

SAPAHI – A RIVER AS A LIFELINE OF MANKIND

Rajesh Kumar Mahato*

ABSTRACT

Sapahi river is a very small tributary of river Swarnrekha river system. It's just 15 km far away from main capital and functional region of Ranchi. In the lower portion of river Sapahi, Rukka dam is major water reservoir for water supply in Ranchi capital. The case study considered as try to prove how a small river can feed and important for small village civilians. Thus it is a macro level field based research, it is very less opportunity to acquire micro level field data. River rises from the up land of the northwest, area characterized by rocky explore and mainly forest with Sal. The river water always feed to mankind, which were living beside the bank since ancient time. In monsoon season, river gives huge water mass for proper development of agriculture in the region; in winter for Ravi crops. River deposits some alluvial soil for good practice of agriculture and industry which helps to growing vegetation cover over on and building industry. Forest resource again helpful for their living population as domestic and commercial uses. In this way a particular river system feeds directly or indirectly for their living people in the entire valley.

This paper is considered to explore some specific characteristics of very small river system, that how Sapahi river system is lifeline of mankind in their valley.

KEYWORDS: *Don, Dendritic, Evapotranspiration, Surface and Subsurface, Sedimentation, Anthropological,*

* Research Scholar, University Department of Geography, Ranchi University, Ranchi-8, Jharkhand, India

RESEARCH METHODOLOGY:

A three-tier approach comprising image interpretation, intensive field survey and laboratory investigation as cartography and printing adopted.

Image interpretation comprises data derivation from map analysis, map work, computation from topographical maps, air photographs and satellite imageries pertaining to deferent component of settlement.

Research also utilized remote sensing and GIS techniques for the landform analysis and various geographic changes.

Primary data also produced by himself for building perspective models, through Questioners.

In the last for empirical analysis on the spot verification on examination of fact dealing in relationship of man and river, man-socioeconomic life, socio-religious life etc. all shorts anthropological technique taken as consideration as well regions – Observation, Interview, Seldom, Questionnaires, Genealogical table, Photography, Sampling, Census as well.

HYPOTHESIS:

The following hypothesis can be considered for testing: -

- ✓ The study will endeavor to test the changing and discharging system of the river in relation to the development of the settlement.
- ✓ River provided soil, water, and organic materials for betterment of agriculture and aquaculture, it will interesting to correlate with their lying natural resource and landuse pattern by mankind.
- ✓ To deal a comparative study between man and the River, who is strongest actor river or man?
- ✓ The whole region may be ready for further planning by utilization of natural resources for their betterment of life.
- ✓ River serves for the benefit of the mass who living in its catchment area.

INTRODUCTION

Sapahi River is a very small drainage unit; 13.8 km long and almost few km in width. It is a tributary of Subarnrekha river which rises from the up land of the northwest on the area characterized with rocky explore and mainly forest with Sal. Jirabar is a major tributary of Sapahi in initial stage, which joins near Jirabar village. Sapahi river joins with Subarnrekha (Rukka Dam) near Rukka village. The pattern of the drainage looks like dendritic. The general slope of the basin towards north-northwest to south-south-eastward. Through empirical observation, fully Granite and Gneisses characterize the river; underlying rocks are hard. From upper course to lower valley the river serves number of villages, which settled, beside the bank. During rainy season it appears with huge amount of water..

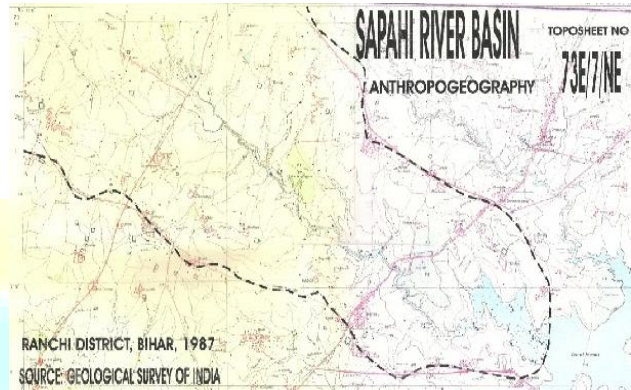
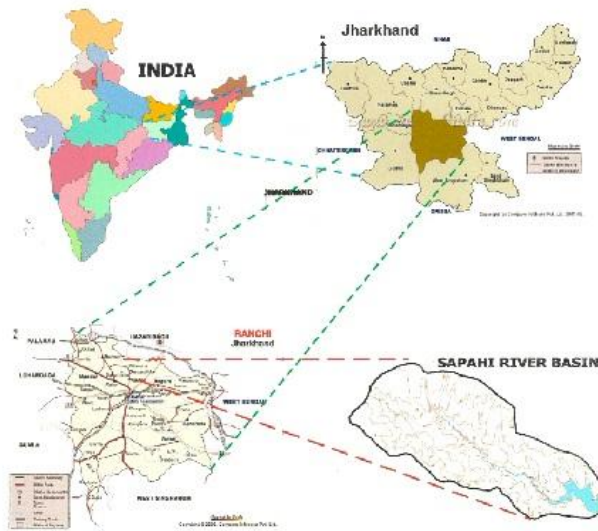
River water always feed to mankind, living population beside the bank. In monsoon season river gives enormous water masses to the field for proper development of agriculture in the region; but in winter it is very less. In summer season in the middle of bank (DON area) uses their moisture for agricultural practices.

