

Geological Study of Rajmahal Trap Area and Its Resource Base: A Regional Perspective

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Abstract: *In Recent, The Geological Study Of Any Spatial Unit Is More Techno-Centric As Well As Simplified Due To Rapid Technological Growth. Most Perhaps No Body Can Ignore This Realization. As So Far The Study On Geology Of Rajmahal Trap Here Is Completely Based On Literature Study Which May Claim Maximum Efforts As True Documentation Behind This Endless Investigation. The First Way Of Explanation Of The Study Is Formation Of Rajmahal Trap And Next Point Should Be Entertained On Spatial Efficiency, Has To Be Measure By The Study Of Resource Base Within Locality. Therefore, Whole Enquiry Is To Be Set As Regional Approach Rather Than Systematic Method.*

Key Words: *Geology, Rajmahal Trap, Resource Base, Regional Approach, Systematic Method*

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I. Introduction:

Rajmahal Trap Area Is An Older Geomorphic Unit Of The Middle-East India Both The Perspective Of Geology And Morphological Enquiry. It Is Also Divided Into Different Geomorphic Provinces Like Depositional Plains, Erosional Plains, High Erosional Plains With Residual Hills, Uplands And Mesa-Like Hills. All These Are Not Contiguous And Also Not Succeeded. Rajmahal Trap Formation Is Of Critical Importance In This Study As The Change Of Resource Base And It Has A Greater Importance On Socio-Economic Landscape. Initially The Area Was Pre-Existing Resource Practice Like Forest And Agriculture Based Then It Replace On Basalt Quarrying Industry As New Resource Practice. Das (1994) Pointed Out That The Potentiality Of Basaltic Rock Of The Rajmahal Trap Area Is For Mainly Constructional Purposes In The Last Century. It Is Also Clearly Mentioned That The Resource Base, Location, Ownership Pattern And Production Trend By Basalt Quarrying Industry Along With Changes Over Time Should Unfold The Forces And Processes Which Become Active To Bring This Industry To Its Present Shape.

II. Study Area:

The Rajmahal Trap Area Is Located In Middle East Part Of India. It Is Bounded By On The North And East By The River Ganga, On The West By The District Of Bhagalpur And On The South By The River Dwaraka. But The Area Under Study Is Concerning With The Geological Basis Of The Stone Quarrying Industry And It Extend Towards South Which Directed By Two Factor Like Interacting People Of Quarrying Industry And Development Of Railway Network. Therefore The Study, Concerned With A Geographic Phenomenon That Has A Spatial Focus But Whose Impact Is Diffused Far And Wide In Different Forms. The Entire Rajmahal Trap Area Is Under The Pakur, Sahibganj, Dumka Districts Of Bihar (Presently Jharkhand) And North Western Part Birbhum District West Bengal. So Far As All These Administrative Units Are Configured Which Interlink With Basalt Quarrying And Its Products Has A Definite Role On Economy, Society And Culture Of The Area.

Objectives:

Basic Study And Implications Regarding This Issue Is Wider As Well As Provoke The Interdisciplinary Thought. But Most Fundamental Objectives Of The Study Are-

1. To Examine The Geological History Of The Rajmahal Trap Area.
2. Try To Focus On A Regional Accounts Related To Pre-Existing Resource Process And New Resource Base Of The Area.

Data Base:

The Whole Enquiry Is Articulated With The Secondary Source Of Information. A Lot Of References On Geological Study Of Rajmahal Trap Are The Main Strength. From The Literatures Related To Formation As Well As Origin, Details Stratigraphy And Microscopic Analysis Of Quality Of Basalt Are Highlighted Here. Another Point, The New Resource Process Is Settled Replace The Pre-Existing Resource Process Like

Agriculture And Forest Based Resource Practices Which Are Able To Change The Character Of The Habit In Respect Of Its Resource Endowment And The Socio-Cultural Attributes Of The People Of The Area.

Geological History Of Rajmahal Trap Area:

Geology Of Rajmahal Trap Area In Terms Of Petrology And Stratigraphy Is Of Critical Importance Because Of Determining Role Of Topographic Configuration, Soils Of The Area, Geological Resource Base And The Most Important Factor Of Quarrying Industry As New Resource Process.

