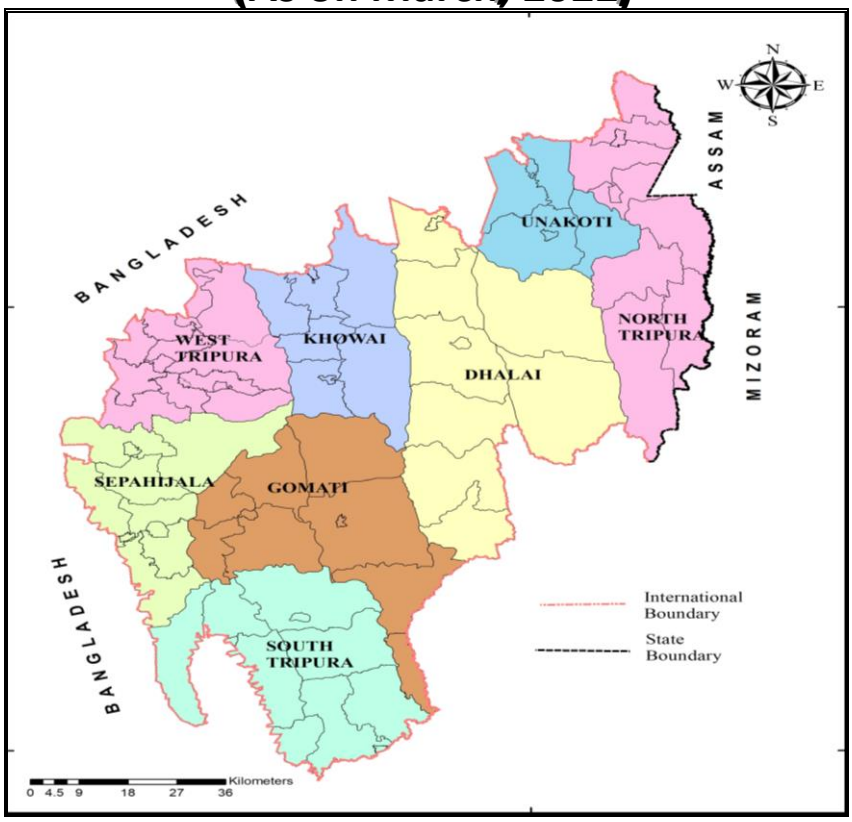
Technical Series: A

No.

DYNAMIC GROUND WATER RESOURCES OF TRIPURA

(As on March, 2022)



CENTRAL GROUND WATER BOARD

NORTH EASTERN REGION

GUWAHATI

December, 2022

केंद्रीय भूमिजल बोर्ड
उत्तर पूर्वी क्षेत्र
गुवाहाटी
दिसंबर, २०२२

DYNAMIC GROUND WATER RESOURCES OF TRIPURA

(As on March, 2022)

Prepared by

PWD (WATER RESOURCES) DEPARTMENT

GOVERNMENT OF TRIPURA

&

CENTRAL GROUND WATER BOARD

NORTH EASTERN REGION, GUWAHATI

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PREFACE

Tripura is a picturesque state in the northeastern region of the country. The state is acceded to the Indian Union in 1949 and is bounded on the north, west, south & southeast by the international boundary of Bangladesh. Shallow tube wells with small command area is most suitable in the state.

For a scientific planning and judicious development of dynamic ground water resource potential of the state, estimation of ground water resource has been done based on the latest methodology as recommended by Ground Water Resource Estimation Committee-2015 (GEC-2015) and duly approved by Govt. of India. The estimation of groundwater resource has been done on block wise basis.

The report on dynamic Ground water resource potential has been assessed based on the field data generated by Central Ground Water Board and statistical information collected from other State Departments. The annual ground water recharge, net ground water availability and existing gross draft on irrigation and domestic uses, etc, have been estimated for the state. The report also highlights on the net annual ground water availability for future use.

The total annual ground water recharge in the state of Tripura is 1.18 BCM. The Annual Extractable Ground Water Resources of the state is 1.06 BCM after deducting the natural discharge. Present Ground Water Extraction is 0.103 BCM out of which 0.02 BCM extraction is on account of irrigation and the annual domestic extraction is 0.08 BCM. The annual allocation for Domestic and Industrial uses has been made as 0.08 BCM based upon the population data projected up to year 2025. The over-all stage of ground water development of the state is 9.7%.

I strongly believe that the report with its technical data will help in understanding present ground water scenario in Tripura State and prove valuable to policy makers, technical experts, professionals and user agencies for management of ground water development in the state in planned manner.

(Suresh Ch. Kapil)
REGIONAL DIRECTOR

CONTENTS

Annexures **Page No.**

CONTRIBUTORS

Estimation of ground water resources of Tripura is based on the data provided by the Nodal Officer, Shri Biswajit Saha, EE, WR Investigation Division, Public Works Department (Water Resources), Govt. of Tripura from the various Departments such as Public Works Department (Drinking Water and Sanitation), Govt. of Tripura, Agriculture Department, Govt. of Tripura, Directorate of Economics and Statistics, Govt. of Tripura. The computation of the resource estimation has been done through the INGRES software and the report is prepared by Smt. Ritu K. Oraon (Scientist-B & OIC), Ms. H. Veikhone Sophia Kay (Scientist-B) and Shri. Rupam Chattaraj (AHG). The contribution of Sh. K.M. Debbarma, Officer Surveyor and Sh. A.C. Namasudra, Officer Surveyor for the help in data collection is duly acknowledged.

1. INTRODUCTION

Tripura is a picturesque state in the northeastern region of the country. The state is acceded to the Indian Union in 1949 and is bounded on the north, west, south & southeast by the international boundary of Bangladesh. In the east, it has a common boundary with Assam & Mizoram. The state lies between North latitudes $22^0 51'$ and $24^0 32'$ and East longitudes $90^0 10'$ and $92^0 21'$. The total geographical area of the state is 10491 sq.km. The state has been divided into 8 districts and 58 blocks and Agartala MC. The state head quarter Agartala does not come under any block.

As per 2011 Census, the total population of the State is 35,05004 as against 31,99,203 in 2001 Census. Total area of Tripura is 10491 sq. km. Population Density of Tripura is 350 persons per sq km which is lower than national average 382 per sq km.

Tripura is basically an Agricultural State with about 64% of its total population depending entirely on Agriculture for their livelihood.

The previous assessment of groundwater resources of Tripura was carried out during 2019-20. The ground water resource of the state has been re-estimated by Central Ground Water Board, North Eastern Region based on GEC 2015 methodology for the assessment year 2021-22. Census figures for population as per 2011 Census are available and whatever data for the year 2021-22 provided by Public Works Department (Water Resources), Govt. of Tripura, Public Works Department (Drinking Water and Sanitation), Govt. of Tripura, Agriculture Department, Govt. of Tripura, Directorate of Economics and Statistics, Govt. of Tripura have been used to update and revise the assessment of groundwater resources of Tripura.

To estimate ground water resources of Tripura for the assessment year 2022, a State Level Committee under the Chairmanship of Principal Secretary, PWD, Govt. of Tripura has been constituted on 16/02/2022 (Appendix-I). Meeting of the State Level Committee was conducted on 11.03.2022 and 02.09.2022 for assessment of the dynamic groundwater Resources (2022) for the state of Tripura.

2. HYDROGEOLGICAL SETUP OF TRIPURA

2.1 Description of rock types with area coverage.

Geologically, Quaternary and Upper Tertiary groups occupy the state. Mobile trough geosynclinal deposition of Barail group followed by flysch type of Surma & Tipam sediments is noticed in the state.

The Surma group of rocks is the oldest group rocks in the state and is represented by Upper Bhuban and Bokabil formations. The rocks of Bhuban formation constituting compact sandstones and shales are exposed in the core of the anticlines viz, Atharamura, Longtarai and Jampui hills of Khowai, Dhalai and North Tripura districts. The Bhuban formation is overlain by Bokabil formation consists mainly of shale.

The Tipam formations are conformable and transitional to the underlying Bokabil formation. These formations are consisting mainly of sandstone with occasional shale. Tipam formations occur in the eight districts of the state. The maximum thickness of this formation is estimated to be around 1400 m and the minimum thickness being 400 m.

The Dupitila formation consisting of earthy brown to buff sandy clay, clayey sandstone and coarse to gritty ferruginous sandstone unconformably overlie the Tipam formation and are well developed in the central portion of the synclinal valleys, specially west of Baramura anticline. The thickness of this formation varies from 10 to 30m.

Most of the longitudinal synclinal valleys of the state are the basins of deposition of recent formation. Recent alluvium occurs along the streams and the flood plains of major rivers. It consists of coarse sand, sandy clay, silt and clay.

2.2 Hydro-meteorological condition

The climate of the state is characterized by moderate temperature and high humid atmosphere. Winter sets in November and lasts till the end of February. Summer season starts from March and lasts upto May and is followed by Southwest monsoon lasting till September. Generally, the maximum summer temperature ranges from 35^0C to 40^0C and average minimum temperature in winter nights is recorded at 6^0C.

The state receives rainfall from Southwest Monsoon. The average annual rainfall over the state is 1911 mm. The intensity of rainfall increases from SW to NE in the state. In West Tripura district the normal monsoon rainfall is 1335 mm and normal annual rainfall is 1804 mm. In South Tripura district normal monsoon rainfall is 1716 mm and normal annual rainfall is 2190 mm. In North Tripura district normal monsoon rainfall is 1387 mm and

normal annual rainfall is 1940 mm. In Dhalai district normal monsoon rainfall is 1338 mm and normal annual rainfall is 1862 mm. In Khowai district normal monsoon rainfall is 1350 mm and normal annual rainfall is 1896 mm. In Unakoti district normal monsoon rainfall is 1388 mm and normal annual rainfall is 1936 mm. In Gomati district normal monsoon rainfall is 1379 mm and normal annual rainfall is 1748 mm. In Sepahijala district normal monsoon rainfall is 1427 mm and normal annual rainfall is 1910 mm.

2.3 Description of hydrogeological units, aquifer parameters.

Hydrogeological surveys, aided by exploratory drilling and deposit well programmes carried out by Central Ground Water Board, N.E. Region since 1972 have revealed that there are 3 to 4 major aquifers encountered within 250m depth in the synclinal valleys of the State, and the thickness of the aquifers varies from valley to valley and it decreases considerably in the northern valleys of the State, namely, Kamalpur, Kailasahar & Dharmanagar valleys. The Tipam formation comprising of medium to fine grained, semi-consolidated & friable sandstones, form the aquifer system of the State. The ground water worthiness of the aquifer varies from valley to valley, while in western part of the State the aquifers are of good potential in comparison to northeastern parts towards Dharmanagar, where it is moderately potential. On the basis of drilling, the aquifer zones down to the explored depth of 250m, can be divided into two groups, viz., (1) a shallow aquifer zone within 40m depth from surface & (2) a deeper aquifer zone below 40m depth. The study of sub-surface geology through lithological logs has revealed that the aquifers are discontinuous in nature even within the same valley.

In Tripura, ground water occurs under unconfined condition in Dupitila formation, Recent formation & in Tipam formation. Besides it also occurs under confined to semi-confined conditions in Tipam formation at considerable depth. Recharge areas for the deeper aquifer lies in the adjacent anticlinal hills. Wherever a good thickness of impermeable clay beds underlie & overlie the saturated granular zones, autoflow artesian conditions have been found in the valleys, which are the discharge area. In fact, the geology as well as geomorphology of the State is favourable for such artesian conditions within synclinal valleys. The artesian flowing conditions occur in patches both at shallow depth and at deeper depth. The auto discharge of the flowing wells in the State ranges from 100 to 6000 lph, the maximum auto discharge from deep tube well to the extent of 54000 lph has been found in Khowai valley near Khowai town, where the piezometric head rose up to 7m above ground

level. The depth to water level in dug wells varies from 0.8 to 9.48 m bgl during pre-monsoon period and 0.31 to 9.39 m bgl during post-monsoon period.

Analysis of aquifer performance tests on exploratory/ deposit deep tubewells in the state have shown transmissivity range from 4.5 to 1577 m^2/day and permeability range from 0.1 to 28.4 m/day. The storage co-efficient ranges from 2.25 X 10^{-5} to 2.20 X 10^{-3} showing confined nature of the aquifer.

Table 1: Hydrogeology of Tripura

Age		Group	Formation	Lithology	Aquifer Disposition	Ground Water Potential
Quater-nary	**Un- consoli-dated**	Recent	Recent Alluvium	Clay, Silt and Sand	Limited thickness along river valleys	Yield Prospects very limited due to superficial thickness
Upper Tertiary	**Semi Consolidated**	Dupitila	Dupitila	Coarse to gritty Sandstone with dominated Clay layers	Forms Unconfined aquifer in dug well zones near surface. Maximum thickness : 30 m	Limited yield prospect due to poor permeability
		Tipam	Champaknagar/ Manu Bazar	Fine to coarse Sandstone with intercalations of Shale layers	Forms major aquifer system for shallow and deep tube wells up to 300 m depth at favourable locations.	Moderate yield prospect, yields varies from 20 to 150 m^3/hr for drawdown upto 30 m
		Surma	Bokabil/ Bhuban	Thinly bedded Sandstone, Siltstone and shale	Occurs on anticlinal hill ranges	Not potential for ground water development, due to argillaceous nature of formations

2.4 Ground water level conditions

Ground water regime of Tripura is being monitored through a network of 118 permanent observation stations (GWMS) four times in a year. The depth to water level during pre-monsoon period (March' 21) generally lies between 0.8 to 9.48 m bgl and during post-monsoon period (November' 21) depth to water level lies between 0.31 to 9.39 m bgl. The fluctuation of water level varies between 0.09 m to 0.49 m. The analysis of long-term water level trend (both pre-monsoon and post-monsoon period) of ground water monitoring stations

indicates that there is no significant falling trend of water level in the state so far.

