568	27°45′50.94″N	95°49′28.56″E	680	Seep	11	308	6.56	14.9	154	Wasteland/Scrubland
17	Madhubon B/266568	27°45′44.28″N	95°56′02.52″E	683	Dhara	9.0	413	6.35	15	208	Built up/Settlement
18	Sapey Kung Tea/ 266564	27°44′54.31″N	95°55′04.58″E	577	Brook	13	94	5.9	25.4	47	Forest
19	Jengtho camp A/ 266580	27°44′54.13″N	95°53′29.29″E	561	Seep	7.0	222	7.3	14.8	100	Built up/Settlement
20	Jengtho camp B/ 266580	27°44′26.84″N	95°52′52.00″E	548	Seep	12	212	5.8	15	106	Built up/Settlement
21	Mazgaon/266486	27°47′26.71″N	95°57′06.48″E	546	Brook	2.42	64	6.3	27	32	Agricultural Land
22	Mimey A/266505	27°48′21.96″N	96°06′39.60″E	602	Dhara	4.06	168	6.6	25	84	Agricultural Land
23	Mimey B/266505	27°48′22.32″N	96°06′42.12″E	609	Seep	3.08	147	6.5	23	74	Agricultural Land
24	Morapat A/ 266485	27°47′38.72″N	95°56′57.88″E	510	Dhara	4.25	290	6.9	23	145	Built up/ Settlement
25	Morapat B/266485	27°47′38.69″N	95°56′57.84″E	504	Seep	6.03	293	6.9	24	146	Built up/Settlement
26	Munglang A/266508	27°43′41.52″N	96°09′03.17″E	749	Seep	1.53	143	6.5	24	77	Built up /Settlement
27	Munglang B/266508	27°43′42.96″N	96°09′03.31″ E	730	Dhara	2.04	45	6.4	22	23	Built up /Settlement
28	Pankhao,B/266501	27°47′49.20″N	96°08′56.40″ E	630	Seep	5.0	195	6.9	22	82	Forest
29	Paseng A/266506	27°46′26.44″ N	96°03′10.33″ E	460	Brook	1.57	64	6.5	26	32	Agricultural Land
30	Paseng B/266506	27°46′41.52″ N	96°03′03.33″ E	496	Seep	2.56	88	6.5	24	42	Agricultural Land
31	Mathing Kung/ 266596	27°37′13.30″ N	95°57′42.37″ E	558	Dhara	2.46	50	6.1	25	132	Agricultural land

Table 3: Identified Contact Springs of Namsai district, Arunachal Pradesh

Sl No	Village/Code	Latitude	Longitude	Elevation	Spring type	Flow liter/sec	EC (µs)	pH	Temp °c	TDS (ppm)	Associated Land.
1	Nongtaw Khamti/ 266607	27°35′44.70″N	96°00′58.21″E	598	Dhara	l5	152	6.4	24	75	Built up/Settlement
2	Nongtaw Khamti/266607	27°35′44.70″N	96°00′58.28″E	598	Dhara	l5	170	6.3	24	83	Built up/Settlement
3	Jona Kachari Kuli/266576	27°45′14.80″N	95°51′54.14″E	558	Dhara	14	221	6.6	27	98	Agricultural land
4	Kathal guri/266620	27°38′46.07″N	95°48′01.62″E	462	Dhara	12	135	6.5	23	67	Agricultural land
5	Lathao B/266563	27°44′12.91″N	95°54′14.62″E	538	Naula	10	74	5.8	23	37	Wasteland/Scrubland
6	Kumari Kacahari/266642	27°35′54.20″N	96°50′67.62″E	500	Dhara	15	58	6.4	26	39	Agricultural land
7	Silatoo Kachari/ 266637	27°36′31.18″N	95°52′20.93″E	554	Dhara	12	49	6.8	19	25	Agricultural land
8	Sitapani Moran/ 266624	27°37′32.52″N	95°47′39.66″E	407	Dhara	8.0	35	5.7	20	15	Agricultural land
9	Miri Pathar/ 266649	27°32′52.37″N	95°52′21.54″E	510	Dhara	12	85	6.6	23	42	Agricultural land

Table 4: Springs of Namsai district, Arunachal Pradesh under resource threats, conflict, use etc

SL No	Block	Village/Code	Resource threat	Degree of threat	Scouring	Conflicting type	Ownership	Spring use
1	Piyong	Chesing Wingko/266594	Runoff	Moderate	Moderate	Grazing	Public	Agricultural
2	Piyong	Jenglai/266592	Runoff	Moderate	Moderate	Others	Public	Agricultural
3	Piyong	Lekang Khamti/ 266590	Others	Moderate	Moderate	Others	Public	Agricultural
4	Piyong	Mathing Kung/ 266596	Others	Moderate	Moderate	Others	Public	Agricultural
5	Piyong	New Chesing Winkgo/266595	Others	Moderate	Moderate	Others	Public	Agricultural