Regarding Geological Data Base, Ball For The First Time Mapped The Rajmahal Hills In 1877, Which Was Subsequently Modified And Added By Arogyaswamy And Singh (1947-1949), Ramoswamy And Raja Rao (1953). Rajmahal Formation Is Rather Complex Formation As It Is Related To Intrusion. In 1965, Roychowdhury Made A Study Of Geology Of The Rajmahal Trap Area, Published In The District Gazettters Of Santhal Pargans Based On Works Of Ball (1877), Roy Gupta (1931), Ray (1941), De And Mukherjee (1949), R. Chowdhury (1951), Mitra (1953), Mukherjee (1953), Chatterjee (1953), Baski (1958). A Systematic Scheme Of This Stratigraphy Is Presented Below With Its Characteristics According To Shrivastava And Saha (1966) And Raja Rao (1953). The Whole Enquiry Has Been Made By Above Mentioned Geologists On The Basis Of Field Investigation, Sample Collection And Its Microscopic Analysis, Slope Analysis Of The Surface And Drainage As Well As Nature Of Weathering. The Simplified View Of Rajmahal Formation Is As Old As That Of Formation Of Himalaya. Due To Formation Of Geosynclines, The Frontal Edges Of Peninsular India Faced Tensional Forces Slipped Down Towards North With The Formation Of Fissures And Cracks. Down Ward Pressure Of Geosynclines Into Mantle Forced Lava To Be Erupted Through The Cracks And Fissures For Epirogenic Adjustment.

Stratigraphy Of Rajmahal Trap Area:

Formation/ Series	Composition	Age	System	Thickness (Mts)	Characteristics And Exposure
Recent	Soil, Alluvium, Laterite	Quaternary		0-30	In The Eastern Plateau Fringe, Plateau-Plain Transition In The Concave Portion Of Upland
Rajmahal	Flows Of Basalt With Inter-Trappean Sediments And Dolerite Dykes	Lower Jurassic	Upper Gondwana	600	Rajmahal Trpas Have Covered An Area Of 10360 Sq. Km Extending From Kahalgown (Very Close To River Ganga) In The North, Suri In Birbhum In South, Ganga Alluvium In The East And Archean Rocks Of Chotonagpur Plateau In The West.
Dubarajpur	Ferruginous Sandstone Shales And Conglomerates	Upper Triassic	Lower Gondwana	122 To 137	The Formation Is Confined To A Narrow Discontinuous Strip Along The Western Edge Of Hills. Rocks Are Exposed In Ramgarh, Gumra, Kanatari, Susnia, Hirapur Baramosia, Amarpara.
Baraker	Felspathic Sandstone Carbonaceous Shales	Permian		Varies From 0-152	Exposed In The Form Of Coalfield On The Edge Of Ganga Alluvium, Panchawara Coalfield Bouded On The West Bu North-South Fault (Pascoe-1959)
Talcher	Coal Seams Bounded By Sandstones, Clays And Boulder Beds	Carbniferous		55 (Approx)	Talcher Rocks Are Restricted Only In Few Places. Those Are Exposed Near Brahmani River, Gumahani Nadi, Karmatari Etc.
Archeans	Pegmatities, Quartz Veins, Granite, Gneiesses With Inclusions Of Amphibloies Pyroxenes And Granulites.	Cambrian	Archeans		Unconformity... Archean Rocks Of The Chotonagpur Plateau Are Extended To The East Of Gangetic Alluvium

Source: After Ball, Roychowdhury And Srivastava

From The Study Of Stratigraphy The Basaltic Rock Of Rajmahal Is Found At The Top Of This Region. Ferruginous Sandstone And Shale Of Dubarajpur Stage Is Found To Occur As A Narrow Discontinuous Strip Along The Western Edge Of The Hills, Beneath Rajmahal Stage. Barakar And Talchir Formations Underneath Dubarajpur Are Also Found As Discontinuous Patches (Ball, 1877). But Archean Formation Is Found To Occur As A Continuous Spread Underneath Talchir Formation. So, Next To The Surface Cap Rock Of Rajmahal, The Most Continuous Formation Surrounding This Area Is The Archean Formation. Archean Rocks Of The Chhotonagpur Plateau Have Been Extended Even Towards The East, Beneath The Gangetic Alluvium. Clear

Picture About This Geological Formation Can Better Be Realized From The Stratigraphic Formation Of This Area In Different Periods Where Archean Formation Is Found At The Bottom And Rajmahal Formation At The Top, Disregarding Recent Formation Of Quaternary Age.