2.5 Ground water quality

Results of chemical quality of ground water show that ground water in all parts of the State is good for domestic, irrigational & industrial uses. Iron content in ground water, however, is high, which warrants proper treatment before use. The water is encrusting in nature throughout the state. Hence, it is recommended that well screens should be cleaned periodically. Range of chemical contents of Ground Water in Tripura is given in the table below:

Table 2: Range of chemical contents of Ground Water in Tripura

Sl. no	Chemical constituents	Phreatic Aquifer		
			Min	**Max**
1	pH		4.15	9.02
2	EC (µS/cm) at 25°C		50.57	841.10
3	Turbidity(NTU)	mg/l	BDL	0.4
4	TDS		24.83	440.2
5	**CO_3**		BDL	51
6	**HCO_3**		12.21	311.35
7	**TA (as $CaCO_3$)**		12.21	362.35
8	Cl-		7.09	141.8
9	**SO_4**		BDL	134.01
10	**NO_3**		BDL	10.73
11	F-		BDL	1.4
12	**Ca**		2	40.03
13	Mg		2.41	35.19
14	TH (as **$CaCO_3$**)		25	200
15	Na		2.77	118.55
16	K		0.69	34.69
17	Fe		BDL	6.54

Ground water in the state is acidic to alkaline with pH values ranging from 4.15 to 9.02. The electrical conductivity values for ground water in phreatic aquifer in Tripura range

from 50.57 to 841.10 µs/cm at 25ºC indicating the quality of ground water to be of low salinity and the water is potable. Total hardness (Ca+Mg) expressed as $CaCO_3$ in ppm is small indicating that the water is soft in quality. The other chemical constituents of ground water namely HCO_3, Cl, Ca, Mg, Fe etc. all are within permissible limit according to Bureau of Indian Standard (IS: 10500-2012**).** The chemical analysis of ground water samples from phreatic aquifer reveals that the ground water of Tripura is generally suitable for drinking purposes. Almost all the chemical constituents are within the permissible limits of drinking water standards except for Iron, which is high in isolated locations. Higher concentration of iron above permissible limit in ground water in phreatic aquifer in Tripura is observed in most of the places..

3. GROUND WATER RESOURCES ESTIMATION METHODOLOGY-GEC'2015

The present methodology used for resources assessment is known as Ground Water Resource Estimation Methodology – 2015 (GEC'2015). The revised methodology GEC 2015 recommends aquifer wise ground water resource assessment. Ground water resources have two components – Replenishable ground water resources or Dynamic ground water resources and In-storage resources or Static resources.GEC 2015 recommends estimation of Replenishable and in-storage ground water resources for both unconfined and confined aquifers. In GEC'2015, two approaches are recommended – water level fluctuation method and norms of rainfall infiltration method. The water level fluctuation method is based on the concept of storage change due to difference between various input and output components. Input refers to recharge from rainfall and other sources and subsurface inflow into the unit of assessment. Output refers to ground water draft, ground water evaporation, transpiration, base flow to streams and subsurface outflow from the unit. Since the data on subsurface inflow/ outflow are not readily available, it is advantageous to adopt the unit for ground water assessment as basin/ sub basin/ watershed, as the inflow / outflow across these boundaries may be taken as negligible.

Thus the ground water resources assessment unit is in general watershed particularly in hard rock areas. In case of alluvial areas, administrative block can also be the assessment unit. In each assessment unit, hilly areas having slope more than 20% are deleted from the total area to get the area suitable for recharge. Further, areas where the quality of ground water is beyond the usable limits should be identified and handled separately. The remaining area after deleting the hilly area and separating the area with poor ground water quality is to be delineated into command and non-command areas. Ground water assessment in command and non-command areas are done separately for monsoon and non-monsoon seasons.

3.1 Ground water Recharge

Monsoon season

Recharge from rainfall is estimated by using the following relationship -

Rrf = RFIF * A* (R – a)/1000

Where,

Rrf= Rainfall recharge in ham

A = Area in Hectares

RFIF = Rainfall Infiltration Factor

R = Rainfall in mm

a = Minimum threshold value above which rainfall induces ground water recharge in mm

The threshold limit of minimum and maximum rainfall event which can induce recharge to the aquifer is to be considered while estimating ground water recharge using rainfall infiltration factor method. The minimum threshold limit is in accordance with the relation shown in above equation and the maximum threshold limit is based on the premise that after a certain limit, the rate of storm rain is too high to contribute to infiltration and they will only contribute to surface runoff. It is suggested that 10% of Normal annual rainfall may be taken as minimum rainfall threshold and 3000 mm as maximum rainfall limit.

The resources assessment during monsoon season is estimated as the sum total of the change in storage and gross draft. The change in storage is computed by multiplying water level fluctuation between pre and post monsoon periods with the area of assessment and specific yield. Monsoon recharge can be expressed as –

$$R_{RF} = h \times Sy \times A - R_{OS} \pm VF \pm LF + GE + T + E + B$$

Where,

h = rise in water level in the monsoon season, A = area for computation of recharge,

Sy = specific yield, D_G = gross ground water draft, R_{OS}= Other sources of ground water recharge during monsoon season include R_c, R_{sw}, R_t, R_{gw}, R_{wc} which are recharge from seepage from canals, surface water irrigation, tanks and ponds, ground water irrigation, water conservation structures respectively; LF = Recharge through Lateral flow/ Through flow across assessment unit boundary in the monsoon season for the i^{th} particular year, VF – Vertical inter aquifer flow in the monsoon season for the i^{th} particular year, T- Transpiration in the monsoon season for the i^{th} particular year, E- Evaporation in the monsoon season for the i^{th} particular year, GE = Ground water extraction in monsoon season for the i^{th} particular year, B = Base flow the monsoon season for the i^{th} particular year

The monsoon ground water recharge has two components – rainfall recharge and recharge from other sources. Mathematically it can be represented as –

$$R(Normal) = R_{RF}\,(normal) + R_{OS}$$

Where,

R_{rf} is the normal monsoon rainfall recharge. R_{OS} is the other sources of ground water recharge during monsoon season include R_c, R_{sw}, R_t, R_{gw}, R_{wc} which are recharge from seepage from canals, surface water irrigation, tanks and ponds, ground water irrigation, water conservation structures respectively

The rainfall recharge during monsoon season computed by Water Level Fluctuation (WLF) method is compared with recharge figures from Rainfall Infiltration Factor (RIF) method. In case the difference between the two sets of data are more than 20%, then RIF figure is considered, otherwise monsoon recharge from WLF is adopted. While adopting the rainfall recharge figures, weightage is to be given to WLF method over adhoc norms method of RIF. Hence, wherever the difference between RIF & WLF is more than 20%, data have to be scrutinized and corrected accordingly.

Non-Monsoon season

During non-Monsoon season, rainfall recharge is computed by using Rainfall Infiltration Factor (RIF) method. Recharge from other sources is then added to get total non-Monsoon recharge. In case of areas receiving less than 10% of the annual rainfall during non-monsoon season, the rainfall recharge is ignored.

Total annual ground water recharge

The total annual ground water recharge of the area is the sum-total of monsoon and non-monsoon recharge. An allowance is kept for natural discharge in the non-monsoon season by deducting 5% of total annual ground water recharge, if WLF method is employed to compute rainfall recharge during monsoon season and 10% of total annual ground water recharge if RIF method is employed. The balance ground water available accounts for existing ground water withdrawal for various uses and potential for future development. This quantity is termed as Annual Extractable Ground Water Resources.

Annual Extractable Ground Water Resources (AEGR) = Annual Ground Water Recharge – Natural discharge during non-monsoon season

Norms for estimation of recharge

GEC'2015 methodology has recommended norms for various parameters being used in ground water recharge estimation. These norms vary depending upon water bearing formations and agroclimatic conditions. While norms for specific yield and recharge from rainfall values are to be adopted within the guidelines of GEC'2015, in case of other parameters like seepage from canals, return flow from irrigation, recharge from tanks & ponds, water conservation structures, results of specific case studies may replace the adhoc norms.

3.2 Ground Water Extraction

The gross yearly ground water extraction is to be calculated for Irrigation, Domestic and Industrial uses. The gross ground water extraction would include the ground water extraction from all existing ground water structures during monsoon as well as during non-monsoon period. While the number of ground water structures should preferably be based on latest well census, the average unit draft from different types of structures should be based on specific studies or ad-hoc norms given in GEC2015 report.

3.3 Stage of ground water Extraction & Categorization of units

The stage of Ground water Development is defined by,

Stage of Ground water = Existing Gross Ground water extraction for all uses **X** 100

Extraction (%) AEGR

Validation of Stage of Ground Water Extraction

The assessment based on the stage of ground water extraction has inherent uncertainties. It is desirable to validate the 'Stage of Ground Water Extraction' with long term trend of ground water levels.

If the ground water resource assessment and the trend of long term water levels contradict each other, this anomalous situation requires a review of the ground water resource computation, as well as the reliability of water level data. The mismatch conditions are enumerated below.

SOGWE	Ground Water Level Trend	Remarks
≤70%	Significant decline in trend in both pre-monsoon and post-monsoon	Not acceptable and needs reassessment
>100%	No significant decline in both pre-monsoon and post-monsoon long term trend	Not acceptable and needs reassessment

Categorisation of Assessment Units

As emphasised in the National Water Policy, 2012, a convergence of Quantity and Quality of ground water resources is required while assessing the ground water status in an

assessment unit. Therefore, it is recommended to separate estimation of resources where water quality is beyond permissible limits for the parameter salinity.

Categorisation of Assessment Units Based on Quantity

The categorisation based on status of ground water quantity is defined by Stage of Ground Water Extractions given below:

Stage of Ground Water Extraction	**Category**
≤70%	Safe
>70%and ≤90%	Semi-Critical
>90%and ≤100%	Critical
> 100%	Over Exploited

Categorisation of Assessment Units Based on Quality

The committee recommends that each assessment unit, in addition to the quantity based categorisation (safe, semi-critical, critical and over-exploited) should bear a quality hazard identifier. Such quality hazards are to be based on available ground water monitoring data of State Ground Water Departments and/or Central Ground Water Board. If any of the three quality hazards in terms of Arsenic, Fluoride and Salinity are encountered in the assessment sub unit in mappable units, the assessment sub unit may be tagged with the particular quality hazard.

3.4 Allocation of ground water resource for utilization

The net annual ground water availability is to be apportioned between domestic, industrial and irrigation uses. Among these, as per the National Water Policy, 2002, requirement for domestic water supply is to be accorded priority. The requirement for domestic and industrial water supply is to be kept based on population as projected to the year 2025. The water available for irrigation use is obtained by deducting the allocation for domestic and industrial use, from the net annual ground water availability.

3.5 Poor quality ground water

Computation of ground water recharge in poor quality ground water is to be done on the same line as described above. However, in saline areas, there may be practical difficulty due to non availability of data, as there will usually be no observation wells in such areas. Recharge assessment in such cases may be done based on rainfall infiltration factor method.

3.6 Apportioning of ground water assessment from watershed to development unit

Where the assessment unit is a watershed, the ground water assessment is converted in terms of an administrative unit such as block/ taluka/ mandal. This is done by converting the volumetric resource into depth unit and then multiplying this depth with the corresponding area of the block.

3.7 Additional Potential Recharge

In shallow water table areas, particularly in discharge areas, rejected recharge would be considerable and water level fluctuation are subdued resulting in under-estimation of recharge component. In the area where the ground water level is less than 5m below ground level or in waterlogged areas, ground water resources have to be estimated upto 5m bgl only based on the following equation -

Potential ground water recharge = (5-D) x A x Sp. Yield

Where,

D = Depth to water table below ground surface in pre-monsoon season in shallow aquifers;

A = Area of shallow water table zone.

The potential recharge from flood plain is estimated based on the same norms as for ponds, tanks and lakes.

4 PROCEDURE FOLLOWED IN THE PRESENT ASSESSMENT INCLUDING ASSUMPTIONS

4.1 Data source for each of the data element and how the data was used in the computation (constraint in the data base, if any)

In the present report, block has been taken as the smallest administrative unit for resources computation.

The following sub-units have been considered for computation of various figures as per GEC-2015 methodology.

The total geographical area of the blocks and block-wise population of 2011 were taken from 2011 Census report. The population data of 2011 is projected for population of 2022 and 2025. Ground water draft for drinking and domestic purposes was calculated as per population. All the data were provided by the nodal department PWD (WR). The monthly rainfall data was used for recharge from rainfall. Block-wise number of ground water abstraction structures for irrigation, drinking and domestic purposes was used for calculating draft as per structures. Deep tube wells and artesian wells were considered to calculate the area under groundwater irrigation. But only shallow tube wells were considered for calculating draft for irrigation from phreatic aquifer. Draft for Industrial extraction has been calculated as per unit draft provided by the firm for issuance of NOC approvals to Central Groundwater Authority. Water level data of CGWB has been utilized for calculating recharge by WLFM and long term water level trend used for categorization of blocks.

Constraints in database- block-wise area irrigated by different structures were not available. Data regarding ground water structures is not complete because there are thousands of private shallow tube wells which have not come under present ground water structure / spot sources survey.

