

FIELD REPORT
ON
TUIRIAL HYDRO ELECTRIC PROJECT
PAPER- XI



EXAMINED

SUBMITTED BY :

MALSAWMKIMI

ROLL NO - 1705BA050

DEPARTMENT OF GEOGRAPHY
GOVERNMENT AIZAWL NORTH COLLEGE
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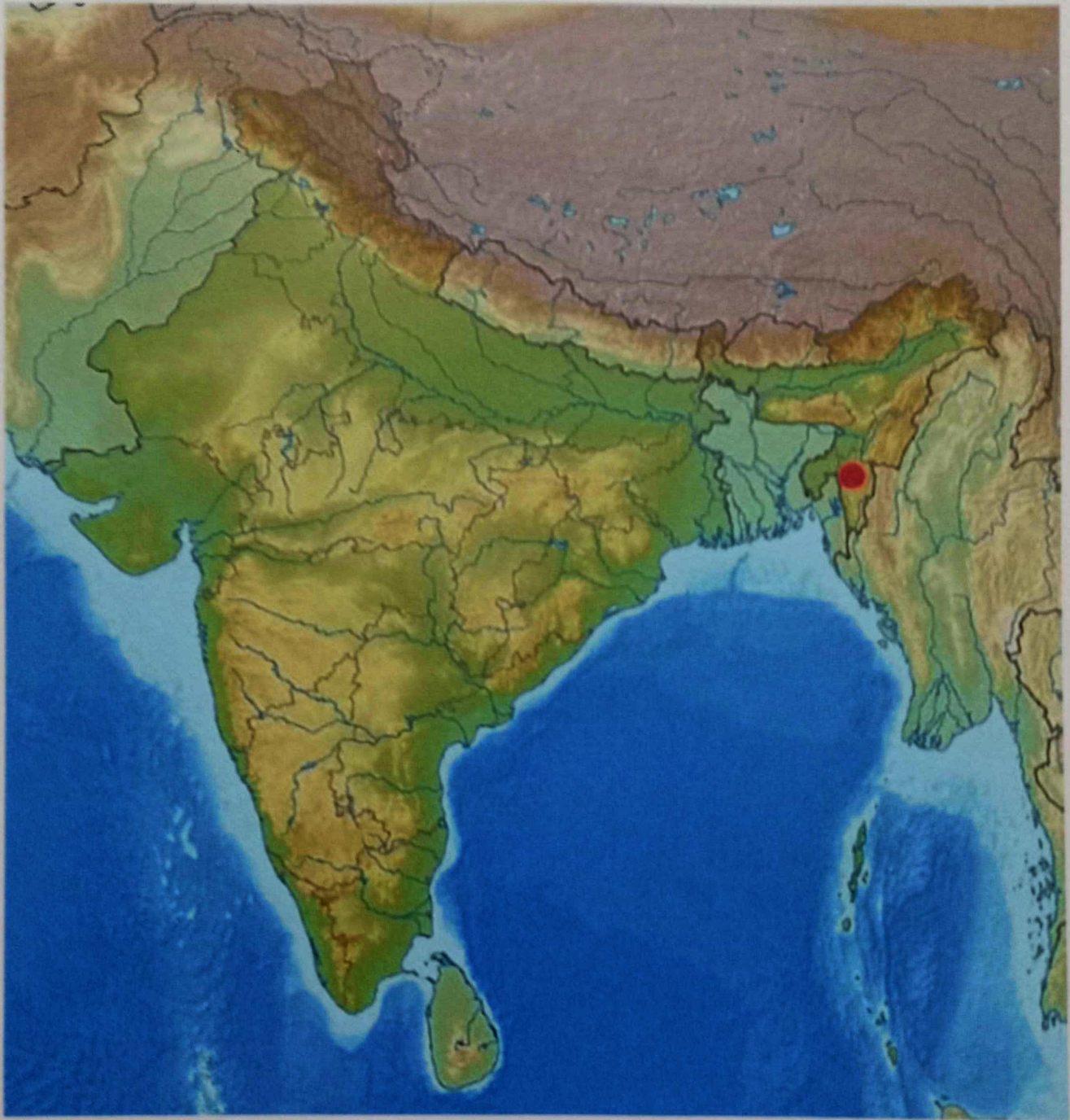
INTRODUCTION OF THE STUDY AREA

We, the students from Aizawl North College visits Tuirial Hydro Electric Project on 4th March,2020. We were altogether 41 students along with 2 teachers. The title of our study was,"A survey to Tuirial Hydro Electric Project".