Rajmahal Traps Horizontal In The North Have Formed Scarps Facing Westward With A Very Gently Easterly Slope With A Thickness Of 600 Meter Inter-Trapped By Sedimentary Beds (Pascoe-1959). It Is The Formation Covered An Area Of 10360 Sq. Km Extending From Kahalgaon Near The River Ganga In The North And North Eastern Part Of Birbhum District In The South. It Is Flanked In The West On Archean Rocks.

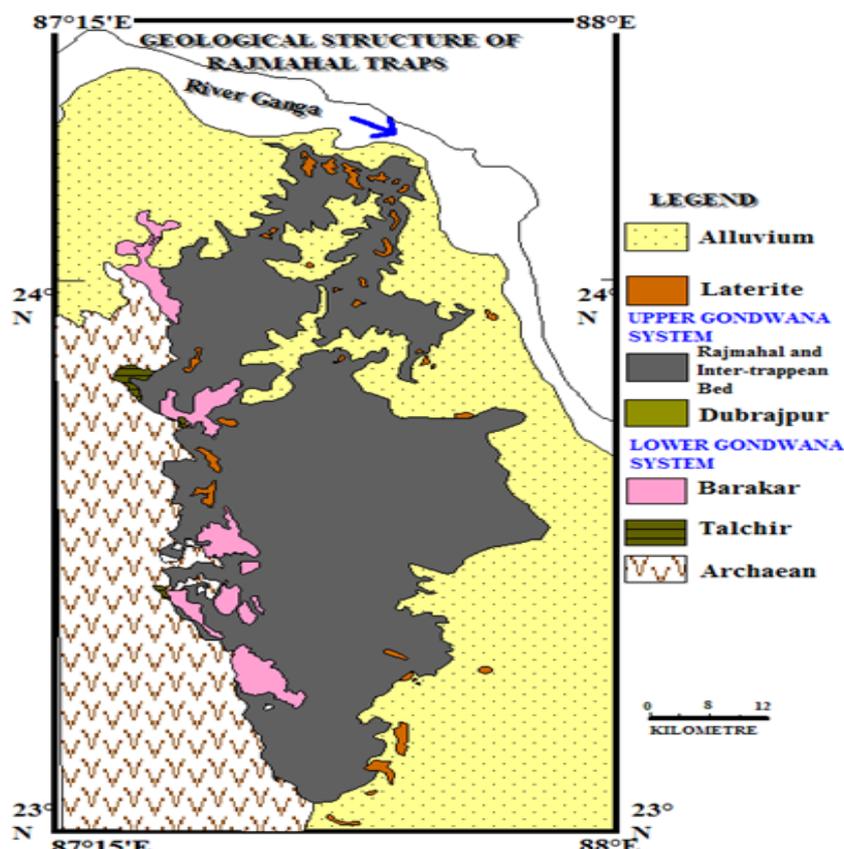


Fig: Geological Structure Of Rajmahal Trap Area

Rajmahal Trap Area Is Extending Over Large Areas Of The Bengal Basin, Later Covered By Post-Oligocene Sediments. This Trap Is Nothing But The Igneous Fissure Intrusions Due To Upward Ejection Of Lava Through Fissures And Cracks Forced By Downward Pressure Of Geosynclines. Geophysical Survey And Deep Drilling Have Proved The Existence Of Basaltic Lava Of Rajmahal Series Extended Up To The Bengal Basin. Trap Around Rajmahal Hills And Its Surrounding Areas Are Supported By Archean Gneisses At The Base.

Resource Base And Resource Process Of The Study Area:

No Resource And Resource Process Is A Static Phenomenon. It Is A Dynamic Process Whose Linkages Extend Deep Into The Cultural System Of The People Connected With Exploitation Of That Resource Far Beyond The Limits Of Immediate Physical, Technological And Occupational Considerations (Chaudhury,1992). Therefore, Understanding Of Resource Base Is More Economic View Than Natural But It Has A Definite Role By Resource Process On Development Of Human Civilization. All Resources Are Derived From Natural Elements But The Resource Potential Of Natural Elements Is Not Realized Unless The Elements Are Separated From Their Natural Disposition And Are Converted Into Raw Materials By Labor Process (Biswas, 1985).