6	Piyong	Nongtaw Khamti/ 266607	Others	Moderate	Moderate	Others	Public	Drinking, Clothing/Sanitation
7	Piyong	Nongtaw Khamti/ 266607	Others	Moderate	Moderate	Others	Private	Drinking, Clothing/Sanitation
8	Piyong	Nongtaw Shyam/ 266605	Others	Moderate	Moderate	Channel Diversion	Public	Clothing/Sanitations
9	Piyong	Piyong Kachari/ 266584	Others	Moderate	Moderate	Others	Public	Agricultural
10	Chongkham	Alubari/ 266493	Nutrient load	Moderate	Moderate	Channel Diversion	Public	Drinking, Clothing/Sanitation
11	Chongkham	Alubari ghat/ 266495	Nutrient load	Moderate	Moderate	Recreational	Public	Clothing/Sanitation
12	Chongkham	Alubari ghat/ 266495	Nutrient load	Moderate	Moderate	Recreational	Public	Clothing/Sanitation
13	Chongkham	Alubari Main Wood/ 266494	Nutrient load	Moderate	Moderate	Recreational	Public	Clothing/Sanitation
14	Lathao	Dadum Jona/ 266574	Drought	Moderate	Moderate	Others	Public	Agricultural
15	Lathao	Dadum Jona/ 266574	Drought	Moderate	Moderate	Others	Public	Agricultural

16	Lekang	Dumsai/ 266628	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
17	Lathao	Jona IV/ 266573	Drought	Moderate	Moderate	Grazing	Public	Agricultural
18	Lathao	Jona I / 266570	Drought	Moderate	Moderate	Grazing	Public	Agricultural
19	Lathao	Jona I / 266570	Runoff	Moderate	Moderate	Grazing	Public	Drinking
20	Lathao	Jona II/ 266571	Nutrient load	Moderate	Moderate	Grazing	Public	Drinking
21	Lathao	Jona III / 266572	Drought	Moderate	Moderate	Grazing	Public	Drinking, Agricultural
22	Lathao	Jona III / 266572	Drought	Moderate	Moderate	Grazing	Public	Agricultural
23	Lathao	Jona Kachari Kuli/ 266576	Drought	Moderate	Moderate	Grazing	Public	Agricultural
24	Lekang	Kathal guri / 266620	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
25	Lekang	Kaupatani/ 266626	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
26	Lathao	Lathao/ 266563	Others	High	Moderate	Grazing	Public	Drinking
27	Lathao	Lathao B/ 266563	Recreational	Moderate	Moderate	Grazing	Public	Drinking
28	Chongkham	Napatia/ 266491	Nutrient load	Moderate	Moderate	Recreational	Public	Drinking, Clothing/Sanitation
29	Chongkham	Napatia/ 266491	Nutrient load	Moderate	Moderate	Recreational activity	Public	Drinking, Clothing/Sanitation
30	Lekang	Adivasi Chuk / 266644	Runoff	Moderate	Moderate	Grazing	Public	Agricultural
31	Lekang	Boka Beel/ 266623	Drought	Moderate	Moderate	Grazing	Public	Agricultural
32	Lekang	Dharampur/ 266612	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
33	Lekang	Dirak Miri/ 266610	Drought	Moderate	Moderate	Grazing	Private	Agricultural
34	Lekang	Eraloni / 266625	Drought	Moderate	Moderate	Grazing	Public	Agricultural
35	Lekang	Kumari Adivasi/ 266645	Runoff	Moderate	Moderate	Grazing	Governme nt	Agricultural
36	Lekang	Kumari Kacahari/266642	Runoff	Moderate	Moderate	Grazing	Public	Agricultural
37	Lathao	Mokokham/266565	Drought	Moderate	Moderate	others	Public	Drinking
38	Lathao	Munglang (A)/266579	Drought	Moderate	Moderate	Grazing	Public	Drinking
39	Lathao	Munglang (B)/ 266579	Runoff	Moderate	Moderate	Grazing	Public	Drinking
40	Lathao	Nangshya CP Camp A /266577	Drought	Moderate	Moderate	Grazing	Public	Agricultural
41	Lathao	Nangshya C P Camp B /266577	Runoff	Moderate	Moderate	Grazing	Public	Agricultural