4.2 Changes, if any, applied in the original methodology proposed by GEC along with justification

Return flow from ground water has not been considered for monsoon season, as there is enough rainfall during monsoon and ground water irrigation is not practiced. There is no major or medium irrigation scheme in Tripura. Entire area has been considered as non-command area.

Water spread area, days of water availability (monsoon & non-monsoon) and seepage from ponds & tanks given in the methodology have been used to determine the seepage from ponds & tanks for monsoon & non-monsoon separately. Since the aquifer remains fully

saturated during the periods of intensive rainfall, additional recharge from ponds & tanks during this period is negligible. Recharge from ponds and tanks during non-monsoon period are considered for 212 days. Computation factor for seepage from ponds & tanks is taken as 0.00144 m/day as per GEC-2015 methodology.

Categorization was done based on stage of groundwater extraction and validation. Validation was done.

4.3 Various norms used in the computation

The unit of computation proposed in the methodology is "watershed". However, it also recommends blocks/ tehsil as the unit for the first few years since there can be non-availability of data. In the present report block- the smallest administrative unit is taken as the unit of computation. This is mainly due to lack of data especially on number of ground water structures, draft, population and other vital figures on watershed basis.

The rainfall infiltration factor recommended by GEC 2015 for sandstone is 0.12. For calculating recharge from return flow from irrigation, an average water requirement of 1m & 0.1m for paddy & non-paddy has been taken from Agriculture department, Govt. of Tripura. Computation factor for return flow from ground water irrigation is taken as 0.25 – 0.45 and from surface water irrigation is taken as 0.30 – 0.50 as per GEC'2015 methodology.

Ground water drafts for various uses in the different subunits have been estimated and according to the recommended methodology. Ground water draft for domestic use has been estimated based on the number of different types of ground water abstraction structures and their unit draft per year and also as per population of 2011. The unit draft of dug well is 0.2 ham and unit draft of shallow tubewell (fitted with hand pumps) is 0.12 ham during monsoon and 0.48 ham during non-monsoon period.

Block-wise ground water draft for irrigation was estimated based on the number of structures of shallow tubewell and the unit draft of shallow tubewell fitted with pump. Ground water in the state is mostly used for domestic & irrigational purposes. Groundwater for Industrial extraction has been calculated as per unit draft provided by the firm for issuance of NOC approvals to Central Groundwater Authority.

The major potential aquifer in the state is Tipam sandstone and the specific yield value for Tipam sandstone is taken as 0.08 (from GEC'2015 Methodology).

4.4 Any documented field studies

No field study has carried out so far to measure unit draft of different structures, rainfall infiltration etc.

5. COMPUTATION OF GROUND WATER RESOURCES IN TRIPURA STATE

Ground water resources of Tripura state have been computed according to the methodology and norms described above. The block-wise details have been provided in Annexures.

a. Salient features of the dynamic ground water resources assessments.

The smallest administrative unit 'block' is taken as the unit of computation. Total number of assessment units in Tripura is 59. The resource computations presented in this report is for the ground water year 2021 – 2022 (1st June, 2021 to 31st May, 2022). Population data of 2011 collected from Census report 2011 and projected population of 2022 and 2025 were worked out. Rainfall data collected for 2018-2022. Ground water abstraction structure for irrigation and for drinking and domestic was provided by PWD (WR), Govt. of Tripura.

b. Assessment sub-unit-wise method adopted for computing rainfall recharge during monsoon season (WLF/RIF).

Recharge from Rainfall has been computed separately for monsoon and non-monsoon periods for the entire state. The recharge from rainfall during monsoon season has been computed using both water level fluctuation method (WLFM) and rainfall infiltration method (RIFM). The results from the above two methods (WLFM & RIFM) have been compared using Percent Deviation (PD). After the computation of the percent deviation (PD) it is found that in out of 59 assessment units, 50 units were considered by RIF method and 9 units by WLF method.

c. Total resources of the state, existing development, balance available for future development etc.

Total ground water recharge is estimated after deducting resultant flow from evaporation and transpiration, and it is 1.18 BCM. Annual extractable groundwater resources are estimated after deducting natural discharge, and it is 1.06 BCM. Ground water extraction for various uses has been estimated for all the assessment units of Tripura. Gross annual ground water extraction for all uses in Tripura is 0.103 BCM and allocation for domestic up to year 2025 is 0.09 BCM. Balance groundwater resources available for future development are 0.09 BCM. The stage of development of Tripura is 9.7 % and all the 59 blocks / assessment units (including 1 non-block, Agartala) in Tripura state falls under **SAFE** category.

d. Spatial variation of the Ground water recharge and development scenario in Tripura

Annual Extractable ground water resources in the state are of the order of 1.06 BCM. Maximum annual extractable ground water resource of 0.18 BCM is found in Gomati district while the minimum of 0.176 BCM is in North Tripura district.

Ground water extraction is done mainly through dug wells and shallow tubewells from unconfined aquifer in the state. The stage of ground water extraction in Tripura is 9.7%. Agartala MC is having the highest stage of ground water extraction of 55.72% while the minimum is 2.49 %, in Karbook block.

e. Comparison with earlier ground water resources estimate and reasons for significant departure from earlier estimates.

A comparison is made between the previous estimate as on March 2020 and present estimate based on GEC'15 as on 2022, and presented in tabular statement given below.

Comparison between ground water resources estimation for Tripura for previous (2019-2020) and present (2021-2022)

Sl. No.	**ITEM**	**Year, 2019-20**	**Year, 2021-22**	**COMPARISON**
	Estimation	**INGRES**	INGRES	
1	Total Annual Ground Water Recharge (BCM)	1.38	1.18	- 0.19
2	Annual Extractable Ground Water Resources (BCM)	1.24	1.06	-0.18
3	Irrigation Draft (BCM)	0.02	0.02	No change
4	Domestic Draft (BCM)	0.08	0.08	No change
5	Stage of GW Extraction (%)	8 %	9.7 %	+ 1.7
6	Provision for Domestic (BCM)	0.086	0.086	No change
7	GW availability for future development	1.13	0.95	-0.18

8	No. of **SAFE** Units	59	59	No change
9	No. of O.E. Units	0	0	No change
10	No. of Dark/ Critical units	0	0	No change

f. Ground water recharge in poor ground water quality zone.

As there is no poor quality zone in Tripura so annual ground water recharge is not assessed.

g. Additional annual potential recharge.

Additional potential recharge is computed for shallow water table areas. Area under shallow water table is calculated from water level maps prepared by CGWB. Additional annual potential recharge in the state is 0.50 BCM.

6. AUTOMATION OF ESTIMATION OF DYNAMIC GROUND WATER RESOURCES USING GEC-2015

The computation of the resource estimation of Tripura for the year 2019-20 is done through IN-GRES software (India Ground Water Resource Estimation System). IN-GRES is the common portal to input, estimate, analyze, and access static and dynamic groundwater resources. India GEC system will take Data Input through Excel as well as through Forms, compute various Ground water components (recharge, draft, flux, etc.), classify assessment unit into appropriate categories and develop visibility dashboards for each of the components. System allows user to view the data in both MIS as well as GIS view. User can also download the reports in formats like CGWB, etc.

India GEC system is divided into 3 modules – Input, Computation and Output.

i. Input module – Input Module refers to the Data Entry module at an Assessment Unit level. Data Input is done via 2 methods i.e.

a. Excel based input – In this, the user needs to download District level data sheet template where he/she can fill the data at an Assessment Unit level. User now needs to upload their fully filled excel sheet into the system.

b. Form based input – In this, the user is shown a form and he/she can fill/edit the data in data sheet in an online mode. Once user is done with editing online, he/she can submit the data file.

ii. Computation module – Computation Module refers to the ground water calculations for an assessment unit. These computations are based on GEC 2015 methodology and are used to calculate Annual Extractable Ground Water Resource, Total Current Annual Ground Water Extraction (utilization) and the percentage of ground water utilization with respect to recharge (stage of Ground Water Extraction) for an assessment unit. Based on these percentages an assessment unit is categorized into SAFE, SEMI-CRITICAL, CRITICAL AND OVEREXPLOITED categories.

iii. Output module Once categorized the data is shown in two views:

a. MIS Dashboard – MIS dashboard shows the results of the assessment for the entire India, and also State wise in tabular form. The MIS dashboard shows all type of recharges,

extractions, inflows and outflows computed for both monsoon and non-monsoon periods of the year and then reflect the overall stage of extraction at the selected Geo-Zoom Level.

b. GIS Dashboard – GIS dashboard shows the data in Web Geo-Server format, implemented in interactive GIS platform allowing user to all GEC related information in the map itself. GIS view represents the data on India map and color codes each block/Assessment unit based on the categorization

Appendix - I: Constitution of Committee for Assessment of Dynamic Ground Water Resources as on 2022

GOVERNMENT OF TRIPURA
PUBLIC WORKS DEPARTMENT (WR)
KUNJABAN : AGARTALA

NO.F.15(76)/SE/WRPC/ 1700-11 Date - 16 / 02 / 2022.

MEMORANDUM

Sub: Constitution of State Level Committee for assessment of Dynamic Ground Water Resources as on 2022.

In accordance with the approval of the Government, a State Level Committee for assessment of Dynamic Ground Water Resources, 2022 in Tripura, is hereby constituted with the following officials : -

1.	Secretary/ Pr. Secretary, PWD, Tripura.	Chairman
2.	Conservator of Forest, Territorial, Tripura	Member
3.	Regional Director, CGWB, NE Region, Guwahati	**Member Secretary**
4.	Chief Engineer, PWD(WR), Tripura.	Member
5.	Chief Engineer, PWD(DWS), Tripura.	Member
6.	Chief Engineer, Agriculture, Tripura.	Member
7.	Chief Engineer, RD, Tripura.	Member
8.	Director, Industries, Tripura.	Member
9.	Scientist-B/Engineer Tripura Space Applications Centre, Gurkhabasti	Member
10.	General Manager, NABARD, Tripura.	Member
11.	Officer-In-Charge, CGWB, State Unit, Tripura.	Member
12.	Executive Engineer W.R. Investigation Division, PWD(WR), Kunjaban	**Nodal Officer cum Member**

The broad Terms of Reference of the Committee would be as follows :

(i) To estimate annual replenishable ground water resources of the State in accordance with the Ground Water Resources Estimation Methodology.
(ii) To estimate the status of utilization of the annual replenishable ground water resources.

//
DEPUTY SECRETARY
PWD(Water Resources)
Kunjaban, Agartala

Forwarded to-

1. The Secretary, PWD, Tripura for information please.
2. The Conservator of Forest, Territorial, Aranya Bhawan, Gurkhabasti for information please.
3. The Regional Director, CGWB, NE Region, Guwahati for information please.
4. The Chief Engineer, PWD(WR), Kunjaban for information please.
5. The Chief Engineer, PWD(DWS), Gurkhabasti for information please.
6. The Chief Engineer, Agriculture, Krishi Bhawan, Agartala for information please.
7. The Chief Engineer, RD, Gurkhabasti for information please.
8. The Director, Industries, Agartala for information please.
9. The Head of Office (DDO), Tripura State Council for Science & Technology, Gurkhabasti for information please.
10. The General Manager, NABARD, Agartala for information please.
11. The Officer-In-Charge, State Unit, CGWB, Agartala for information please.
12. The Executive Engineer, WR Investigation Division. Kunjaban for information please.

16/02/2022

DEPUTY SECRETARY
PWD(Water Resources)
Kunjaban, Agartala

Appendix - II: Minutes of the meeting of the State level Committee (SLC) on of Dynamic Ground Water Resources of Tripura, as on March, 2022, held on 2nd Sept. 2022.

MINUTES OF THE MEETING OF THE STATE LEVEL COMMITTEE (SLC) ON DYNAMIC GROUND WATER RESOURCE ASSESSMENT OF TRIPURA AS ON MARCH 2022

Date: 2nd September 2022 **Time: 12.30 PM.**

Venue: Conference Hall No.1, Secretariat Complex, Agartala

A meeting of State Level Committee (SLC) on Dynamic Ground Water Resource Assessment of Tripura as on March 2022 was convened on 2nd September 2022 at 12.30 hrs at the Conference Hall No.1, Secretariat Complex, Agartala.

The meeting was chaired by Kiram Gitte, IAS, Secretary to the Govt. of Tripura, PWD, Tripura & Chairman of SLC. The Chairman of the SLC welcomed all the members of SLC present in the meeting. List of members attended in the meeting is enclosed as Annexure-I.

Sri Suresh Chandra Kapil, Regional Director & Member Secretary, SLC-GWRA (Tripura) welcomed all the representative members of the SLC. He highlighted that Ground Water Resources of Tripura has been carried out jointly by Central Ground Water Board, SUO, Agartala and PWD (Water Resources), Tripura (State Nodal Department) in coordination with other members/departments of SLC.

Member Secretary, SLC briefed about computation of dynamic ground water resources of Tripura through IN-GRES software. Groundwater Resources Estimation System (IN-GRES)" is a software/web-based application developed by CGWB in collaboration with Vassar Lab, IIT-Hyderabad.

The member Secretary informed that earlier this dynamic groundwater resource estimation work was done manually through out the country. Later it was observed that some minor computational error might have occurred in calculating the resource, as the process of dynamic groundwater resource estimation is a complicated and lengthy. So, to overcome this human error, Ministry of Jal Shakti in collaboration with IIT Hyderabad developed the software IN-GRES (INDIA GROUNDWATER RESOURCE ESTIATION SOFTWARE). He also highlighted that socio-economic condition of the state may be enhanced through sustainable development of groundwater by the statkeholders.