River serves us as fertile soil, which mainly forms by sedimentation and deposition. In this way sand, pebbles and gravels also develops; actually these are the continuous work of river stream day-night; which are usable for building materials; vegetation cover also develops in these bed which again very economically valuable for mankind. Aquaculture also very useful and importance for the settled population.

LOCATION OF THE STUDY AREA

The study area is located in Chottanagpur plateau region just 15 km far away from Ranchi main capital region. Problem selected i.e. the status of Sapahi river and their feeding capacity for living population in the valley, with special reference to resource evaluation – a macro-level study of the river Sapahi.

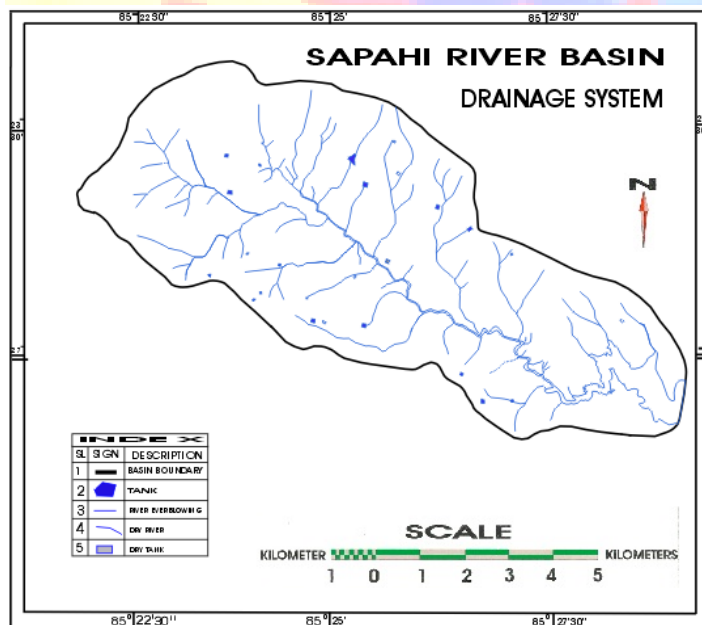
LOCATION OF SAPAHI RIVER IN JHARKHAND



CHARACTERISTICS OF SAPAHI RIVER BASIN

River is open systems in the sense that the mass of water and sediment entering is balanced by that leaving the system. River acts as system consisting of one main channel with all the tributaries flowing into it. A river system which lies in a drainage basin is bounded by a divide called watershed. Beyond this watershed the river is drained by another system. A typical river system has three subsystems.