Tuirial Hydro Electric Project is an earthfill and gravity dam on the River Sonai near Kolasib in the state of Mizoram in India.The catchment of Tuirial has an area of 1860 km² and located in the centre of Mizoram.The Tuirial river falls over 1500m between its source and Tuirial Dam Site and has an average annual discharge of 68 m³/s.The project consists of a zoned earthfill dam of about 74m height with fill volume of 2-8Mm³, a chute spillway with three radial gates of 10m×14m each.There are two 8m diameter diversion tunnels of about 700m length, later to be converted as power tunnel and bottom outlet,respectively.A surface powerhouse with installed capacity of 2×30MW is envisaged.The Project was Inaugurated by Narendra Modi (using a remote control from AR Ground) on 16 December, 2017.

The primary purpose of the dam is hydroelectric power production.The Cabinet Committee on Economic Affairs (CCEA) approved the 60MW Tuirial Hydro Electric Project (THEP) project costing Rs 913 crore in 2010.It is the 2nd largest earthen dam and the largest in India.





Location Map of Tuirial Dam

DRAINAGE SYSTEM OF TUIRIAL DAM

The Tuirial is a river of Mizoram and Assam ,northeastern India. It is also known as River Sonai,a tributary of Barak River .It flows in a northerly direction towards Cachar district and joins the Barak at Dungripar Village near Sonai town.It is impounded by Tuirial Dam.

Tuirial river or Sonai river is an important river and situated in the northern part of Mizoram.The span of the river is about 117km and it originates from North Chawilung hills in Aizawl district.It flows northward and merges in Cachar District in Assam.An important tributary is Tuirini,which joins the main stream from the eastern bank after flowing parallel to it for about 29kms.Tuirial river flanks the eastern part of the Aizawl city,whereas, the western side is surrounded by the Tlawng river.

Important perennial streams like Lungdai lui,Tuisen lui,Keitum lui and Hachhe lui join Tuirial river before it confluent to Barak river in Cachar district of Assam.

Tuirial river near the Tuirial Hydel Project has been selected as the study site.The Tuirial Hydel Project is situated in the Aizawl District of Mizoram at latitudes of 24°21.5'N and longitude 92°53.2'E . The Hydel Project is categorized as hydro-electric and has a capacity of 60MW .The area has a main daily maximum temperature of 26.5°C and a mean daily minimum temperature of 11.3°C .

The project is accessible from Aizawl (163km) and from Silchar (Assam) via Bagha Bazar,Vairengte,Saiphai,and Saipum to the project site.The location of the dam is in a well gorge, just downstream of U-bend ,97km upstream of the confluence with the river Barak.The width of the river in the dam site is about 60 metres and the banks raise up to an elevation of about 120m on either side.The course of the river is fairly straight at the dam site .The gorge is suitable to accomodate the entire dam and the topography offers scope for housing the off-take of power tunnels,as well as,for providing the spilling arrangements.The river bed consists of sandy soil with boulders and rock exposures are found on both the banks.The banks are formed steeply sloping hills covered with forest growth.

Keeping in view the components of hydro electric power projects ,four sampling points along the river bank have been selected:

- i) Site 1 (S1) : Site 1 as demarcated as reference station (control site) which is at the upstream of dam with least human activities around and the river has its natural flow.
- ii) Site 2(S2) : Site 2 is demarcated as diversion inlet on river where the flow of river recedes with the development reservoir.
- iii) Site 3(S3) : Site 3 is demarcated as power house outlet(downstream of dam).There is little flow in the river at downstream of the dam.
- iv) Site 4(S4) : Site 4 is demarcated as diversion outlet situated downstream of river ,where the desilted river water after power generation is discharged back into the river through a tunnel.