With due permission of the Chair, presentation of the Dynamic Groundwater resources of Tripura as on March 2022 was made by Ritu Kumari Oraon, Scientist-B, CGWB, SUO, Agartala along with State Nodal Officer, Biswajit Saha, Executive Engineer (Water Resources), Tripura, Ms H V Sophia Kay, CGWB, SUO, Agartala, Sri Rupam Chattaraj, Asst. Hydrogeologist and Dr. S S Singh, Scientist-D, OIC, GWRA, NER.

With due permission of the Chair, committee members of SLC discussed in detail on the methodology of resource estimation, various factors utilized / considered as per norm or otherwise, constrains of non-availability of various field data, source of various field data utilized for resource calculation etc.

After thorough discussion all the members of the State Level Committee (SLC) has agreed and accepted upon the figures in the draft report of Dynamic Ground Water Resources of Tripura for the Assessment Year 2021-22 as on March 2022.

02/09/2022

Suresh Chandra Kapil
Regional Director, CGWB NER
& Member Secretary, SLC

Kiran Gitte, IAS
Secretary to the Govt. of Tripura
PWD & Chairman, SLC

ANNEXURE I

LIST OF MEMBERS PRESENT IN THE MEETING ON DYNAMIC GROUND WATER RESOURCES ASSESSMENT OF TRIPURA FOR THE ASSESSMENT YEAR 2021-22 AS ON MARCH 2022

Date: 2nd September 2022 **Time: 12:30AM .**

Venue: Conference Hall No.1, Secretariat Complex, Agartala

Sl. No.	Name & Designation	Department	Contact No.	Email Mail	Signature
1	**Kiran Gitte, IAS** Secretary to the Govt. of Tripur, PWD & Chairman SLC	PWD, Tripura	+91-9527828282	kirangitteias@gmail.com	
2	Sri Suresh Chandra Kapil, Regional Director & Member Secretary, SLC-GWRA	CGWB NER Guwahati	+91-9459397465	rdner-cgwb@nic.in	
3	Sutirtha Paul State Geologist	I&C	940210 1415	jimipaul@rediffmail.com	
4	S. L. Bhowmik	PWS	88372535 85		
5	Sr. M. DAS CE, PHE&WR	PHE(WR)	8416098244		
6	Bisurajinfra.	PWD (WR)	9436135789.	bSahaBue@gmail'Com.	
7	Binay Debbarma (A.E) O/O The C.E. Deptt. of Agriculture & F.W.	Department of Agriculture & F.W.	9436736509		02/09/22
8	Sanjib@as, IFS DCF HQ.	Forest.	7630049150	dcfhq.tripura@gmail.com	2.9.22

9	Vivek Kr. Mishra Water Resources & Environment Sp.	TWD-TRESP PMU	9711875970	wev.tresp@gmail.com	
10	~~Suresh Chandra~~ Deputy RD				
11	Ritu K Oraon Scientist-B	CGWB SUO Agartala	9174841017	ritu.oraon-cgwb@gov.in	
12	Rupam Chattaraj. Asst. Hydrogeologist	CGWB SUO, Agartala	8770420238	R.Chattaraj-cgwb@gov.in	Chattaraj.
13	Dr. S. S. SINGH Scientist - D (HG)	CGWB, NER Ghy-3	9435546 166	sss153@rediffmail.com	
14	ANIL PUROHIT	DGM NABARD	77188 40513	agartala@nabard.org	
15	Er Swapan Kr Das CE, RD Dept	Rural Dev. Department	9436123475	Swapan.kumar@nic.in	2/3/2022
16	H. V. Sophia kay Scientist 'B'	CGWB, SUO, Agartala	9654357231	veikhosophia@gmail.com	02/09/2022
17					
18					
19					
20					
21					
22					

Figures:

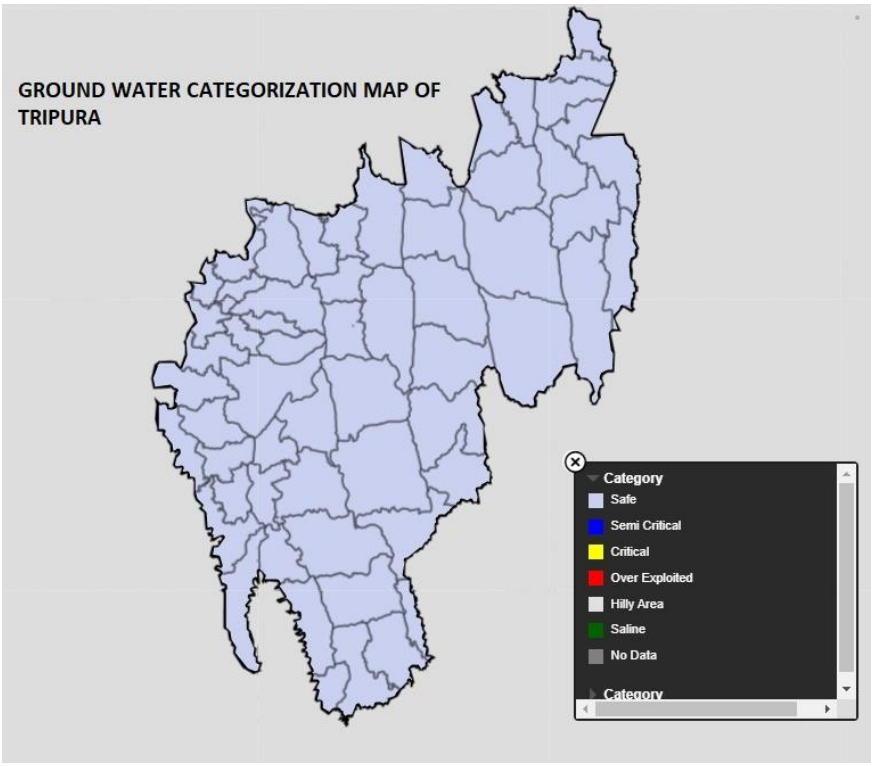

Figure 1: Ground Water Categorization Map of Tripura

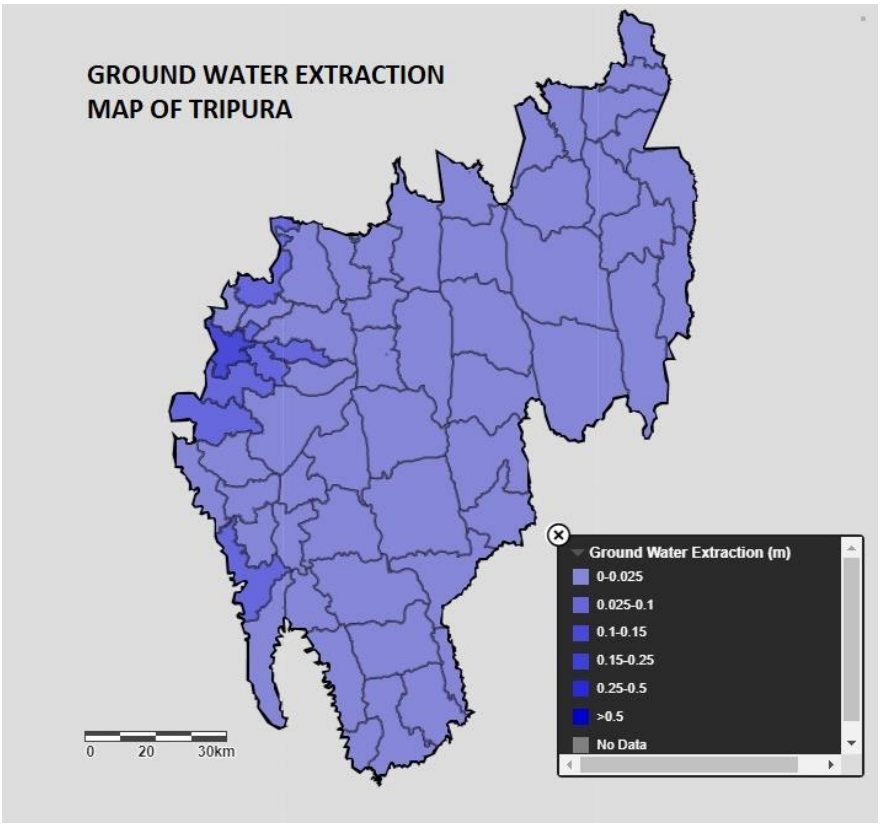

Figure 2: Ground Water Extraction Map of Tripura

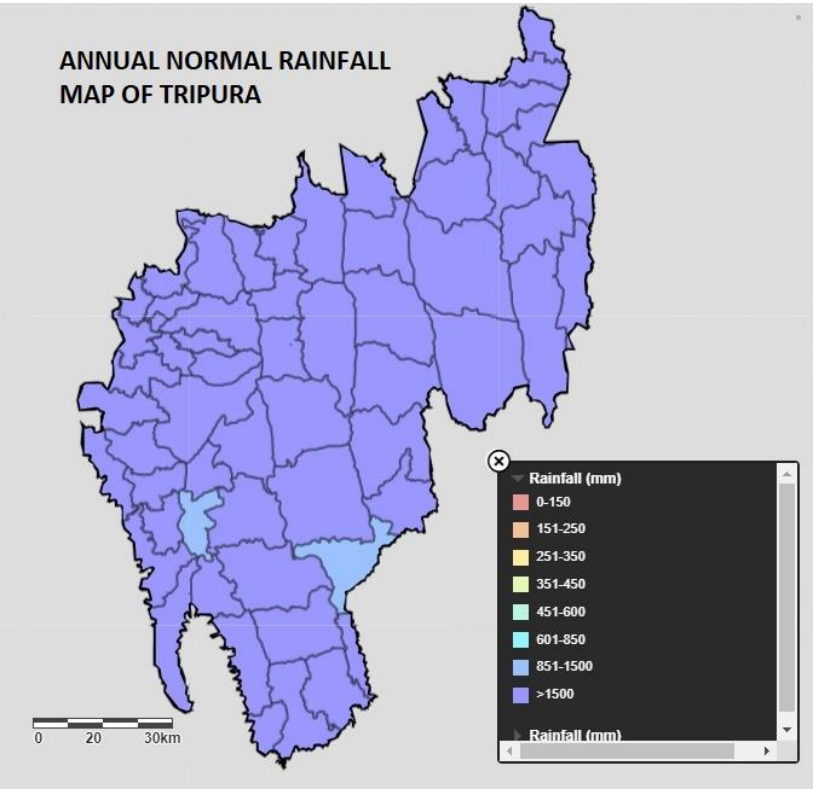

Figure 3: Annual Normal Rainfall Map of Tripura

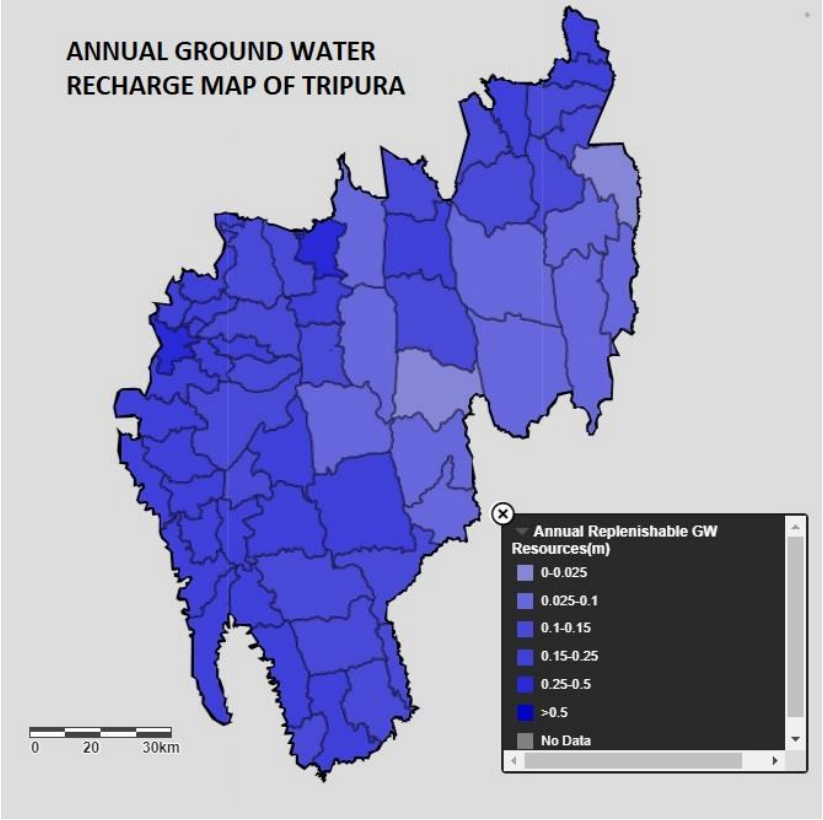

Figure 4: Annual Ground Water Recharge Map of Tripura

Annexure 1(A) : General description of the Ground Water Assessment Unit of Tripura State (2021-22)

Type of Ground Water Assessment Unit (Watershed/ Block/ Taluka/ Mandal): **Block**