1. Collecting system, 2. Transporting system, 3. Dispersing system



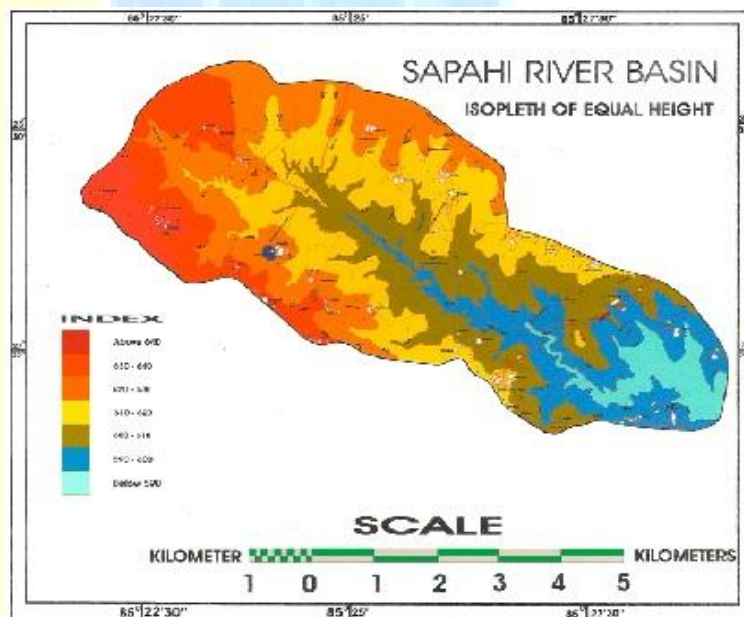
SUITABLE EXAMPLES FROM SAPAHI RIVER

Generally, every river basin experiences, three types of work mentioned above viz, collecting system, transporting and dispersing system. In Sapahi river Basin the all gullies and tributaries are helper of main stream and also a part of collecting system. The upper valley collects lots of water mass in rainy season, otherwise in all dry seasons in became also dry. After coming in main stream from Jirabar village it is known as

Jirabar river but afterward it known as Sapahi river. Main Transporting portion of river is calls to the middle portion of Sapahi basin, which mainly blows from collected water of gullies and its tributaries. It becomes giant working system in rainy season. Thus this river is very small tributary of river Subarnrekha that is why it not occurring dispersing. In the lower region of the river a Rukka Dam created near Rukka village which spreading in various long track of km.

CHARGING AND DISCHARGING SYSTEM OF THE BASIN

Charging of surface and subsurface system on the basin of the river means receiving of precipitation from atmosphere. It may be as rainfall, snowfall, or amount of humidity available in surroundings. Charging of the basin area depend upon various factors such as structure and composition of rocks, Vegetation cover, and temperature also. Charging of a river basin is greatly dependent on the regular water supply in sufficient quantity; because it is to reason,



which gives the kinetic energy for the whole types of degradation work. The basic input of a drainage basin is rainfall which is intercepted first by vegetation (if the basin has vegetation cover) and reaches the ground surface through the leaves, branches and stems of trees as 'aerial rainwater is retained by the leaves. Some portion of water interception storage is evaporated while the remaining portion reaches the ground surface as stem flow.

Through evapotranspiration from interception storage, surface storage and soil moisture storage, and Channel runoff from channel storage. Man affects and modifies the internal processes of hydrological regime of the drainage basin in a variety of ways.

Sapahi basin fall in Monsoon region (Tropical Monsoon climate) of Chottanagpur plateau, where mainly rainfall occurs in rainy season (July-Oct). We have to generalize the data from data

records of Ormanjhi block of Ranchi district. Tropic of cancer is just passing through the south of the basin, but due to higher altitude temperature declines.

Maximum temperature in December : 22.9⁰ C

Mean daily minimum temperature : 10.3⁰ C

Mean daily maximum temperature : 37⁰ C

The highest temperature recorded in Ormanjhi block, receives rainfall throughout the year especially in the months of June-September. July-August is the main rainy month. Average rainfall of the block is 137.5 cm in the months of July, August, September and October. In the month of December and January rainfall occurs through western disturbances.

Months	January	July	August	September
Mean Rainfall	3.7cm	35.5mm	35.9mm	19.2mm

Discharging means outlet system (network) of water mass through forming gullies, channels and main streams flows up to mouth of huge water collection centre, evaporation and sipping toward downward (underground water).

Discharging in Sapahi river basin as follows:

To find out the surface discharge we have to find out the following

Velocity of river water, Channel shape, Channel width, Channel depth, Channel slope

Discharge $Q = w * d * v$

Where w = channel width, d = average channel depth, v = average velocity

23/04/09 (summer season): **Width** 2.7 feet

Depth 2.3 feet

Velocity 0.6 feet / sec

Discharge: $2.7 * 2.3 * 0.6 = 3.726$ CFS

09/07/09 (Rainy season) : **Width** 41 feet

Depth 25.6 feet

Velocity 1.8 feet / sec

Discharge: $41 * 25.6 * 1.2 = 1,469.44$ CFS

VILLAGE NAME	Surface water					Underground water	
	RIVER	CANNAL	LAKE	TANK	TAP	HANDPUMP	WELL
Jirabar(Jirawar)	1	0	0	0	0	0	1
Kamta	1	1	0	1	0	0	1
Kulhi	1	1	0	0	0	0	1
Kuchu	1	0	0	0	0	0	1
Barwe	1	0	0	0	0	0	1
Dahu	1	0	0	1	0	0	0
Irba	1	1	0	1	0	1	1
Koilari	1	1	1	1	0	0	1
Hutup	1	0	0	1	0	1	1
Karma	0	0	0	1	0	1	1
Rukka	1	1	1	1	0	1	1
Chakla	1	0	0	0	0	0	1
Dardag	1	0	0	0	0	0	1
Harnda	1	0	0	0	0	0	1
Sildiri	1	0	0	0	0	0	1
TOTAL	1	6	2	7	2	4	14

Total number of WELL, TAB, DAM, LAKE, TANK, etc. **Source:** Census of India, 2001.