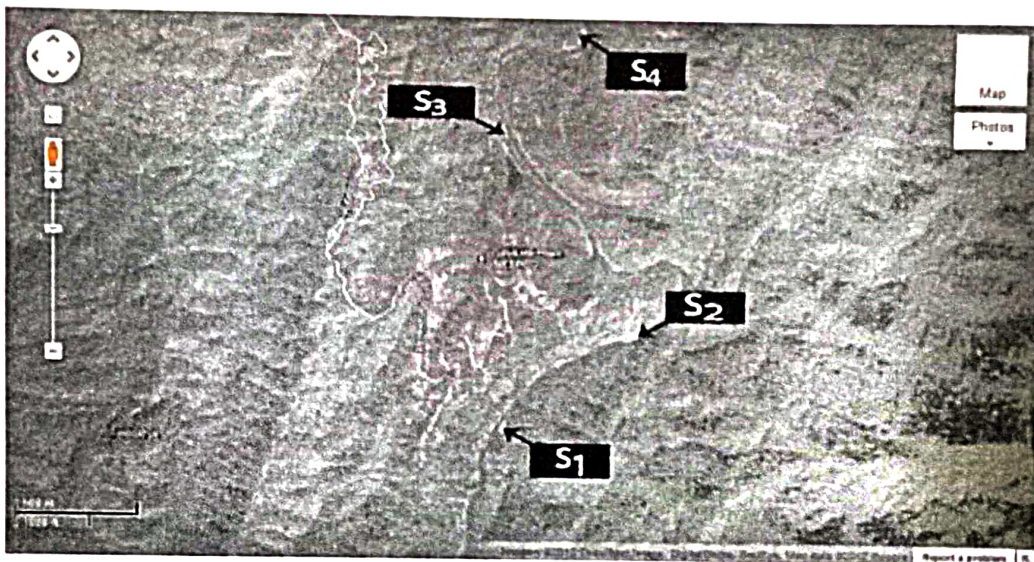


Figure 4.2: Location map of study sites.



Photo plate 4.1: Site 1: Reference (control site) station which is situated at the upstream of dam.

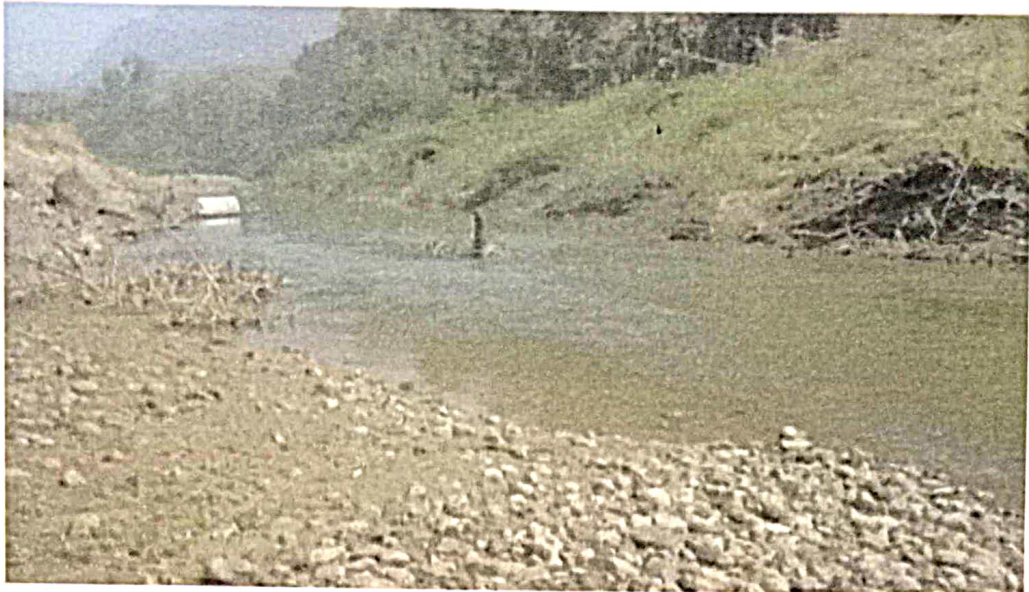


Photo plate 4.2: Site 2: Diversion inlet on river.



Photo plate 4.3: Site 3: Power house outlet (downstream of dam).