Sl.No	Ground Water Assessment Unit(Block)	Type of rock formation	Areal extent (in hectares)						
			Total geographical area	Hilly area	Ground Water Recharge worthy area			Water logged and shallow water Table	Flood Prone Area
					Command area	Non command area	Poor ground water quality area		
1	2	3	4	5	6	7	8	9	10
	AMBASA	Semi consolidated Tertiary Sandstone	30556	17277	0	13279	0	9586.331	0
2	CHAWMANU	-Do-	45829	29646	0	16183	0	0	0
3	DUMBURNAGAR	-Do-	28157	15850	0	12307	0	8137.222	0
4	DURGACHOWMOHANI	-Do-	14587	8685	0	5902	0	5902	0
5	GANGANAGAR	-Do-	25624	21086	0	4538	0	0	0
6	MANU	-Do-	46331	20000	0	26331	0	17159.45	26.21283
7	RAISHYABARI	-Do-	16958	9050	0	7908	0	6254.94	0
8	SALEMA	-Do-	23447	10314	0	13133	0	6735.903	0
	DHALAI		**231489**	**131908**		**99581**		**53775.85**	**26.21283**
9	AMARPUR	-Do-	41046	14255	0	26791	0	18024.29	76.98782
10	KAKRABAN	-Do-	10378	3000	0	7378	0	2792.872	2650.748
11	KARBOOK	-Do-	21468	6083	0	15385	0	8287.26	1.69203
12	KILLA	-Do-	19372	3075	0	16297	0	5921.817	1.314528
13	MATABARI	-Do-	22880	5022	0	17858	0	14735.13	1335.302
14	OMPI	-Do-	30511	15045	0	15466	0	6471.781	0

Sl.No	Ground Water Assessment Unit(Block)	Type of rock formation	Areal extent (in hectares)						
			Total geographical area	Hilly area	Ground Water Recharge worthy area			Water logged and shallow water Table	Flood Prone Area
					Command area	Non command area	Poor ground water quality area		
1	2	3	4	5	6	7	8	9	10
15	SILACHHARI	-Do-	7394	2919	0	4475	0	3300	0
16	TEPANIA	-Do-	8656	2478	0	6178	0	6178	0
	GOMATI		**161705**	**51877**		**109828**		**65711.15**	**4066.044**
17	KALYANPUR	-Do-	10153	2900	0	7253	0	5125.439	1200.286
18	KHOWAI	-Do-	10173	188	0	9985	0	7289.606	5069.027
19	MUNGIAKAMI	-Do-	29292	18109	0	11183	0	0	11.19807
20	PADMABIL	-Do-	11904	5375	0	6529	0	2981.489	504.0109
21	TELIAMURA	-Do-	13262	7113	0	6149	0	4628.879	68.38303
22	TULASIKHAR	-Do-	26461	18000	0	8461	0	268.5418	172.0679
	KHOWAI		**101245**	**51685**		**49560**		**20293.95**	**7024.973**
23	DAMCHHERA	-Do-	18510	17100	0	1410	0	1115.437	0
24	DASDA	-Do-	37545	27146	0	10399	0	5408.466	0
25	JAMPUI HILL	-Do-	18889	14434	0	4455	0	0	0
26	JUBARAJNAGAR	-Do-	14386	5635	0	8751	0	8424.596	649.2693
27	KADAMTALA	-Do-	9578	80	0	9498	0	8271.708	8274.74
28	KALACHERRA	-Do-	7768	124	0	7644	0	7124.681	0
29	LALJURI	-Do-	19950	12806	0	7144	0	4813.428	0
30	PANISAGAR	-Do-	9166	4085	0	5081	0	3387.038	0
	NORTH TRIPURA		**135792**	**81410**		**54382**		**38545.35**	**8924.01**
31	BISHALGARH	-Do-	14998	1266	0	13732	0	10971.12	1623.757
32	BOXANAGAR	-Do-	11806	754	0	11052	0	10850.18	33.66306
33	CHARILAM	-Do-	12675	1202	0	11473	0	10077.11	674.6016

Sl.No	Ground Water Assessment Unit(Block)	Type of rock formation	Areal extent (in hectares)						
			Total geographical area	Hilly area	Ground Water Recharge worthy area			Water logged and shallow water Table	Flood Prone Area
					Command area	Non command area	Poor ground water quality area		
1	2	3	4	5	6	7	8	9	10
34	JAMPUIJALA	-Do-	30652	5075	0	25577	0	20125.61	5.621784
35	KANTHALIA	-Do-	15580	3750	0	11830	0	9537.071	1198.811
36	MOHANBHOG	-Do-	8716	2593	0	6123	0	2618.701	0
37	NALCHAR	-Do-	9965	2582	0	7383	0	6190.67	3762.437
	SEPAHIJALA		**104392**	**17222**		**87170**		**70370.46**	**7298.891**
38	BAGAFA	-Do-	30219	11209	0	19010	0	11139.06	0
39	BHARAT CH NAGAR	-Do-	12209	3682	0	8527	0	8225.191	0
40	HRISHYAMUKH	-Do-	18260	6250	0	12010	0	11217.27	0
41	JOLAIBARI	-Do-	23601	10941	0	12660	0	11977.18	0
42	POANGBARI	-Do-	7415	3150	0	4265	0	3336.056	0
43	RAJNAGAR	-Do-	20822	4640	0	16182	0	9657.491	0
44	RUPAICHARI	-Do-	18485	10125	0	8360	0	7908.815	0
45	SATCHAND	-Do-	20190	3101	0	17089	0	14555.09	0
	SEPAHIJALA		**151201**	**53098**		**98103**		**78016.15**	**0**
46	CHANDIPUR	-Do-	12845	4619	0	8226	0	4511.076	0
47	GOURNAGAR	-Do-	12195	3431	0	8764	0	7668.934	7802.68
48	KUMARGHAT	-Do-	24697	7175	0	17522	0	15536.98	1297.99
49	PENCHARTHAL	-Do-	15966	7600	0	8366	0	5502.253	0
	UNAKOTI		**65703**	**22825**		**42878**		**33219.24**	**9100.67**
50	AMC	-Do-	7650	0	0	7650	0	7644.634	3139.125
51	BAMUTIA	-Do-	5471	0	0	5471	0	5393.427	
52	BELBARI	-Do-	9655	2744	0	6911	0	6123.342	

Sl.No	Ground Water Assessment Unit(Block)	Type of rock formation	Areal extent (in hectares)						
			Total geographical area	Hilly area	Ground Water Recharge worthy area			Water logged and shallow water Table	Flood Prone Area
					Command area	Non command area	Poor ground water quality area		
1	2	3	4	5	6	7	8	9	10
53	DUKLI	-Do-	10445	497	0	9948	0	9600.939	3028.398
54	HEZAMARA	-Do-	18366	7500	0	10866	0	2241.795	
55	JIRANIA	-Do-	5630	953	0	4677	0	3866.003	204.721
56	LEFUNGA	-Do-	4942	1416	0	3526	0	2182.982	
57	MANDWI	-Do-	18073	6250	0	11823	0	10095.69	
58	MOHANPUR	-Do-	10886	0	0	10886	0	6209.971	339.5832
59	OLD AGARTALA	-Do-	6524	0	0	6524	0	6391.899	
	WEST TRIPURA		**97642**	**19360**		**78282**		**59750.69**	**6711.827**
TOTAL	**TRIPURA**		**1049169**	**429385**	**0**	**619784**	**0**	**359932.2**	**43152.63**

Annexure 1(B): Data variables used in Dynamic Ground Water Resources of the Tripura State (2021-22)

Sl.No.	District	Assessment Unit	Command/ Non-command/ Poor GW Quality	Normal Annual Rainfall (mm)	Average Pre-monsoon Water level (mgbl)	Average Post-monsoon Water Level (mgbl)	Average Fluctuation (m)
1	DHALAI	AMBASA	Non command	2238.20	4.56	2.31	2.25
2	DHALAI	CHAWMANU	- Do -	1793.27	3.80	2.19	1.61
3	DHALAI	DUMBURNAGAR	- Do -	1531.72	3.57	1.71	1.86
4	DHALAI	DURGACHOWMOHANI	- Do -	2238.20	3.97	2.48	1.49
5	DHALAI	GANGANAGAR	- Do -	1531.72	3.34	1.90	1.44
6	DHALAI	MANU	- Do -	1793.27	3.80	2.19	1.61
7	DHALAI	RAISHYABARI	- Do -	1531.72	3.57	1.71	1.86
8	DHALAI	SALEMA	- Do -	2238.20	4.56	2.31	2.25
9	GOMATI	AMARPUR	- Do -	1877.86	2.98	2.35	0.63
10	GOMATI	KAKRABAN	- Do -	1425.85	9.95	9.25	0.70
11	GOMATI	KARBOOK	- Do -	1357.70	2.98	2.35	0.63
12	GOMATI	KILLA	- Do -	1880.99	2.78	1.95	0.83
13	GOMATI	MATABARI	- Do -	1880.99	2.88	1.16	1.72
14	GOMATI	OMPI	- Do -	1877.86	2.78	1.95	0.83
15	GOMATI	SILACHHARI	- Do -	1877.86	4.83	3.49	1.34
16	GOMATI	TEPANIA	- Do -	1803.24	3.79	2.43	1.36
17	KHOWAI	KALYANPUR	- Do -	1832.78	4.28	3.93	0.35
18	KHOWAI	KHOWAI	- Do -	1958.89	1.98	1.84	0.14
19	KHOWAI	MUNGIAKAMI	- Do -	1832.78	4.41	2.08	2.33
20	KHOWAI	PADMABIL	- Do -	1958.89	7.28	5.65	1.63

Sl.No.	District	Assessment Unit	Command/ Non-command/ Poor GW Quality	Normal Annual Rainfall (mm)	Average Pre-monsoon Water level (mgbl)	Average Post-monsoon Water Level (mgbl)	Average Fluctuation (m)
21	KHOWAI	TELIAMURA	- Do -	1832.78	3.53	2.35	1.18
22	KHOWAI	TULASIKHAR	- Do -	1958.89	4.41	2.08	2.33
23	NORTH TRIPURA	DAMCHHERA	- Do -	1835.76	0.00	0.00	0.00
24	NORTH TRIPURA	DASDA	- Do -	1835.76	3.93	2.48	1.45
25	NORTH TRIPURA	JAMPUI HILL	- Do -	1835.76	0.00	0.00	0.00
26	NORTH TRIPURA	JUBARAJNAGAR	- Do -	2043.36	2.72	1.87	0.85
27	NORTH TRIPURA	KADAMTALA	- Do -	2043.36	2.24	1.31	0.93
28	NORTH TRIPURA	KALACHERRA	- Do -	2043.36	1.90	0.86	1.04
29	NORTH TRIPURA	LALJURI	- Do -	1835.76	4.76	3.32	1.44
30	NORTH TRIPURA	PANISAGAR	- Do -	2043.36	4.23	3.04	1.19
31	SEPAHIJALA	BISHALGARH	- Do -	1780.41	3.38	2.19	1.19
32	SEPAHIJALA	BOXANAGAR	- Do -	2006.62	3.61	1.90	1.71
33	SEPAHIJALA	CHARILAM	- Do -	1780.41	3.38	2.19	1.19
34	SEPAHIJALA	JAMPUIJALA	- Do -	1780.41	3.90	2.30	1.60
35	SEPAHIJALA	KANTHALIA	- Do -	2006.62	3.49	1.87	1.62
36	SEPAHIJALA	MOHANBHOG	- Do -	2006.62	3.33	2.40	0.93
37	SEPAHIJALA	NALCHAR	- Do -	2006.62	3.33	2.40	0.93
38	SOUTH TRIPURA	BAGAFA	- Do -	1903.15	4.17	2.93	1.24

Sl.No.	District	Assessment Unit	Command/ Non-command/ Poor GW Quality	Normal Annual Rainfall (mm)	Average Pre-monsoon Water level (mgbl)	Average Post-monsoon Water Level (mgbl)	Average Fluctuation (m)
39	SOUTH TRIPURA	BHARAT CH NAGAR	- Do -	1903.15	4.09	2.96	1.13
40	SOUTH TRIPURA	HRISHYAMUKH	- Do -	2185.63	4.20	2.87	1.33
41	SOUTH TRIPURA	JOLAIBARI	- Do -	1903.15	4.39	3.31	1.08
42	SOUTH TRIPURA	POANGBARI	- Do -	2481.35	4.33	3.26	1.07
43	SOUTH TRIPURA	RAJNAGAR	- Do -	2185.63	3.38	2.19	1.19
44	SOUTH TRIPURA	RUPAICHARI	- Do -	2481.35	4.83	3.49	1.34
45	SOUTH TRIPURA	SATCHAND	- Do -	2481.35	4.06	3.25	0.81
46	UNAKOTI	CHANDIPUR	- Do -	1935.54	2.03	1.51	0.52
47	UNAKOTI	GOURNAGAR	- Do -	1935.54	5.45	2.00	3.45
48	UNAKOTI	KUMARGHAT	- Do -	1935.54	4.67	3.24	1.43
49	UNAKOTI	PENCHARTHAL	- Do -	1935.54	5.75	4.04	1.71
50	WEST TRIPURA	AMC	- Do -	1883.25	6.71	4.21	2.50
51	WEST TRIPURA	BAMUTIA	- Do -	1883.25	3.97	2.99	0.98
52	WEST TRIPURA	BELBARI	- Do -	1685.97	3.00	2.28	0.72
53	WEST TRIPURA	DUKLI	- Do -	1883.25	5.03	3.63	1.40
54	WEST TRIPURA	HEZAMARA	- Do -	1883.25	6.19	4.62	1.57

Sl.No.	District	Assessment Unit	Command/ Non-command/ Poor GW Quality	Normal Annual Rainfall (mm)	Average Pre-monsoon Water level (mgbl)	Average Post-monsoon Water Level (mgbl)	Average Fluctuation (m)
55	WEST TRIPURA	JIRANIA	- Do -	1685.97	3.00	2.28	0.72
56	WEST TRIPURA	LEFUNGA	- Do -	1883.25	3.97	2.99	0.98
57	WEST TRIPURA	MANDWI	- Do -	1685.97	5.23	3.73	1.50
58	WEST TRIPURA	MOHANPUR	- Do -	1883.25	3.97	2.99	0.98
59	WEST TRIPURA	OLD AGARTALA	- Do -	1685.97	3.00	2.28	0.72
TOTAL	TRIPURA			1905.90			