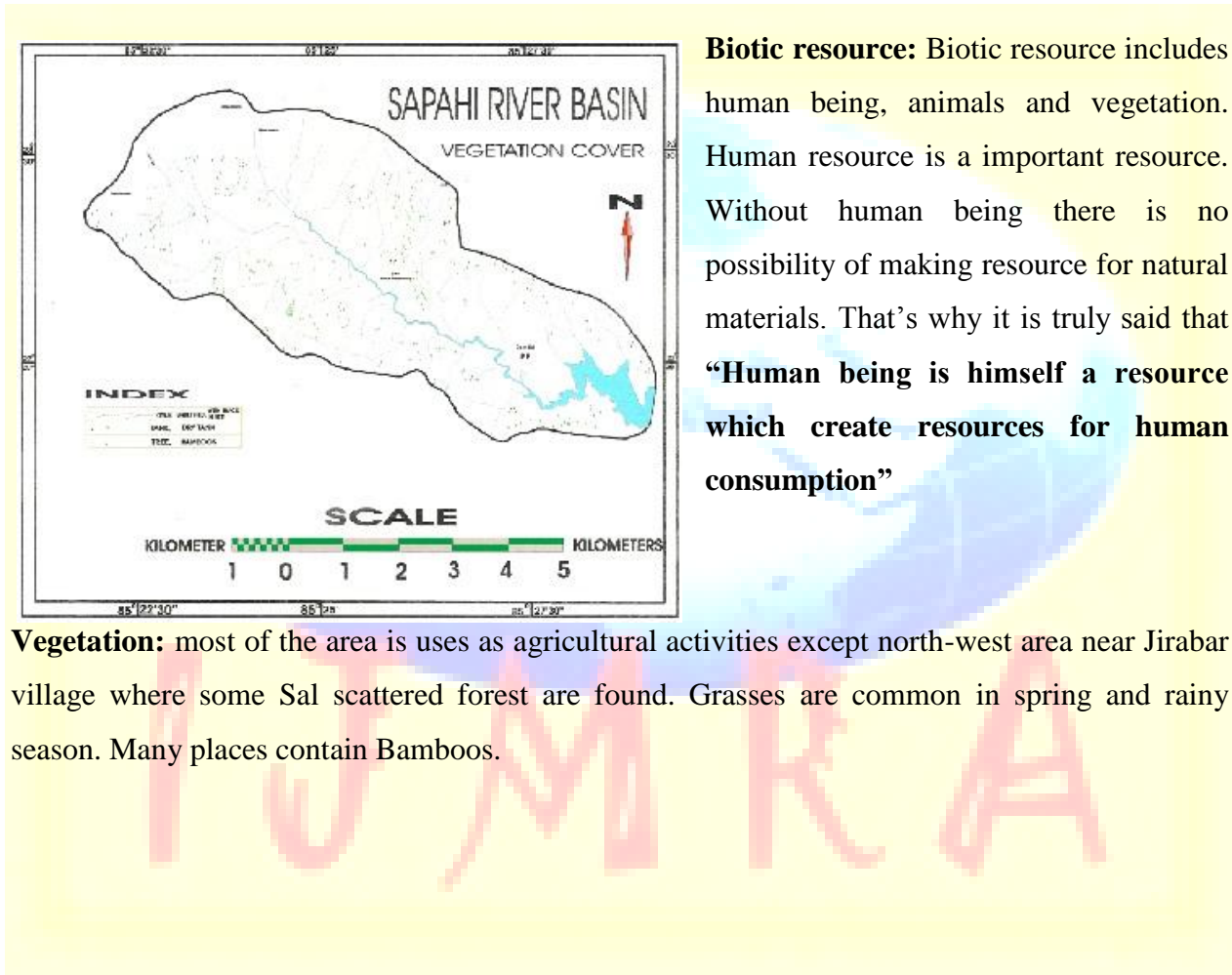
Therefore, from above discussion it is clear that in rainy season the region got its optimum mass of water which provides to basin at enormous quantities but in dry or summer season it converts into a dry nala. So according to our hypothesis Sapahi river serves in enormous quantity of water for life, living in river valley and it is also very much responsible for the agglomeration of different type of human settlement as different villages.