42	Lathao	New jaipur Lathao/ 266575	Drought	Moderate	Moderate	Grazing	Public	Agricultural
43	Lathao	Sulungtoo/ 266562	Runoff	Moderate	Moderate	Grazing	Public	Drinking, Agricultural
44	Lathao	Tengapani/ 266569	Nutrient load	Moderate	Moderate	Others	Public	Drinking
45	Lathao	Tengapanimukh A/ 266578	Drought	Moderate	Moderate	Grazing	Public	Drinking
46	Lathao	Tengapanimukh B/ 266578	Others	Moderate	Moderate	Grazing	Public	Agricultural
47	Namsai	Enthem/ 266543	Drought	Moderate	Moderate	Grazing	Public	Agricultural
48	Namsai	Kaisu / 266547	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
49	Namsai	Kaissu L Camp / 266558	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
50	Namsai	Manfaiseng B/266552	Runoff	Moderate	Moderate	Grazing	Public	Agricultural
51	Namsai	Manfaiseng (A)/ 266552	Drought	Moderate	Moderate	Grazing	Public	Agricultural
52	Namsai	Manhofai / 266548	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
53	Namsai	Manna II/ 266545	Drought	Moderate	Moderate	Grazing	Public	Agricultural
54	Namsai	Nanam Khimiyang II / 266551	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
55	Namsai	New Jenthu A/ 266531	Drought	Moderate	Moderate	Grazing	Public	Agricultural
56	Namsai	Pathar Gaon/ 266544	Drought	Moderate	Moderate	Grazing	Public	Agricultural
57	Chongkham	Manmaw/ 266500	Nutrient load	Moderate	Moderate	Grazing	Public	Clothing/Sanitation
58	Chongkham	Manmaw/ 266500	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
59	Chongkham	Pankhao/ 266501	Nutrient load	Moderate	Moderate	Others	Public	Drinking
60	Chongkham	Marau camp / 266499	Runoff	Moderate	Moderate	Others	Public	Drinking
61	Chongkham	Chakma 1/ 266516	Runoff	Moderate	Moderate	Others	Public	Drinking
62	Chongkham	Chakma II, A/ 266517	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
63	Chongkham	Chakma II, B/ 266517	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
64	Chongkham	Chakma III, A/ 266518	Nutrient load	Moderate	Moderate	Grazing	Public	Clothing/Sanitation
65	Chongkham	Chakma III, B/ 266518	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
66	Chongkham	Chongkham HQ/ 266519	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
67	Chongkham	Chongkham I A/ 266521	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
68	Chongkham	Chongkham I B/ 266521	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
69	Chongkham	Chongkham II/ 266522	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
70	Chongkham	Chongkham III B/ 266523	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
71	Chongkham	Chongkham IV/ 266524	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
72	Lekang	Lower Silatoo Miri/ 266635	Drought	Moderate	Moderate	Grazing	Public	Agricultural

73	Lekang	Nongkhon/ 266630	Nutrient load	Moderate	Moderate	Others	Public	Agricultural
74	Lekang	Nongkhon II/ 266631	Nutrient load	Moderate	Moderate	Others	Public	Agricultural
75	Lekang	Nongkhon tinali / 266632	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
76	Lekang	Silatoo Miri) / 266634	Drought	Moderate	Moderate	Grazing	Public	Agricultural
77	Lekang	Silatoo Kachari/ 266637	Drought	Moderate	Moderate	Others	Private	Agricultural