In The Study Area, The Terrain Condition Or Physiography And Also Geology Plays A Dominant Role In The Development Of Resource Processes .Before Stone Quarrying, Soils And Forest Was The Fundamental Natural Resource Base Of This Area. It Is True That Forest Cover And Some Patches Of Agricultural Land Of The Area Was Means Of Rural Livelihood Of The Area. A. Biswas Clearly Mentioned That The Spatial Arrangement Of Settlement Of Different Ethno-Cultural Groups Of The People Was Living There On The Basis Of Pre-Existing Resource Process Like Forest And Agriculture. He Also Point Out That The Tribes As Distinct Community Settled On The West Of Erosional Plain, Muslims Peasants To The East Of

The Erosional Plain And Caste Hindus At The Strategic Location At Junction Of Erosional And Depositional Plains.. The Pre-Existing Of Resource Base Of The Area Like Forest Plays As Dynamic Resource Base And Resource Process. Because, The Forest Of The Area Was Considered As Source Of Food And Drinks, Source Of Raw Materials Both Timber And Non-Timber Forest Products, Source Of Shelter Etc. Of The People. With The Rapid Depletion Of Forest, Forest Economy Has Lost Its Importance Before Nineteenth Century Or Earlier To That. So, The Peoples Especially The Tribal People Who Were Lived At The Hill Portion Of The Trap Area, They Were Gradually Adopted With Agricultural Activity And Non-Agricultural Activity In Lower Foot Hills Area. They Soil Cover In The Plateau Fringe And Also In The Plain Tract Is The Resource Base For Agriculture. It Is Clear That The Plains Have High Agricultural Prospects For Fertile Soil. Therefore, Non-Tribal Agriculturalists Tried To Take Control Of This Region Pushing Back The Santals On Errosional Plain Who Again Restricted The Concentration Of The Pahariyas Over Hill Top (Das, 1994). Apart From This, It Is Noted That Basalt Quarrying As New Resource Process Of The Area Which Is More Give Emphasis On The Present Context. This Resource Process Is Directly Associated With The Geological Formation Of The Rajmahal Trap Area. And Most Perhaps, The Favorable Factors Which Have Helped It Emerge As The Significant Stone Producing Unit Of India. The Major Factors Are-Quality Of Stone; It Is Noted That The Character Of Stone In Pakur Is Really Good For Constructional Purpose. It Is Bluish Green Colour, Hard, Heavy Without Any Intervention Of Ash Bed. Second Factor Is Cheap Labor; It Is Highly Labor Intensive Industry. The Massive Laborers Were Coming From The Tribal Society Of The Area. Third Factor Is Land Availability; The Quarrying Industry Is Like As Open Cast Mining Therefore, Large Number Of Plot Are Needed For Making The Stone Cheeps From The Excavation Of Basaltic Rock To Finished Products And It Is Available Of The Area. Another Factor Is The Capital, Historically It Is Recorded That The Maharaja Of Kashimbazar Was Also Interested For The Development Of Quarrying Industry (Das, 1994). From The Initial Stage The Quarrying Industry Of The Area Was Located At The River Bank Side, Thereafter; It Was Followed The Railway And Road Way For Better Transport Conditions.

III. Conclusion:

After 1980s, The Practice Of Stone Quarrying Of The Entire Area Causes Vigorous Land Dereliction As Well As Deforestation, Land Crisis For Human Habitat. New Resource Process Has Made A Fragile Ecosystem Both Elementary Forms Of Physical And Social Environment Of The Area (Gadgil And Guha, 1992). . In Case Of Pakur, Decay The Of The Stone Quarrying Industry Will Lead To Total Destruction Of Related Industrial Community In Absence Of Diversification In Their Means Of Sustenance. On The Other Hand, The Simultaneous Development Of Stone Quarrying Industry, Agriculture, Artisan Craft Etc. In A Diffused Way Can Lessen The Hazards Arising Out Of Over Dependency On A Single Resource And Can Support The Community Even In The Absence Of A Particular Process (Biswas, 1985). In This Context, The Tribes Who Are Engaged As Unskilled Laborer Are Most Vulnerable Groups Because The Stone Quarrying Industry Is Depend On Single Resource Process And Unidirectional Way. The Over Exploitation Of Basaltic Rocks As Fixed Resource Should Be Excavated By Scavenging Operations Due To Huge Demand Of Stone Cheeps For Different Constructional Works.

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