MONITORING OF RIVER'S NATURAL WEALTH AND LANDUSE PATTERN

Exploitation of the natural resources in a particular region; the activities is directly related with the use of land; therefore the land use differently uses thus it calls different land use pattern.

To monitoring of the river's natural wealth we can divide it into a number of categories. A very common classification divides them into the following categories.

1. Biotic resource,
2. Water resource,
3. Land resource,
4. Mineral resource,
5. Power resource



Biotic resource: Biotic resource includes human being, animals and vegetation. Human resource is a important resource. Without human being there is no possibility of making resource for natural materials. That's why it is truly said that **“Human being is himself a resource which create resources for human consumption”**

Vegetation: most of the area is uses as agricultural activities except north-west area near Jirabar village where some Sal scattered forest are found. Grasses are common in spring and rainy season. Many places contain Bamboos.

TOTAL HUMAN RESOURCE:

VILLAGE NAME	TOTAL AREA	TOTAL HOUSEHOLD	TOTAL POPULATION	MALE POPULATION	FEMALE POPULATION
Jirabar(Jirawar)	229	100	485	242	243
Kamta	175	209	1267	627	640
Kulhi	361	286	1641	843	798

Kuchu	466	354	2073	1039	1034
Barwe	462	303	1788	921	867
Dahu	268	225	1324	662	662
Irba	281	600	4151	2188	1963
Koilare	104	67	471	207	264
Hutup	278	197	1035	515	520
Karma	114	282	2064	1066	998
Rukka	462	299	1626	851	775
Chakla	723	464	2721	1406	1315
Dardag	189	273	1466	763	703
Harchanda	97	354	1694	907	787
Sildiri	149	111	653	337	316
TOTAL	4358	4124	24459	12574	11885

Source: Census of India, 2001, Directorate of Census operations, Jharkhand; Series-21.

Note: these data are based on political boundary of a village, not on river basin; that is why; there is technical difficulty to show human resource in the basin.

According to above mentioned data it clear that this river basin has a large number of population which also produces different types of economic activities. The basin contains total population of 24459, in which 12574 are male and 11885 are female.

VILLAGE NAME	TOTAL AREA	SURFACE WATER					UNDERGROUND WATER	
		RIVER	CANAL	LAKE	TANK	TAP	HANDPUMP	WELL
Jirabar (Jirawar)	229	1	0	0	0	0	0	1
Kamta	175	1	1	0	1	0	0	1
Kulhi	361	1	1	0	0	0	0	1
Kuchu	466	1	0	0	0	0	0	1
Barwe	462	1	0	0	0	0	0	1
Dahu	268	1	0	0	1	0	0	0
Irba	281	1	1	0	1	0	1	1
Koilare	104	1	1	1	1	0	0	1
Hutup	278	1	0	0	1	1	1	1
Karma	114	0	0	0	1	0	1	1
Rukka	462	1	1	1	1	0	1	1
Chakla	723	1	0	0	0	0	0	1
Dardag	189	1	1	0	0	0	0	1
Harchanda	97	1	0	0	0	0	0	1

Sildiri	149	1	0	0	0	0	0	1
TOTAL	4358	1	6	2	7	1	4	14

Surface and Subsurface water system; **Source:** Census of India, 2001.

Animals: most of villages possess Goats, Dogs, Hens, Ducks, Cows, Oxen, Sheep, etc are pet animals; whereas wild wolves, foxes, snakes, reptiles and many more. Artificially a night safari zoo established in the lower region of the basin, in the just left hand side, of the river, where after Sapahi submits their water mass to Rukka Dam in Suvarnrekha river. Many other species of animals, birds etc. caught out here in cage, they have to be fed by administration of the zoo. Actually the zoo is commercially using for entrapment of humans. The main species are tiger, Lion, Zebra, Cheetas, Monkey, Peacock, Elephant, Lakerbagha, Foxes and many other species. The main empirical observation about the zoo is that, the natural vegetation of the region (Sal tree) is almost is a mostly removed from every settlement but in this zoo remaining natural vegetation as Sal tree is also now remaining in their natural conditions.

Water resource: water uses for many purposes such as irrigation, daily uses, creating of hydropower, and many more; but this basin includes dendritic (tree shape) type of drainage

network and after all its gullies, tributaries and main stream of river possesses lots of water in rainy season but another side it overflows in their lower basin in rainy season.



In this way there is scarcity of water resource in the dry season of mid April to mid June, therefore civilian are use those moistures lying in the just middle (locally call as DON) of the river in the lower basin areas. Thus it can possible to use water

given by the river network.