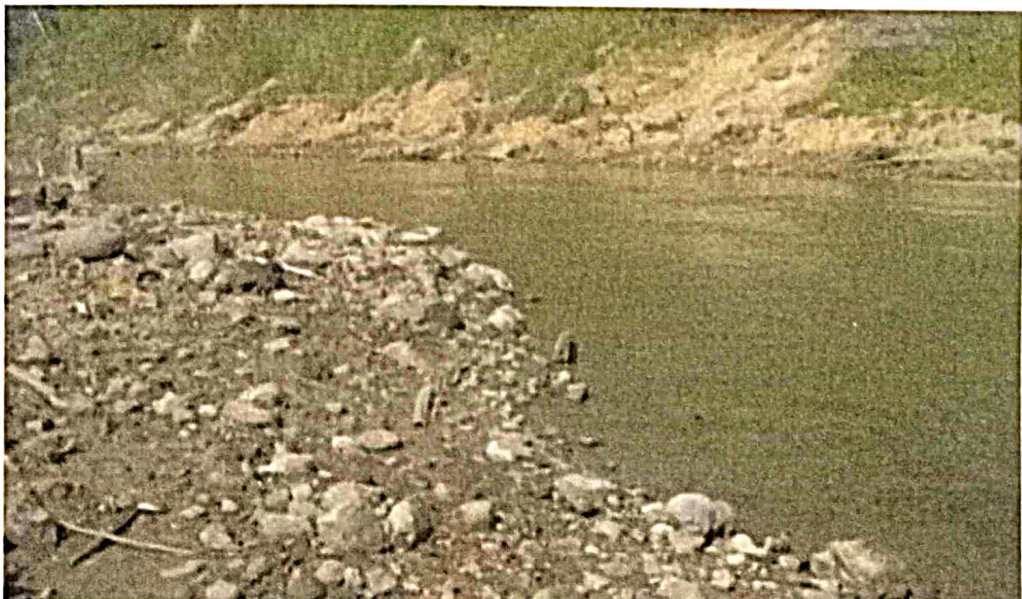


Photo plate 4.4: Site 4: Diversion outlet situated downstream of river.

TOPOGRAPHY

Tuirial Hydel Project is situated in the Aizawl District of Mizoram at latitudes of $24^{\circ}21.5'N$ and longitude $92^{\circ}53.2'E$. The area has a mean daily maximum temperature of $26.5^{\circ}C$ and a mean daily minimum temperature of $11.3^{\circ}C$.

The project is accessible from Aizawl (163km) and from Silchar (Assam) via Bagha Bazar, Vairengte, Saiphai and Saipum to the project site. The location of the dam is in a well gorge, just downstream of U-bend, 97km upstream of the confluence with the river Barak. The width of the river in the dam site is about 60 metres and the banks raise up to an elevation of about 120m on either side. The course of the river is fairly straight at the dam site. The gorge is suitable to accommodate the entire dam and the topography offers scope for housing the off-take of power tunnels, as well as, for providing the spilling arrangements. The river bed consists of sandy soil with boulders and rock exposures are found on both the banks. The banks are formed steeply sloping hills covered with forest growth.



CONSTRUCTION OF TUIRIAL HYDRO ELECTRIC PROJECT

The construction of the power station began in 1998 by North Eastern Electric Power Corporation Limited (NEEPCO) ,but was halted in 2004 by the Tuirial Crop Compensation Claimant Association (TCCCA). The project,built at a costs of Rs 1302 crore ,took nearly two decades to complete .Its foundation stone was laid by former Union Minister Kabindra Purakasyatha in September 1996,the construction suddenly came to a halt during the tenure of the MNF government following a controversy over payment of compensation to land - losers for this project site in 2003.

Massive protest was taken out by indigeneous Hmar community against the hydroelectric power project.They pressurize Mizoram Government to withdraw from pursuing the projects and ensure the protection of the constitutional rights of the tribal people .The protest was organized by the Sinlung People's Collective(SPC) and the Sinlung People's Human Rights Organization (SPHRO).

The project has been implemented by North Eastern Electric Power Corporation (NEEPCO) by engaging BHEL for supply and erection of power generating equipment ,Patel Engineering Ltd. for execution of major civil works and Sew - PES- Tuirial consortium for Hydro-Mechanical works.

Tuirial project is a storage type project where the reservoir with gross storage of 1400 million cubic metres is developed by the construction of a 75 meter high earthen dam across the river Tuirial.The catchment of Tuirial reservoir has an area of 1861 square kilometres .The huge reservoir created with the submergence of 4500 hectares at full reservoir level will facilitate navigation and commodity movement over the water body development of PC culture and intra-earlier development in tourism.

The primary purpose of the project is hydroelectric power production and is a compact project as a dam to surface farmhouse.The power house with an installation of two units of capacity 30 megawatts each and design energy of 250.63 nu is located on the left bank of the river.

To ease the construction of the earthen dam,the waters of the Tuirial river were diverted through to diversion tunnels of length 787.8 metres each.The diversion tunnel one is converted to low-level outlet and shall be used for depleting the

**SALIENT FEATURES
OF
TUIRIAL HYDRO ELECTRIC PROJECT**

Location	
District	Aizawl Kolasib, Mizoram
Latitude	24°21'5" N
Longitude	92°53'2" E
Hydrology	
Catchment area	1,861 sq km
Annual Rainfall	2,600 mm, 75% from May to November
Average Discharge	68.8 m ³ /s
Design Flood (PMF)	9,000 m ³ /s
Construction (diversion) design flood (1 in 100 year event)	2,900 m ³ /s
Reservoir	
Emergency reservoir level (ERL)	96.5 m asl
Maximum reservoir level (MRL)	95.2 m asl
Normal maximum operating level (FSL)	90.5 m asl
Minimum draw down level (MSL)	68.0 m asl
Gross storage volume	1,400 X 10 ⁶ m ³
Live storage volume	715 X 10 ⁶ m ³
Reservoir surface area	45 sq km
Reservoir length	85 km
Dam	
Dam Type	Zoned earth fill
Max. height above river bed level	75 m
Dam crest elevation	97.0 m asl
Dam crest length	250 m
Fill volume	30,75 X 10 ⁶ m ³
Saddle Dam	
Location	Dugan Lui Valley, 2.5km NE of Main Dam
Dam Type	Earth fill
Max. height above river bed level	20 m
Dam crest elevation	96.6 m asl
Dam crest length	100 m
Fill volume	43,500 m ³