78	Lekang	Silatoo Khamti / 266638	Drought	Moderate	Moderate	Grazing	Public	Clothing/Sanitation
79	Lekang	Sitapani Moran / 266624	Nutrient load	Moderate	Low	Others	Public	Agricultural
80	Lekang	Waisali / 266619	Nutrient load	Moderate	Moderate	Others	Public	Agricultural
81	Lekang	Lekang HQ/ 266656	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
82	Lekang	Mahadevpur-I / 266657	Drought	Moderate	Moderate		Public	Agricultural
83	Lekang	Mahadevpur-III /266659	Drought	Moderate	Moderate	Grazing	Public	Agricultural
84	Lekang	Mahadevpur-IV /266660	Drought	Moderate	Moderate	Grazing	Public	Agricultural
85	Lekang	Mahadevpur-II /266658	Drought	Moderate	Moderate	Grazing	Public	Agricultural
86	Lekang	Nongkhon Satghoria/266633	Runoff, Nutirent Load	Moderate	Moderate	Grazing	Public	Agricultural
87	Lekang	Philobari/266641	Drought	Moderate	Moderate	Others	Public	Agricultural
88	Lekang	Sanga Pathar A/266629	Drought	Moderate	Moderate	Others	Public	Agricultural
89	Lekang	Sanga Pathar- B/2666629	Drought	Moderate	Moderate		Public	Agricultural
90	Lekang	Hati Mara Beel /266621	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
91	Lekang	Kakani/266640	Drought	Moderate	Moderate	Others	Public	Agricultural
92	Lekang	Kharira Chuk/266613	Drought	Moderate	Moderate	Grazing	Public	Agricultural
93	Lekang	Khowji/266647	Nutrient load	Moderate	Moderate	Others	Public	Agricultural
94	Lekang	Krishnapur/266618	Nutrient load	Moderate	Moderate	Others	Public	Agricultural
95	Lekang	Krishnapur satghariya/266614	Drought	Moderate	Moderate	Grazing	Public	Agricultural
96	Lekang	Kumari Khamti /266643	Drought	Moderate	Moderate	Grazing	Public	Agricultural
97	Lekang	Lekang Gohain Gaon /266608	Runoff	Moderate	Moderate	Grazing	Public	Agricultural
98	Lekang	Mahaloni/266617	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
99	Lekang	Miri Pathar/266649	Others	High	Low	Grazing	Public	Agricultural
100	Lekang	Mohong deori /266650	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
101	Lekang	Mohong Old /266655	Drought	Moderate	Moderate	Others	Private	Agricultural
102	Lekang	Murthy Camp/266661	Drought	Moderate	Moderate	Grazing	Public	Agricultural
103	Lekang	New Mohong/266648	Nutrient load	Moderate	Moderate	Grazing	Public	Agricultural
104	Lekang	Nockte Chuk /266639	Drought	Moderate	Moderate	Grazing	Public	Agricultural
105	Chongkham	Embong/266510	Runoff	Moderate	Moderate	Others	Public	Agricultural
106	Chongkham	Emphum (A) /266507	Runoff	Moderate	Moderate	Grazing	Public	Drinking
107	Chongkham	Emphum B/266507	Nutrient load	Moderate	Moderate	others	Public	Drinking
108	Chongkham	Empong A/266503	Recreational activity	Moderate	Moderate	others	Public	Agricultural
109	Chongkham	Empong B/266503	Recreational activity	Moderate	Moderate	others	Public	Agricultural
110	Chongkham	Gunanagar I A/266496	Runoff	Moderate	Moderate	Grazing	Public	Clothing/Sanitation
1112	Chongkham	Gunanagar I B/266496	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
112	Chongkham	Gunanagar II A /266497	Recreational activity	Moderate	Moderate	others	Public	Clothing/Sanitation
113	Chongkham	Gunanagar II B /266497	Recreational activity	Moderate	Moderate	Others	Public	Clothing/Sanitation
114	Chongkham	Injo A/266513	Runoff	Moderate	Moderate	Grazing	Public	Drinking