Annexure 2 (A): Assessment of Dynamic Ground Water Resources of the Tripura State (2021-2022)

Sl. No	Assessment Unit Name (Block)	Monsoon		Non Monsoon		Total Annual Ground Water Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Current Annual Groundwater Extraction				Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)
		Recharge from Rainfall	Recharge from Other Sources	Recharge from Rainfall	Recharge from Other Sources				Irrigation	Industrial	Domestic	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	AMBASA	2268.34	122.63	839.23	192.84	3423.04	171.15	3110.35	18.60	1.19	94.43	114.22	103.48	2987.08	3.67
2	CHAWMANU	1833.47	27.36	494.14	136.65	2491.62	249.16	1772.28	0.00	0.00	82.07	82.07	89.94	1682.34	4.63
3	DUMBURNAGAR	1715.75	49.15	303.99	138.30	2207.19	110.36	1791.05	3.15	0.00	90.45	93.60	99.12	1688.77	5.23
4	DURGA CHOWMOHANI	716.11	179.53	373.01	354.68	1623.33	162.33	1081.26	51.81	1.43	121.84	175.07	133.52	894.5	16.19
5	GANGANAGAR	482.76	0	112.09	28.36	623.21	31.16	482.02	0.00	0.00	79.19	79.19	86.78	395.25	16.43
6	MANU	2983.20	131.42	804.00	330.18	4248.80	424.88	2939.08	13.23	0.00	205.37	218.60	225.05	2700.8	7.44
7	RAISHYABARI	1161.00	4.93	195.33	34.26	1395.52	139.55	1226.87	3.78	0.00	54.48	58.26	59.7	1163.39	4.75
8	SALEMA	2291.63	126.24	830.00	274.17	3522.04	176.10	3232.81	34.65	0.00	195.84	230.49	214.61	2983.55	7.13
9	AMARPUR	4273.54	281.73	782.46	942.39	6280.12	314.00	5408.59	20.79	0.00	129.41	150.20	137.21	5250.59	2.78
10	KAKRABAN	781.66	189.48	32.82	747.13	1751.09	175.12	1558.00	7.20	0.00	172.24	179.44	182.63	1368.17	11.52
11	KARBOOK	2395.84	111.66	8.73	368.08	2884.31	288.43	2555.54	1.89	0.00	61.66	63.55	65.38	2488.27	2.49
12	KILLA	1935.07	92.26	524.00	415.41	2966.74	296.67	2247.45	63.12	0.00	93.59	156.71	99.23	2085.1	6.97
13	MATABARI	2120.42	182.14	574.19	760.57	3637.32	363.74	2567.48	10.80	1.06	233.51	245.37	247.58	2308.04	9.56
14	OMPI	1869.14	107.16	451.70	370.92	2798.92	279.89	2485.07	6.30	0.00	88.38	94.68	93.71	2385.06	3.81
15	SILACHHARI	540.83	9.2	130.70	63.21	743.94	74.39	652.89	1.26	0.00	42.08	43.34	44.62	607.01	6.64
16	TEPANIA	710.12	43.69	181.83	224.64	1160.28	116.03	958.52	5.40	0.00	61.31	66.71	65	888.12	6.96
17	KALYANPUR	1000.53	169.49	275.61	629.83	2075.46	207.54	1867.92	111.00	0.00	104.53	215.53	109.9	1647.02	11.54
18	KHOWAI	1404.20	196.61	473.51	797.05	2871.37	287.14	2372.76	57.60	0.00	145.87	203.47	153.35	2161.82	8.57
19	MUNGIAKAMI	1828.52	58.88	424.95	142.06	2454.41	122.72	2327.69	13.20	0.00	65.46	78.66	68.81	2245.68	3.38
20	PADMABIL	870.11	38.18	309.62	126.40	1344.31	67.21	1267.36	10.20	0.00	79.74	89.94	83.84	1173.31	7.10

Sl. No	Assessment Unit Name (Block)	Monsoon		Non Monsoon		Total Annual Ground Water Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Current Annual Groundwater Extraction				Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)
		Recharge from Rainfall	Recharge from Other Sources	Recharge from Rainfall	Recharge from Other Sources				Irrigation	Industrial	Domestic	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
21	TELIAMURA	678.59	144.84	233.66	474.58	1531.67	153.16	1342.10	103.20	2.38	153.21	258.78	161.07	1075.46	19.28
22	TULASIKHAR	1427.86	70.78	401.24	178.43	2078.31	207.83	1841.26	11.40	0.00	97.53	108.93	102.54	1727.32	5.92
23	DAMCHHERA	199.21	20.01	49.28	100.54	369.04	36.90	307.32	3.00	0.00	64.20	67.20	68.94	235.38	21.87
24	DASDA	1175.35	82.66	363.46	187.88	1809.35	180.93	827.77	1.80	0.00	128.45	130.25	137.92	688.04	15.74
25	JAMPUI HILL	629.41	0	155.71	0.00	785.12	78.51	640.24	0.00	0.00	27.99	27.99	30.06	610.18	4.37
26	JUBARAJNAGAR	1268.48	117.72	448.13	274.12	2108.45	210.85	1608.78	0.00	1.46	158.10	159.56	169.76	1437.57	9.92
27	KADAMTALA	1376.76	100.49	486.39	167.25	2130.89	213.08	1363.04	21.60	0.00	216.69	238.29	232.66	1108.78	17.48
28	KALACHERRA	886.41	53.95	391.44	43.79	1375.59	137.56	826.17	2.40	0.36	167.62	170.38	179.97	643.44	20.62
29	LALJURI	807.45	17.41	249.69	174.88	1249.43	124.95	929.77	0.00	0.00	109.36	109.36	117.42	812.35	11.76
30	PANISAGAR	589.20	155.12	260.19	335.11	1339.62	133.96	1122.74	3.60	0.00	104.68	108.28	112.39	1006.75	9.64
31	BISHALGARH	1482.04	228.26	494.52	1122.69	3327.51	332.75	2701.46	241.20	0.48	178.64	420.31	187.8	2271.98	15.56
32	BOXANAGAR	1399.90	55.41	379.13	236.22	2070.66	207.07	1468.23	66.60	0.00	116.04	182.64	122	1279.63	12.44
33	CHARILAM	1238.23	74.84	413.16	420.07	2146.30	214.63	1653.03	66.60	1.04	194.46	262.10	204.45	1380.93	15.86
34	JAMPUIJALA	2760.42	96.84	921.08	367.26	4145.60	414.56	3108.03	27.00	0.59	102.52	130.11	107.78	2972.65	4.19
35	KANTHALIA	1498.45	132.25	405.82	661.15	2697.67	269.77	2330.30	297.60	0.00	140.24	437.84	147.43	1885.28	18.79
36	MOHANBHOG	775.57	146.29	210.04	619.65	1751.55	175.16	1565.29	1.20	0.00	106.98	108.18	112.47	1451.62	6.91
37	NALCHAR	935.17	134.51	253.27	625.90	1948.85	194.89	1537.24	3.60	0.00	165.63	169.23	174.13	1359.51	11.01
38	BAGAFA	2260.86	138.05	647.11	746.77	3792.79	379.28	2567.03	22.20	0.00	169.39	191.59	179.6	2365.23	7.46
39	BHARAT CH NAGAR	1014.12	82.96	290.26	470.22	1857.56	185.76	1167.99	15.75	0.95	75.37	92.07	79.91	1071.39	7.88
40	HRISHYAMUKH	1754.74	129.89	326.51	697.71	2908.85	290.88	2089.89	18.45	0.00	120.64	139.09	127.91	1943.53	6.66
41	JOLAIBARI	1505.65	197.28	430.95	853.71	2987.59	298.76	2493.15	27.00	0.00	117.60	144.60	124.69	2341.47	5.80
42	POANGBARI	712.09	0.27	125.85	42.86	881.07	88.11	688.17	3.00	0.00	60.96	63.96	64.63	620.54	9.29
43	RAJNAGAR	2705.55	33.8	439.94	289.56	3468.85	173.45	3115.13	105.00	0.00	140.14	245.14	148.59	2861.53	7.87

Sl. No	Assessment Unit Name (Block)	Monsoon		Non Monsoon		Total Annual Ground Water Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Current Annual Groundwater Extraction				Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)
		Recharge from Rainfall	Recharge from Other Sources	Recharge from Rainfall	Recharge from Other Sources				Irrigation	Industrial	Domestic	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
44	RUPAICHARI	1395.80	66.71	246.68	295.46	2004.65	200.46	1680.12	4.80	0.00	109.68	114.48	116.29	1559.04	6.81
45	SATCHAND	2853.20	211.05	504.25	827.36	4395.86	439.59	3781.34	3.75	0.89	138.87	143.51	147.24	3629.46	3.80
46	CHANDIPUR	943.30	112.46	349.36	303.63	1708.75	170.88	1305.54	0.00	0.00	151.14	151.14	162.28	1143.26	11.58
47	GOURNAGAR	1507.49	92.5	372.21	340.34	2312.54	231.25	1940.89	4.80	0.08	157.30	162.18	168.9	1767.1	8.36
48	KUMARGHAT	2009.30	234.99	744.17	609.13	3597.59	359.76	3097.38	0.00	0.00	240.58	240.58	258.31	2839.06	7.77
49	PENCHARTHAL	959.35	91.8	355.31	292.51	1698.97	169.90	1513.72	0.00	1.37	102.47	103.84	110.02	1402.34	6.86
50	AMC	1312.89	49.38	288.98	263.54	1914.79	191.48	1723.31	0.00	0.24	960.02	960.26	1017.9	705.17	55.72
51	BAMUTIA	625.95	36.94	206.67	140.78	1010.34	101.03	806.61	20.40	0.24	107.62	128.26	114.11	671.86	15.90
52	BELBARI	729.16	100.08	207.12	380.51	1416.87	141.68	1099.36	3.00	1.19	175.78	179.97	186.38	908.79	16.37
53	DUKLI	1138.18	134.95	375.79	541.55	2190.47	219.04	1902.84	240.00	16.05	216.15	472.20	229.18	1417.62	24.82
54	HEZAMARA	1347.89	71.77	410.47	224.55	2054.68	102.73	1916.75	2.40	0.00	81.50	83.90	86.41	1827.94	4.38
55	JIRANIA	493.45	76.97	140.17	501.01	1211.60	121.16	1000.95	103.20	0.72	85.50	189.42	90.65	806.38	18.92
56	LEFUNGA	403.42	42.07	133.20	202.07	780.76	78.08	684.15	0.00	12.15	107.62	119.77	114.11	557.89	17.51
57	MANDWI	1247.41	125.18	354.33	412.50	2139.42	213.94	1760.46	0.00	21.96	102.18	124.14	108.35	1630.15	7.05
58	MOHANPUR	1245.50	131.65	411.22	545.26	2333.63	233.37	1927.39	166.80	0.62	159.09	326.51	168.68	1591.28	16.94
59	OLD AGARTALA	688.33	69.68	195.52	361.18	1314.71	131.47	1016.78	88.20	2.30	119.97	210.47	127.21	799.07	20.70
	Total	81164.37	5983.55	21794.19	22408.86	131350.97	11866.19	106356.71	2113.53	68.73	8133.36	10315.62	8663.60	95510.84	9.70

Annexure 2(B): Comparison of Ground Water Resources (2019-2020) and (2021-2022)