Spillway	
Type	Radial gated weir, open chute & stilling basin
Design flood (PMF routed outflow)	4,450 m ³ /s
Spillway specific discharge	117 m ³ /s
Crest elevation of ogee weir	76.6 m asl
Number and size of radial gates	3 nos / 10.0m X 14.0m
Diversion Tunnel	
Number of tunnels	2
Invert level	27.0 m
Shape	Modified Horseshoe
Diameter (lined)	8 m
Length	787.8 m (including Intake Structure)
Low Level Outlet	
Invert level	38.80 m
Size of gates	2mX3m & 2mX3m
Discharge capacity at FSL	200 m ³ /s
Power Tunnel	
Invert level	54.0 m asl
Type of Inlet	Bellmouth
Tunnel shape	Circular, modified horseshoe
Diameter : concrete / steel liner	6.0m & 8.0m / 6.0m, 5.6m & 3.6m
Length : concrete / steel liner	200m / 140m, 80m & 2 nos 30m
Design discharge	131 m ³ /s
Surge shaft	Not required
Power House	
Installed capacity	60 MW
Type of Turbines	Francis, vertical axis
Number and capacity of units	2 X 30 MW
Normal tailwater level (1 unit/ 2 units)	29.3m asl / 30.7 m asl
Maximum tailwater level	48.0 m asl
Maximum gross head (1 unit/ 2 units)	61.2 m / 59.8 m
Minimum gross head	42.5 m
Design Head	53.0m



Figure : Spillway



Figure : Split Gates

PRODUCTION OF TUIRIAL HYDRO ELECTRIC PROJECT

Tuirial Hydro -power project is the first major Central Sector Project to be successfully commissioned in Mizoram. It is the first large hydro -power project in the State .It will produce 251 Million Units of electrical energy every year, and boost the socio- economic development of the state.

Tuirial Hydro Electric Project has two 30 MW turbines and has the installed a capacity of 250 million units of electrical energy every year. The power project guarantee 25×7 Affordable Clean Power for All. Mizoram peak load demand is only 87 MW and will now be the third power-surplus state in the northeast after Sikkim and Tripura.

Apart from attaining self-sufficiency in electric power ,the project will help Mizoram in water supply ,pisciculture and wild life conservation and tourism

ACHIEVEMENT OF TUIRIAL HYDRO ELECTRIC PROJECT

Tuirial Hydro Electric Power Plant is the biggest power project located in Mizoram and will feed the entire energy to be generated to the home State. The State's current demand of electricity is 87MW and this is being met by the mini power projects and availability of its share of power from central sector projects.

Tuirial Hydro-power project is the first major Central Sector Projects to be successfully commissioned in Mizoram. It is the first large hydro-power project in the State. It will produce 251 Million Units of electrical energy every year, and boost the socio-economic development of the State.

With the commissioning of this project, Mizoram becomes the third power-surplus State in the North-East, after Sikkim and Tripura.

The project was first declared and cleared by the Union Government of Prime Minister Vajpayee ji, way back in 1998, but got delayed.

The completion of this project is a reflection of our commitment to complete the going projects and usher in a new era of development in the North Eastern region.

Besides generating electricity, the reservoir water will also open new avenues for navigation. This will provide connectivity to remote villages. The huge reservoir, spread over an area of 45 square kilometres, can also be used for development of fisheries.

This project will boost eco-tourism, and provide a source of assured drinking water supply.



CONCLUSION

From our survey, we can know that the story of Tuirial Hydro Electric Project. How many megawatts they produce. How did Tuirial Hydro Electric Project is construct. Also, about the drainage system of Tuirial river .

Tuirial Hydro Electric Project produce 251 million units of electrical energy every year . The government of Mizoram get 12% of the power generated from the Hydel Project free of cost.

From Tuirial Hydro Electric Project, Mizoram state gain not only electricity, but also open new avenues for navigation, which provide connectivity to remote villages.

Besides this, the project also boost eco-tourism , and provide a source of assured drinking water supply.