115	Chongkham	Injo B/266513	Runoff	Moderate	Moderate	others	Public	Drinking
116	Chongkham	Insa A /266512	Nutrient load			others	Public	Drinking
117	Chongkham	Insa B /266512	Recreational activity			others	Public	Drinking
118	Chongkham	Kherem/266498	Nutrient load	Moderate	Moderate	Grazing	Public	Drinking
119	Chongkham	Kherem B/266498	Nutrient load	Moderate	Moderate	others	Public	Drinking
120	Chongkham	Lathao A/266511	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
121	Chongkham	Lathao B, /266511	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
122	Piyong	Adi Ningroo/266587	others	Moderate	Moderate	Others	Public	Agricultural
123	Piyong	Winseng Nongtaw/266602	Runoff	Moderate	Moderate	Grazing	Public	Agriculture
124	Namsai	Dhonekhona A/266532	others	Moderate	Moderate	others	Public	Agricultural
125	Lathao	Khainalah A/266567	others	High	Moderate	others	Private	Drinking/Clothing/Sanitation
126	Lathao	Khainalah B/266567	others	High	Moderate	others	Private	Drinking/Clothing/Sanitation
127	Lathao	Kunginju Tea Estate A/ 266566	others	Moderate	Moderate	others	Private	Drinking/Clothing/Sanitation

128	Lathao	Kunginju Tea Estate B/ 266566	Industrial Development	Moderate	Moderate	others	Public	Drinking/Clothing/Sanitation
129	Lathao	Madhubon A/266568	others	High	Moderate	others	Private	Drinking/Clothing/Sanitation
130	Lathao	Madhubon B/266568	others	High	Moderate	others	Private	Drinking/Clothing/Sanitation
131	Lathao	Sapey Kung Tea estate A/266564	others	Moderate	Moderate	others	Private	Drinking/Clothing/Sanitation
132	Lathao	Sapey Kung Tea estate B /266564	others	Moderate	Moderate	others	Private	Drinking/Clothing/Sanitation
133	Lathao	Jengtho camp A /266580	others	High	Moderate	others	Private	Drinking/Clothing/Sanitation
134	Lathao	Jengtho camp B /266580	others	High	Moderate	others	Private	Drinking/Clothing/Sanitation
135	Chongkham	Lonka village/266528	Nutrient load	Moderate	Moderate	others	Public	drinking
136	Chongkham	Lonka village/266528	Nutrient load	Moderate	Moderate	others	Public	drinking
137	Chongkham	Mabira /266487	Nutrient load	Moderate	Moderate	others	Public	Clothing/Sanitation
138	Chongkham	Mabira / 266487	Nutrient load	Moderate	Moderate	others	Public	Agriculture
139	Chongkham	Mankao A/ 266504	Nutrient load	Moderate	Moderate	others	Public	Agriculture
140	Chongkham	Mankao B/ 266504	Nutrient load	Moderate	Moderate	others	Public	Drinking
141	Chongkham	Mankong Seng A /266527	Nutrient load	Moderate	Moderate	others	Public	Drinking
142	Chongkham	Mankong Seng B / 266527	Nutrient load	Moderate	Moderate	others	Public	Drinking
143	Chongkham	Manphaktan/ 266520	Nutrient load	Moderate	Moderate	others	Public	Clothing/Sanitation
144	Chongkham	Marau camp/266499	Nutrient load	Moderate	Moderate	others	Public	Drinking
145	Chongkham	Mazgaon/266486	Runoff	Moderate	Moderate	others	Public	Agriculture
146	Chongkham	Mimey A/266505	Runoff	Moderate	Moderate	others	Public	Drinking
147	Chongkham	Mimey B/266505	Nutrient load	Moderate	Moderate	others	Public	Drinking
148	Chongkham	Momong A/266488	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
149	Chongkham	Momong B/266488	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