COMPARISION OF GROUND WATER RESOURCES (2019-2020) and (2021-2022)													
		Total Annual Ground Water Recharge (ham)			Annual Extractable Ground Water Recsource (ham)			Total Current Annual Ground Water Extraction (ham)			Stage of Ground Water Extraction (%)		
S.No	District	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff
1	AMBASA	3576.76	3423.04	-153.72	3217.55	3110.35	-107.20	98.53	114.22	15.69	3.06	3.67	0.61
2	CHAWMANU	3272.09	2491.62	-780.47	1932.46	1772.28	-160.18	79.16	82.07	2.91	4.1	4.63	0.53
3	DUMBURNAGAR	2852.16	2207.19	-644.97	1653.66	1791.05	137.39	87.25	93.60	6.35	5.28	5.23	-0.05
4	DURGA CHOWMOHANI	2107.96	1623.33	-484.63	1632.9	1081.26	-551.64	153.77	175.07	21.30	9.42	16.19	6.77
5	GANGANAGAR	866.73	623.21	-243.52	780.06	482.02	-298.04	76.39	79.19	2.80	9.79	16.43	6.64
6	MANU	5630.54	4248.80	-1381.74	4625.72	2939.08	-1686.64	198.1	218.60	20.50	4.28	7.44	3.16
7	RAISHYABARI	1800.9	1395.52	-405.38	1088.06	1226.87	138.81	52.55	58.26	5.71	4.83	4.75	-0.08
8	SALEMA	3523.05	3522.04	-1.01	3166.03	3232.81	66.78	188.91	230.49	41.58	5.97	7.13	1.16
9	AMARPUR	5886	6280.12	394.12	4843.97	5408.59	564.62	126.1	150.20	24.10	2.6	2.78	0.18
10	KAKRABAN	2209.94	1751.09	-458.85	1988.94	1558.00	-430.94	175.05	179.44	4.39	8.8	11.52	2.72
11	KARBOOK	3105.71	2884.31	-221.40	2739.56	2555.54	-184.02	60.08	63.55	3.47	2.19	2.49	0.30
12	KILLA	3458.77	2966.74	-492.03	3101.05	2247.45	-853.60	151.8	156.71	4.91	4.9	6.97	2.07
13	MATABARI	4625.42	3637.32	-988.10	4223.23	2567.48	-1655.75	238.46	245.37	6.91	5.65	9.56	3.91
14	OMPI	3137.71	2798.92	-338.79	2685.78	2485.07	-200.71	86.12	94.68	8.56	3.21	3.81	0.60
15	SILACHHARI	948.9	743.94	-204.96	854.01	652.89	-201.12	41.01	43.34	2.33	4.8	6.64	1.84
16	TEPANIA	1357.82	1160.28	-197.54	1215.35	958.52	-256.83	65.14	66.71	1.57	5.36	6.96	1.60
17	KALYANPUR	2001.79	2075.46	73.67	1801.61	1867.92	66.31	213.2	215.53	2.33	11.83	11.54	-0.29
18	KHOWAI	2592.16	2871.37	279.21	2184.2	2372.76	188.56	200.21	203.47	3.26	9.17	8.57	-0.60
19	MUNGIAKAMI	2482.72	2454.41	-28.31	2358.59	2327.69	-30.90	77.19	78.66	1.47	3.27	3.38	0.11
20	PADMABIL	1702.1	1344.31	-357.79	1617	1267.36	-349.64	88.16	89.94	1.78	5.45	7.10	1.65
21	TELIAMURA	1698.5	1531.67	-166.83	1528.65	1342.10	-186.55	255.35	258.78	3.43	16.7	19.28	2.58
22	TULASIKHAR	2043.96	2078.31	34.35	1941.76	1841.26	-100.50	106.75	108.93	2.18	5.5	5.92	0.42
23	DAMCHHERA	432.63	369.04	-63.59	386.64	307.32	-79.32	65.33	67.20	1.87	16.9	21.87	4.97

COMPARISION OF GROUND WATER RESOURCES (2019-2020) and (2021-2022)													
		Total Annual Ground Water Recharge (ham)			Annual Extractable Ground Water Recsource (ham)			Total Current Annual Ground Water Extraction (ham)			Stage of Ground Water Extraction (%)		
S.No	District	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff
24	DASDA	2580.42	1809.35	-771.07	1545.39	827.77	-717.62	126.49	130.25	3.76	8.18	15.74	7.56
25	JAMPUI HILL	1066.51	785.12	-281.39	959.86	640.24	-319.62	27.17	27.99	0.82	2.83	4.37	1.54
26	JUBARAJNAGAR	2372.05	2108.45	-263.60	1796.28	1608.78	-187.50	154.92	159.56	4.64	8.62	9.92	1.30
27	KADAMTALA	2439.23	2130.89	-308.34	1799.59	1363.04	-436.55	232	238.29	6.29	12.89	17.48	4.59
28	KALACHERRA	1851.27	1375.59	-475.68	1304.89	826.17	-478.72	165.48	170.38	4.90	12.68	20.62	7.94
29	LALJURI	1548.3	1249.43	-298.87	1295.71	929.77	-365.94	106.16	109.36	3.20	8.19	11.76	3.57
30	PANISAGAR	1739.47	1339.62	-399.85	1462.66	1122.74	-339.92	105.21	108.28	3.07	7.19	9.64	2.45
31	BISHALGARH	3328.87	3327.51	-1.36	2980.72	2701.46	-279.26	416.31	420.31	4.00	13.97	15.56	1.59
32	BOXANAGAR	2183.17	2070.66	-112.51	1606.4	1468.23	-138.17	180.04	182.64	2.60	11.21	12.44	1.23
33	CHARILAM	2271.77	2146.30	-125.47	2024.41	1653.03	-371.38	257.75	262.10	4.35	12.73	15.86	3.13
34	JAMPUIJALA	4774.08	4145.60	-628.48	4243.65	3108.03	-1135.62	127.22	130.11	2.89	3	4.19	1.19
35	KANTHALIA	2654.62	2697.67	43.05	2329.34	2330.30	0.96	434.7	437.84	3.14	18.66	18.79	0.13
36	MOHANBHOG	1707.15	1751.55	44.40	1532	1565.29	33.29	105.79	108.18	2.39	6.91	6.91	0.00
37	NALCHAR	1980.06	1948.85	-31.21	1782.05	1537.24	-244.81	165.52	169.23	3.71	9.29	11.01	1.72
38	BAGAFA	4090.82	3792.79	-298.03	3266.47	2567.03	-699.44	187.26	191.59	4.33	5.73	7.46	1.73
39	BHARAT CH NAGAR	1907.01	1857.56	-49.45	790.6	1167.99	377.39	74.4	92.07	17.67	9.41	7.88	-1.53
40	HRISHYAMUKH	2701.85	2908.85	207.00	2431.67	2089.89	-341.78	126.56	139.09	12.53	5.2	6.66	1.46
41	JOLAIBARI	3158.45	2987.59	-170.86	2791.63	2493.15	-298.48	141.59	144.60	3.01	5.07	5.80	0.73
42	POANGBARI	1029.96	881.07	-148.89	921.59	688.17	-233.42	62.4	63.96	1.56	6.77	9.29	2.52
43	RAJNAGAR	3098.48	3468.85	370.37	2658.29	3115.13	456.84	241.56	245.14	3.58	9.09	7.87	-1.22
44	RUPAICHARI	2300.23	2004.65	-295.58	2028.7	1680.12	-348.58	111.68	114.48	2.80	5.51	6.81	1.30
45	SATCHAND	5014.37	4395.86	-618.51	4502.27	3781.34	-720.93	135.93	143.51	7.58	3.02	3.80	0.78
46	CHANDIPUR	2130.36	1708.75	-421.61	1717.05	1305.54	-411.51	146.71	151.14	4.43	8.54	11.58	3.04
47	GOURNAGAR	2527.3	2312.54	-214.76	2365.03	1940.89	-424.14	157.55	162.18	4.63	6.66	8.36	1.70
48	KUMARGHAT	4556.67	3597.59	-959.08	3978.81	3097.38	-881.43	233.55	240.58	7.03	5.87	7.77	1.90
49	PENCHARTHAL	2353.24	1698.97	-654.27	2203.17	1513.72	-689.45	99.46	103.84	4.38	4.51	6.86	2.35

COMPARISION OF GROUND WATER RESOURCES (2019-2020) and (2021-2022)													
		Total Annual Ground Water Recharge (ham)			Annual Extractable Ground Water Recsource (ham)			Total Current Annual Ground Water Extraction (ham)			Stage of Ground Water Extraction (%)		
S.No	District	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff
50	AMC	1973.14	1914.79	-58.35	1775.83	1723.31	-52.52	935.91	960.26	24.35	52.7	55.72	3.02
51	BAMUTIA	1095.63	1010.34	-85.29	986.06	806.61	-179.45	123.86	128.26	4.40	12.56	15.90	3.34
52	BELBARI	1540.03	1416.87	-123.16	1386.02	1099.36	-286.66	172.8	179.97	7.17	12.47	16.37	3.90
53	DUKLI	2283.8	2190.47	-93.33	2055.42	1902.84	-152.58	449.61	472.20	22.59	21.87	24.82	2.95
54	HEZAMARA	2802.92	2054.68	-748.24	2521.3	1916.75	-604.55	80.57	83.90	3.33	3.2	4.38	1.18
55	JIRANIA	1081.54	1211.60	130.06	973.38	1000.95	27.57	185.26	189.42	4.16	19.03	18.92	-0.11
56	LEFUNGA	786.59	780.76	-5.83	707.93	684.15	-23.78	103.22	119.77	16.55	14.58	17.51	2.93
57	MANDWI	2934.67	2139.42	-795.25	2787.94	1760.46	-1027.48	98	124.14	26.14	3.52	7.05	3.53
58	MOHANPUR	2426.36	2333.63	-92.73	2164.96	1927.39	-237.57	320.83	326.51	5.68	14.82	16.94	2.12
59	OLD AGARTALA	1345.08	1314.71	-30.37	1210.58	1016.78	-193.80	203.26	210.47	7.21	16.79	20.70	3.91
	TRIPURA	146949.79	131350.97	-15598.82	124454.43	106356.71	-18097.72	9881.34	10315.62	434.28	8	9.70	1.70

Annexure 3A:

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN INDIA (2021-2022)												
S.No	**District**	**Total No. of Assessed Units**	**Safe**		**Semi-Critical**		**Critical**		**Over-Exploited**		**Saline**	
			Nos.	**%**	**Nos.**	**%**	**Nos.**	**%**	**Nos.**	**%**	**Nos.**	**%**
1	DHALAI	8	8	100	-	-	-	-	-	-	-	-
2	GOMATI	8	8	100	-	-	-	-	-	-	-	-
3	KHOWAI	6	6	100	-	-	-	-	-	-	-	-
4	NORTH TRIPURA	8	8	100	-	-	-	-	-	-	-	-
5	SEPAHIJALA	7	7	100	-	-	-	-	-	-	-	-
6	SOUTH TRIPURA	8	8	100	-	-	-	-	-	-	-	-
7	UNAKOTI	4	4	100	-	-	-	-	-	-	-	-
8	WEST TRIPURA	10	10	100	-	-	-	-	-	-	-	-
	Total States	59	59	100	-	-	-	-	-	-	-	-
	Grand Total	59	59	100	-	-	-	-	-	-	-	-

Annexure 3B

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN INDIA (2021-2022)													
S.No	States / Union Territories	Total Geographical Area in 1000 sq km	Recharge Worthy Area in 1000 sq km	Safe		Semi-Critical		Critical		Over-Exploited		Saline	
				Recharge Worthy Area in 1000 sq km	%	Recharge Worthy Area in 1000 sq km	%	Recharge Worthy Area in 1000 sq km	%	Recharge Worthy Area in 1000 sq km	%	Recharge Worthy Area in 1000 sq km	%
1	**DHALAI**	2.31489	0.99581	0.99581	100	-	-	-	-	-	-	-	-
2	**GOMATI**	1.61705	1.09828	1.09828	100	-	-	-	-	-	-	-	-
3	**KHOWAI**	1.01245	0.4956	0.4956	100	-	-	-	-	-	-	-	-
4	**NORTH TRIPURA**	1.35792	0.54382	0.54382	100	-	-	-	-	-	-	-	-
5	**SEPAHIJALA**	1.04392	0.8717	0.8717	100	-	-	-	-	-	-	-	-
6	**SOUTH TRIPURA**	1.51201	0.98103	0.98103	100	-	-	-	-	-	-	-	-
7	**UNAKOTI**	0.65703	0.42878	0.42878	100	-	-	-	-	-	-	-	-
8	**WEST TRIPURA**	0.97642	0.78282	0.78282	100	-	-	-	-	-	-	-	-
	Total States	10.49169	6.19784	6.19784	100	-	-	-	-	-	-	-	-
	Grand Total	10.49169	6.19784	6.19784	100	-	-	-	-	-	-	-	-

Annexure 3 C

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN INDIA (2021-2022)												
S.No	States / Union Territories	Annual extractable ground water resource in mcm	Safe		Semi-Critical		Critical		Over-Exploited		Saline	
			Annual extractable ground water resource in mcm	%	Annual extractable ground water resource in mcm	%	Annual extractable ground water resource in mcm	%	Annual extractable ground water resource in mcm	%	Annual extractable ground water resource in mcm	%
1	**DHALAI**	156.3572	156.3572	100	-	-	-	-	-	-	-	-
2	**GOMATI**	184.3354	184.3354	100	-	-	-	-	-	-	-	-
3	**KHOWAI**	110.1909	110.1909	100	-	-	-	-	-	-	-	-
4	**NORTH TRIPURA**	76.2583	76.2583	100	-	-	-	-	-	-	-	-
5	**SEPAHIJALA**	143.6358	143.6358	100	-	-	-	-	-	-	-	-
6	**SOUTH TRIPURA**	175.8282	175.8282	100	-	-	-	-	-	-	-	-
7	**UNAKOTI**	78.5753	78.5753	100	-	-	-	-	-	-	-	-
8	**WEST TRIPURA**	138.386	138.386	100	-	-	-	-	-	-	-	-
	Total States	1063.567	1063.567	100	-	-	-	-	-	-	-	-
	Grand Total	1063.567	1063.567	100	-	-	-	-	-	-	-	-

Annexure 4

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN TRIPURA (2021-2022)																			
S.No	States / Union Territories	Total 2019-2020	Total 2021-2022	Diff	Safe			Semi-Critical			Critical			Over-Exploited			Saline		
					2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff	2019-2020	2021-2022	Diff
1	DHALAI	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
2	GOMATI	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
3	KHOWAI	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
4	NORTH TRIPURA	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
5	SEPAHIJALA	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
6	SOUTH TRIPURA	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
7	UNAKOTI	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
8	WEST TRIPURA	1	1	0	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-
	TRIPURA	8	8	1	8	8	1	-	-	-	-	-	-	-	-	-	-	-	-

Annexure 4 A

CATEGORISATION OF ASSESSMENT UNIT, 2021-2022							
TRIPURA							
S.NO	**District**	**S.NO**	**Semi-Critical**	**S.NO**	**Critical**	**S.NO**	**Over-Exploited**
1	**DHALAI**		-		-		-
2	**GOMATI**		-		-		-
3	**KHOWAI**		-		-		-
4	**NORTH TRIPURA**		-		-		-
5	**SEPAHIJALA**		-		-		-
6	**SOUTH TRIPURA**		-		-		-
7	**UNAKOTI**		-		-		-
8	**WEST TRIPURA**		-		-		-