Rukka and Koilari village have lake, Rukka lake/Dam is big the whole region, where Sapahi river submit with their carried water form upper part of the basin. Rukka dam's water are now supplying to Ranchi urban area also. Each villages possesses tank namely Kamta, dahu, Irrba, Koilari, Hutup, Karma, and Rukka which uses as bathing and sometimes in irrigation. Biggest tank is found in Kuchu village which is also cemented. Underground water which are uses as well and tubenal. According to 2001 census there are four villages namely Rukka, Karm, Hutup, and

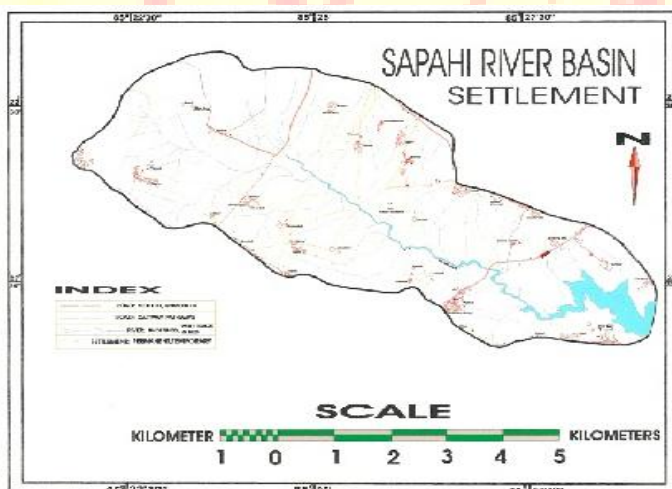
Irba where handpump are working and without one village (Dahu) all villages have found well. Only one village (Hutup) has Tap.

Land resource: use of land for any purpose may be call as land resources, such as space for building construction, agriculture or many more. Under political boundary these villages contains 4358 sq. km are (2001 census), but in the falling region in Sapahi river basin includes 348 sq km area. This mainly utilizes as agriculture, pasturing, banking information, business and somewhere as communicaiton. In the upper region of the basin mostly these are fallow land and some part in far north-west region are covered with Sal tree.



Mineral resource: minerals are the elements or their chemical compounds that constitute the rocks themselves are defined as mineral aggregates. Sapahi river basin possesses very weak in mineral deposits, some place founds the deposition of fine sand (dominated by Silica) to which people are utilize as building material for neighbouring villages and also supply to Ranchi town.

Power resource: the basin has no any means for self power supply because there is scarcity of power resources. There is only one check Dam is created, but its collected water is utilized at very small scale (such as irrigation, bathing, and others). Another dam is in Rukka which a big dam but through this power is not generated in the basin, but after artificially channelled the water a distance of about 15 km long at Sikidri in a hydel plant (Swarnrekha Vidhut Pariyojana,

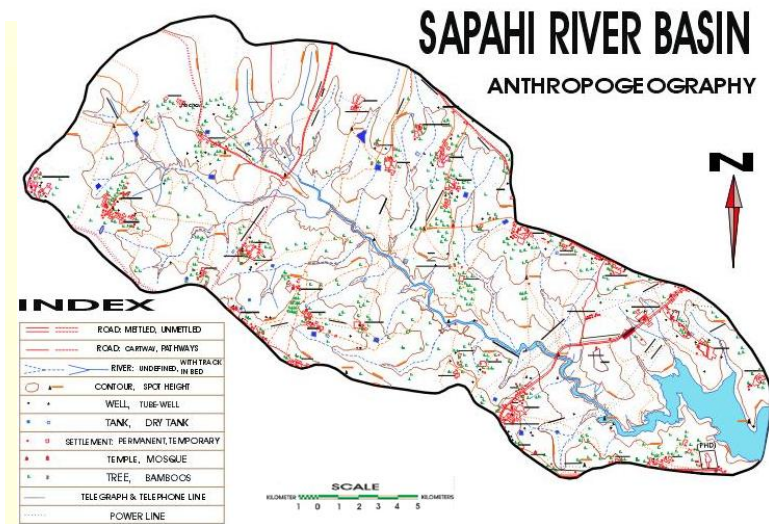


Jharkhand Govt.)

Landuse Pattern: Landuse means how we utilize the available natural resources for welfare of human being. There may be three types of landuse may be occurs such as primary (Agriculture and mining), Secondary (Industry and modification activities) and Tertiary (Service sector). River water is important

natural resource in the basin, without it other resources are also available for the development of civilian. Biotic resources are also developed due to availability of water mass in the basin; other non-biotic resources are just help to sustain living population. These natural resources are giving opportunity to people for development and betterment of their life.