150	Chongkham	Morapat A/266485	Nutrient load	Moderate	Moderate	others	Public	Drinking
151	Chongkham	Morapat B/266485	Nutrient load	Moderate	Moderate	others	Public	Drinking
152	Chongkham	Munglang A/266508	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
153	Chongkham	Munglang B/266508	Runoff	Moderate	Moderate	others	Public	Agriculture
154	Chongkham	Nalog A/266489	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
155	Chongkham	Nalog B/266489	Runoff	Moderate	Moderate	others	Public	Clothing/Sanitation
156	Chongkham	Namgo 266509	Nutrient load	Moderate	Moderate	others	Public	Drinking/Clothing/Sanitation
157	Chongkham	Namgo model A/266526	Nutrient load	Moderate	Moderate	others	Public	Clothing/Sanitation
158	Chongkham	Namgo model B/266526	Nutrient load	Moderate	Moderate		Public	Clothing/Sanitation
159	Chongkham	Namgo A/266509	Nutrient load	Moderate	Moderate	Others	Public	Drinking/Clothing/Sanitation
160	Chongkham	Namliang tea garden A / 266492	Nutrient load	Moderate	Moderate	Others	Public	Drinking
161	Chongkham	Namliang tea Gerden B/266492	Nutrient load	Moderate	Moderate	Others	Public	Drinking
162	Chongkham	Namliang A / 266490	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
163	Chongkham	Namliang B/266490	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
164	Chongkham	Panghao / 266501	Runoff	Moderate	Moderate	Others	Public	Clothing/Sanitation
165	Chongkham	Paseng A/ 266506	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
166	Chongkham	Paseng B/ 266506	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
167	Chongkham	Tenga pani area A/266525	Nutrient load	Moderate	Moderate	Oters	Public	Drinking
168	Chongkham	Tenga pani area B/266525	Nutrient load	Moderate	Moderate	Others	Public	Drinking
169	Chongkham	Tingwa camp /266515	Nutrient load	Moderate	Moderate	Others	Public	Drinking
170	Chongkham	Tissue A/266502	Nutrient load	Moderate	Moderate	Others	Public	Clothing/Sanitation
171	Chongkham	Tuling camp A/266514	Nutrient load	Moderate	Moderate	Others	Public	Drinking
172	Chongkham	Tuling camp B/266514	Nutrient load	Moderate	Moderate	Others	Public	Drinking
173	Lekang	Dumsai/266628	Nutrient load	Moderate	Moderate	Grazing	Public	Agriculture
174	Lekang	Ekorani/266615	Nutrient load	Moderate	Moderate	Grazing	Public	Agriculture
175	Lekang	New Silatoo/266636	Nutrient load	Moderate	Moderate	Grazing	Public	Agriculture
176	Lekang	Old Mohong/266651	Nutrient load	Moderate	Moderate	Grazing	Public	Agriculture
177	Lekang	Old Mohong-I/266652	Drought	Moderate	Moderate	Grazing	Public	Agriculture
178	Lekang	Old Mohong-II/266653	Drought	Moderate	Moderate	Grazing	Public	Agriculture
179	Lekang	Old Mohong-III/266653	Drought	Moderate	Moderate	Grazing	Public	Agriculture
180	Lekang	Padumoni /266616	Drought	Moderate	Moderate	Grazing	Public	Agriculture

181	Lekang	Raja Beel/266611	Drought	Moderate	Moderate	Grazing	Public	Agriculture
182	Lekang	Rangali Beel /266609	Drought	Moderate	Moderate	Grazing	Public	Agriculture
183	Lekang	Sikari Chuk/266622	Runoff /Nutrient load	Moderate	Moderate	Grazing	Public	Agriculture
184	Lekang	Singi Beel/266646	Drought	Moderate	Moderate	Grazing	Public	Agriculture

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