Annexure 4 B

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2021-2022							
TRIPURA							
S.NO	District	S.NO	Fluoride	S.NO	Arsenic	S.NO	Salinity
1	DHALAI		-		-		-
2	GOMATI		-		-		-
3	KHOWAI		-		-		-
4	NORTH TRIPURA		-		-		-
5	SEPAHIJALA		-		-		-
6	SOUTH TRIPURA		-		-		-
7	UNAKOTI		-		-		-
8	WEST TRIPURA		-		-		-
			-				

Annexure 4 C

CATEGORISATION OF ASSESSMENT UNIT, 2021-2022												
TRIPURA												
S.NO	**District**	**S.NO**	**Semi-Critical**	**S.NO**	**Critical**	**S.NO**	**Over-Exploited**	**S.NO**	**Fluoride**	**S.NO**	**Arsenic**	**S.NO**	**Salinity**
1	**DHALAI**		-		-		-		-		-		-
2	**GOMATI**		-		-		-		-		-		-
3	**KHOWAI**		-		-		-		-		-		-
4	**NORTH TRIPURA**		-		-		-		-		-		-
5	**SEPAHIJALA**		-		-		-		-		-		-
6	**SOUTH TRIPURA**		-		-		-		-		-		-
7	**UNAKOTI**		-		-		-		-		-		-
8	**WEST TRIPURA**		-		-		-		-		-		-

Attribute Table:

District	Assessment Unit Name	Recharge from Rainfall-Monsoon	Recharge from Other Sources-Monsoon	Recharge from Rainfall-Non-M	Recharge from Other Sources-Non-M	Total Annual Ground Water (Ham) Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Irrigation Use (Ham)	Industrial Use (Ham)	Domestic Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)	Categorization (OE/Critical/Semicritical/Safe)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Dhalai	Ambasa	2268.34	122.63	839.23	192.84	3281.50	171.15	3110.35	18.6	1.188	94.43061	114.22	103.48	2987.08	3.67225553	safe
Dhalai	Chawmanu	1833.47	27.36	494.14	136.65	2021.44	249.16	1772.28	0	0	82.070469	82.07	89.94	1682.34	4.63075812	safe
Dhalai	Dumburnagar	1715.75	49.15	303.99	138.3	1901.41	110.36	1791.05	3.15	0	90.453132	93.61	99.12	1688.77	5.22654309	safe
Dhalai	Durgachowmohani	716.11	179.53	373.01	354.68	1243.59	162.33	1081.26	51.81	1.4256	121.837365	175.08	133.52	894.5	16.1922202	safe
Dhalai	Ganganagar	482.76	0	112.09	28.36	513.18	31.16	482.02	0	0	79.186896	79.18	86.78	395.25	16.4267043	safe
Dhalai	Manu	2983.2	131.42	804	330.17	3363.96	424.88	2939.08	13.23	0	205.372287	218.6	225.05	2700.8	7.43770159	safe
Dhalai	Raishyabari	1161	4.93	195.33	34.27	1366.42	139.55	1226.87	3.78	0	54.476469	58.26	59.7	1163.39	4.74866938	safe
Dhalai	Salema	2291.63	126.24	830	274.18	3408.91	176.1	3232.81	34.65	0	195.844473	230.49	214.61	2983.55	7.12971069	safe
Gomati	Amarpur	4273.54	281.73	782.46	942.39	5722.59	314	5408.59	20.79	0	129.409947	150.2	137.21	5250.59	2.77706389	safe
Gomati	Kakraban	781.68	189.48	32.82	747.13	1733.12	175.12	1558	7.2	0	172.239777	179.44	182.63	1368.17	11.5173299	safe
Gomati	Karbook	2395.84	111.66	8.73	368.08	2843.97	288.43	2555.54	1.89	0	61.658793	63.55	65.38	2488.27	2.48675427	safe
Gomati	Killa	1935.07	92.26	524	415.41	2544.12	296.67	2247.45	63.12	0	93.587022	156.71	99.23	2085.1	6.97279139	safe
Gomati	Matabari	2120.42	182.14	574.19	760.57	2931.22	363.74	2567.48	10.8	1.06	233.506341	245.37	247.58	2308.04	9.55684173	safe
Gomati	Ompi	1869.14	107.16	451.7	370.92	2764.96	279.89	2485.07	6.3	0	88.37964	94.68	93.71	2385.06	3.80995304	safe
Gomati	Silachhari	540.83	9.2	130.7	63.21	727.28	74.39	652.89	1.26	0	42.08085	43.34	44.62	607.01	6.63817795	safe
Gomati	Tepania	710.12	43.69	181.83	224.64	1074.55	116.03	958.52	5.4	0	61.305984	66.71	65	888.12	6.95968785	safe
Khowai	Kalyanpur	1000.53	169.49	275.61	629.83	2075.46	207.54	1867.92	111	0	104.531985	215.53	109.9	1647.02	11.5385027	safe
Khowai	Khowai	1404.2	196.61	473.51	797.05	2659.90	287.14	2372.76	57.6	0	145.867797	203.46	153.35	2161.82	8.57482426	safe
Khowai	Mungiakami	1828.52	58.88	424.95	142.06	2450.41	122.72	2327.69	13.2	0	65.45691	78.66	68.81	2245.68	3.37931597	safe
Khowai	Padmabil	870.11	38.18	309.62	126.4	1334.57	67.21	1267.36	10.2	0	79.744689	89.95	83.84	1173.31	7.09743088	safe
Khowai	Teliamura	678.59	144.84	233.66	474.58	1495.26	153.16	1342.1	103.2	2.376	153.207801	258.78	161.07	1075.46	19.2817227	safe
Khowai	Tulasikhar	1427.86	70.78	401.24	178.43	2049.09	207.83	1841.26	11.4	0	97.529022	108.93	102.54	1727.32	5.91605748	safe
North Tripura	Damchhera	199.21	20.01	49.28	100.54	344.22	36.9	307.32	3	0	64.203354	67.2	68.94	235.38	21.8664584	safe
North Tripura	Dasda	1175.35	82.66	363.46	187.87	1008.70	180.93	827.77	1.8	0	128.454012	130.26	137.92	688.04	15.7362552	safe
North Tripura	Jampui Hill	629.41	0	155.71	0	718.75	78.51	640.24	0	0	27.994113	27.99	30.06	610.18	4.37179808	safe
North Tripura	Jubarajnagar	1268.48	117.72	448.13	274.12	1819.63	210.85	1608.78	0	1.4553	158.101794	159.55	169.76	1437.57	9.91745298	safe

District	Assessment Unit Name	Recharge from Rainfall-Monsoon	Recharge from Other Sources-Monsoon	Recharge from Rainfall-Non-M	Recharge from Other Sources-Non-M	Total Annual Ground Water (Ham) Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Irrigation Use (Ham)	Industrial Use (Ham)	Domestic Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)	Categorization (OE/Critical/Semicritical/Safe)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
North Tripura	Kadamtala	1376.76	100.49	486.39	167.25	1576.12	213.08	1363.04	21.6	0	216.69174	238.29	232.66	1108.78	17.4822456	safe
North Tripura	Kalacherra	886.41	53.95	391.44	43.79	963.73	137.56	826.17	2.4	0.3564	167.619753	170.38	179.97	643.44	20.6228742	safe
North Tripura	Laljuri	807.45	17.41	249.69	174.88	1054.72	124.95	929.77	0	0	109.362906	109.36	117.42	812.35	11.7620487	safe
North Tripura	Panisagar	589.2	155.12	260.19	335.11	1256.70	133.96	1122.74	3.6	0	104.675868	108.28	112.39	1006.75	9.64426314	safe
Sepahijala	Bishalgarh	1482.04	228.26	494.52	1122.69	3034.21	332.75	2701.46	241.2	0.4752	178.637643	420.32	187.8	2271.98	15.558994	safe
Sepahijala	Boxanagar	1399.9	55.41	379.13	236.22	1675.30	207.07	1468.23	66.6	0	116.040654	182.64	122	1279.63	12.4394679	safe
Sepahijala	Charilam	1238.23	74.84	413.16	420.08	1867.66	214.63	1653.03	66.6	1.0395	194.464773	262.11	204.45	1380.93	15.8563365	safe
Sepahijala	Jampuijala	2760.42	96.84	921.08	367.25	3522.59	414.56	3108.03	27	0.594	102.519594	130.12	107.78	2972.65	4.18657478	safe
Sepahijala	Kanthalia	1498.45	132.25	405.82	661.15	2600.07	269.77	2330.3	297.6	0	140.23665	437.83	147.43	1885.28	18.788568	safe
Sepahijala	Mohanbhog	775.57	146.29	210.04	619.65	1740.45	175.16	1565.29	1.2	0	106.981938	108.18	112.47	1451.62	6.9111794	safe
Sepahijala	Nalchar	935.17	134.51	253.27	625.9	1732.13	194.89	1537.24	3.6	0	165.627072	169.23	174.13	1359.51	11.0086909	safe
South Tripura	Bagafa	2260.86	138.05	647.11	746.77	2946.31	379.28	2567.03	22.2	0	169.389711	191.59	179.6	2365.23	7.46348893	safe
South Tripura	Bharat Ch Nagar	1014.12	82.96	290.26	470.22	1353.75	185.76	1167.99	15.75	0.9504	75.367098	92.06	79.91	1071.39	7.8819168	safe
South Tripura	Hrishyamukh	1754.74	129.89	326.51	697.7	2380.77	290.88	2089.89	18.45	0	120.635055	139.09	127.91	1943.53	6.65537421	safe
South Tripura	Jolaibari	1505.65	197.28	430.95	853.71	2791.91	298.76	2493.15	27	0	117.597744	144.59	124.69	2341.47	5.7994906	safe
South Tripura	Poangbari	712.09	0.27	125.85	42.86	776.28	88.11	688.17	3	0	60.957117	63.96	64.63	620.54	9.29421509	safe
South Tripura	Rajnagar	2705.55	33.8	439.94	289.56	3288.58	173.45	3115.13	105	0	140.144013	245.15	148.59	2861.53	7.86965552	safe
South Tripura	Rupaichari	1395.8	66.71	246.68	295.46	1880.58	200.46	1680.12	4.8	0	109.678266	114.47	116.29	1559.04	6.81320382	safe
South Tripura	Satchand	2853.2	211.05	504.25	827.36	4220.93	439.59	3781.34	3.75	0.891	138.872718	143.51	147.24	3629.46	3.79521545	safe
Unakoti	Chandipur	943.3	112.46	349.36	303.63	1476.42	170.88	1305.54	0	0	151.140222	151.14	162.28	1143.26	11.5768188	safe
Unakoti	Gournagar	1507.49	92.5	372.21	340.33	2172.14	231.25	1940.89	4.8	0.08	157.303539	162.19	168.9	1767.1	8.35647564	safe
Unakoti	Kumarghat	2009.3	234.99	744.17	609.13	3457.14	359.76	3097.38	0	0	240.582231	240.59	258.31	2839.06	7.76753256	safe
Unakoti	Pencharthal	959.35	91.8	355.31	292.51	1683.62	169.9	1513.72	0	1.37	102.466377	103.83	110.02	1402.34	6.85926063	safe
West Tripura	AMC	1312.89	49.38	288.98	263.54	1914.79	191.48	1723.31	0	0.2376	960.018715	960.26	1017.9	705.17	55.7218376	safe
West Tripura	Bamutia	625.95	36.94	206.67	140.78	907.64	101.03	806.61	20.4	0.2376	107.622513	128.26	114.11	671.86	15.901117	safe
West Tripura	Belbari	729.16	100.08	207.12	380.51	1241.04	141.68	1099.36	3	1.188	175.783635	179.97	186.38	908.79	16.3704337	safe
West Tripura	Dukli	1138.18	134.95	375.79	541.55	2121.88	219.04	1902.84	240	16.05	216.145773	472.19	229.18	1417.62	24.8150133	safe

District	Assessment Unit Name	Recharge from Rainfall-Monsoon	Recharge from Other Sources-Monsoon	Recharge from Rainfall-Non-M	Recharge from Other Sources-Non-M	Total Annual Ground Water (Ham) Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resource (Ham)	Irrigation Use (Ham)	Industrial Use (Ham)	Domestic Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stage of Ground Water Extraction (%)	Categorization (OE/Critical/ Semicritical/Safe)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
West Tripura	Hezamara	1347.89	71.77	410.47	224.55	2019.48	102.73	1916.75	2.4	0	81.50085	83.9	86.41	1827.94	4.37720099	safe
West Tripura	Jirania	493.45	76.97	140.17	501.01	1122.11	121.16	1000.95	103.2	0.72	85.500009	189.42	90.65	806.38	18.9240222	safe
West Tripura	Lefunga	403.42	42.07	133.2	202.07	762.23	78.08	684.15	0	12.15	107.622513	119.77	114.11	557.89	17.5063948	safe
West Tripura	Mandwi	1247.41	125.18	354.33	412.5	1974.40	213.94	1760.46	0	21.96	102.184524	124.14	108.35	1630.15	7.05156607	safe
West Tripura	Mohanpur	1245.5	131.65	411.22	545.26	2160.76	233.37	1927.39	166.8	0.6237	159.085323	326.52	168.68	1591.28	16.9410446	safe
West Tripura	Old Agartala	688.33	69.68	195.52	361.18	1148.25	131.47	1016.78	88.2	2.297295	119.972799	210.47	127.21	799.07	20.6996597	safe

***Assessment Units: Block**