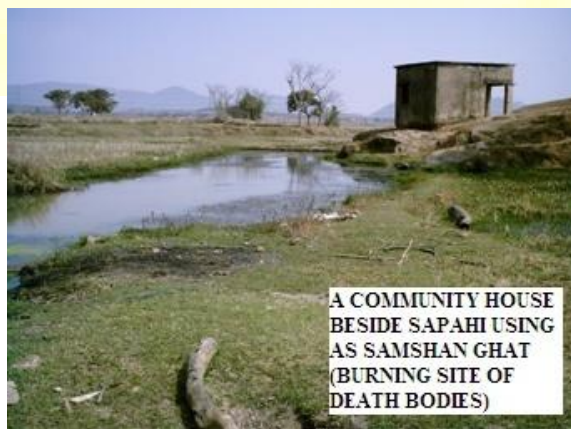
RIVER BASIN AND ANTHROPOLOGICAL DEVELOPMENT



From many centuries ago the area was covered with densely sal vegetation. Many kings empire were used as punishment area for extremely offence. Because lots of wild animal were located in this dense forest. All human migration was occurred through this region and spread the area of the region. Many tribal groups were also

entered in this region such as Berhor Kharia, which calls primitive tribe after that Munda, Santhal, etc came. With the passing time many living human group of great Gangetic plain were also came which calls Aryans. In the Medieval period Muslim ruler came and also began to make their colony. At last in 17th centaury Britishians came, with this Christianity also came and increases in the numbers of follower.

In case of my study region all type of above mentioned human races are founding. And gradually anthropological development came in their optimum stage in modern time. Therefore now region have combindly founds a particular system of Social, Cultural, Traditional, Customonal and Mythical Characteristic. These characteristic of the region makes differ from other area. Through my empirical observation the region is dominantly characterized with all above mentioned property. Temple, Mosque, Church and Tomb are their evidence of cultural realms



and proof for living that type of follower. Now regional characteristics includes all the above.

RESPONSE FROM THE RESIDING CIVILIANS: I prepared a questionnaire for confirming that how much the river serves to the living people in the basin, I interviewed from mire that 300 people living in almost 8 villages viz, in Kuchu, Kukai, Barawe-Basati, Irba, Sildiri, Rukka, Rukka villages etc., including all age group. For my questionnaire I choose almost 20 attributes towards using properties of the river.

In this way, I concluded in the follows:

1. **43.75%** people said, they never use irrigation.
2. **31.25%** people said, they never using summer irrigation.
3. **15.63 %** of people said, they never using winter irrigation.
4. Only **9.37 %** of people said, they never use spring irrigation.
5. **88.46 %** people said that they never using the river water and only **11.53 %** people using water sometimes.
6. **57.69 %** people said that they use river water for water washing, sometimes.
7. **57.14 %** of people go to take cattle bathing in the river basin.
8. **23.07 %** people goes to river for taking bath daily, **50 %** people said they goes sometimes, **26.92 %** people said, they never goes.
9. Only **7.40 %** people said that they use river water for drinking regularly.
10. **33.33 %** of people said that they wash motor car.
11. **100%** people do not use river water as making food, industrial use for forestry.
12. **40 %** people said that they use DON, **4 %** use sometimes.
13. **61.11 %** people said that through DON yield produces much better, **27.77 %** people said through DON not possible good yield, **11.61 %** people said they don't know.
14. **38.09 %** people said that they collect rainy water.
15. **52.17 %** people said they have a well.
16. **13.04 %** of people said that they use Nalis (drain) for irrigate the bagans(garden).
17. **60.86 %** people agree that they store the rainy water in the field.
18. **81.81 %** are said that they fulfil satisfy that river fulfil their needs.
19. **77.77 %** said that river not got dry in summer season.
20. **83.33 %** are said that river roles a great to the man living in the basin.

From above mentioned data it is clear that Sapahi river serves to the local people and able to feed, because about 81.81 % people said that they benefited by river and its water resource. In this way people are utilizing the river basin for fulfillment of their basic need. Therefore, river act as a great role in Anthropological development.

VILLAGE ECONOMIC - PURSUITS- PRIMARY, SECONDARY AND TERTIARY

Economic activities of village are totally depending upon the availability of local resources. Resource directly attracts to use or exploit for local people. Huge amount of resource may be



attract large number of employment, but when it will be in fewer amounts, than economic activities will be also weak. Pattern of land use and economic activities can be described such as primary, Secondary and Tertiary; creations of this kind of economic activities are totally availability of local resources. Sapahi river basin contains the following type of economic activities:

1. Brick industry, 2. Gur manufacturing, 3. Drink (Haria – Tari) industry, 4. Agriculture related equipment, 5. Forest product related industry

Tertiary economic activity: though, Primary and Secondary economic activities, some product creates, when these product gives to the consumers by transporting, then transporting may be call as Tertiary economic, in which only service are provided. In the Sapahi river basin, these types of services are occurring as Motor Car transport; previously, it only takes as cart track but nowadays all type of modern vehicles are passing through the region. NH 33 is the lifeline of Jharkhand, which passing through south-eastern part of the basin.

Nowadays, almost all part of the region are well connected with communication (Roadways) total of 53.75 km of mettled roads are lying in the basin. Ring road is working in progress which will be connecting near Irba village. Most people are engaging in business, nowadays almost all village contain at least one Modikhana (Goods store shop) to serve the people. Electricity is another service which has 29.75 km of electrified line. Telegraph and Telephone line of 4 km is connected. Main water pipe line of worth distance for 3.75 km is also connected from Rukka

dam, which goes up to Ranchi main town. Some health facilities are opened in just before year, such as Apollo Group of Hospital and Cancer Research Centre in nearby Irba village.

Therefore, which I prepared hypothesis earlier, that **‘river is indispensable for the human survival’** is totally satisfied by people giving answering in questionnaires. The different economic activities of people living in this river valley is proof for survive. So, my adopted title as **“Sapahi: A river as a lifeline of mankind”** is totally proof by above mentioned economic activities in the region.

CONCLUSIONS

On the basis of above mentioned data and information the following conclusion may be conclude:

1. The given data of precipitation and runoff shows to valley charging and discharging system. The amount of water mass less discharging in summer season (About **3.726 CFS**) and in rainy season it converts into vast trunk system (About **1,469.44 CFS**).
2. River provided soil, water, and organic materials for betterment of agriculture and aquaculture; the different economic activities are best example to showing what and how the natural resources are using by living people.
3. Sapahi river obviously opened to use their natural resource in various ways, and dominant controlling factor to development for entire basin, but man utilized their skill and technology to develop them. In my field survey about 81.81 % people accept that Sapahi River fulfill their basic need.
4. From above verification it is clear that the river is indispensable for the human survival since many centaury and centaury.
5. River serves for the benefit of the mass with the help of natural resources of the basin, which so ever in its catchment area, therefore river automatically calls in a true way that **“Sapahi is a river as a lifeline of mankind.”**

REFERENCE:

- Marrisawa, M., 1968, Streams their dynamics and Morphology; Mc. Graw-Hill Book Co., Newyork, pp- 18-40, 46-76, 82-110.
- Mukhopadya, S.C., 1982, The Tista Basin; A study in Fluvial Geomorphology, K.P. Bagchi and Co., Kol, 308 p.
- Mukhopadya, S.C., 1980, Geomorphology of the Subarnarekha Basin, The Univ. of Burdwan, pp- 172-191.
- Sarkar, G. & Gupta, S., 2009, Fluvio-Geomorphological characteristics of Downstream of R. Panchonoi. Ind. Jour. Of Landscape system and ecological studies, Institute of Landscape, Vol-32, No.1, pp-9-14.Kattelmann.; publ. no. 201, 1991, Hydrologic regime of Sapt Kosi Basin, Nepal.
- Schumm, S.A. and H.R. Khan, 1972; Experimental study of channel patterns. Geological Society of America, Bulletin, 83, 1755-70.
- Wadia, D.N. (1975), Geology of India, Tata Mc. Graw-Hill, New Delhi, pp-10-250.
- Mukhopadya, S.C., 1980, Geomorphology of the Subarnarekha Basin, The Univ. of Burdwan, pp- 172-191.
- Mukhopadya, S.C., 1982, The Tista Basin; A study in Fluvial Geomorphology, K.P. Bagchi and Co., Kol, 308 p.
- Geographical perspective, A journal of the AGBJ, 2008 Vol-9.
- District Census Handbook, 1981, Primary Census Abstract, District –Ranchi, Series-4, Part XIII-A& B.
- Mahato, R.K., 2009, Morphometric analysis of Sapahi river (Unpublished Master thesis); pp-35-48.
- Talash, (2 Monthly magazine), Series 4, 1 Nov, 2008.
- Ranchi District Gazetteer, 1954, pp-25-27.
- www.jharkhandgov.com
- www.encyclopedia.com