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INLAND DRAINAGE OF NORTH EASTERN RAJASTHAN AND ITS POSSIBLE LINK WITH THE GHAGGAR-YAMUNA SYSTEM

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ABSTRACT : The north - eastern Rajasthan contains incomparable geomorphological and archaeological evidences which bear the testimony of rise and decay of many civilizations. It is characterized by an inland drainage which originate from the Aravallis and flow radially in the northern and eastern part of Rajasthan and lost in the plain. The present paper aims to propose a hypothesis that these inland streams had the link with the Ghaggar--Yamuna System and later on due to rise of the divide and with the onset of aridity these streams were left as behaded streams.

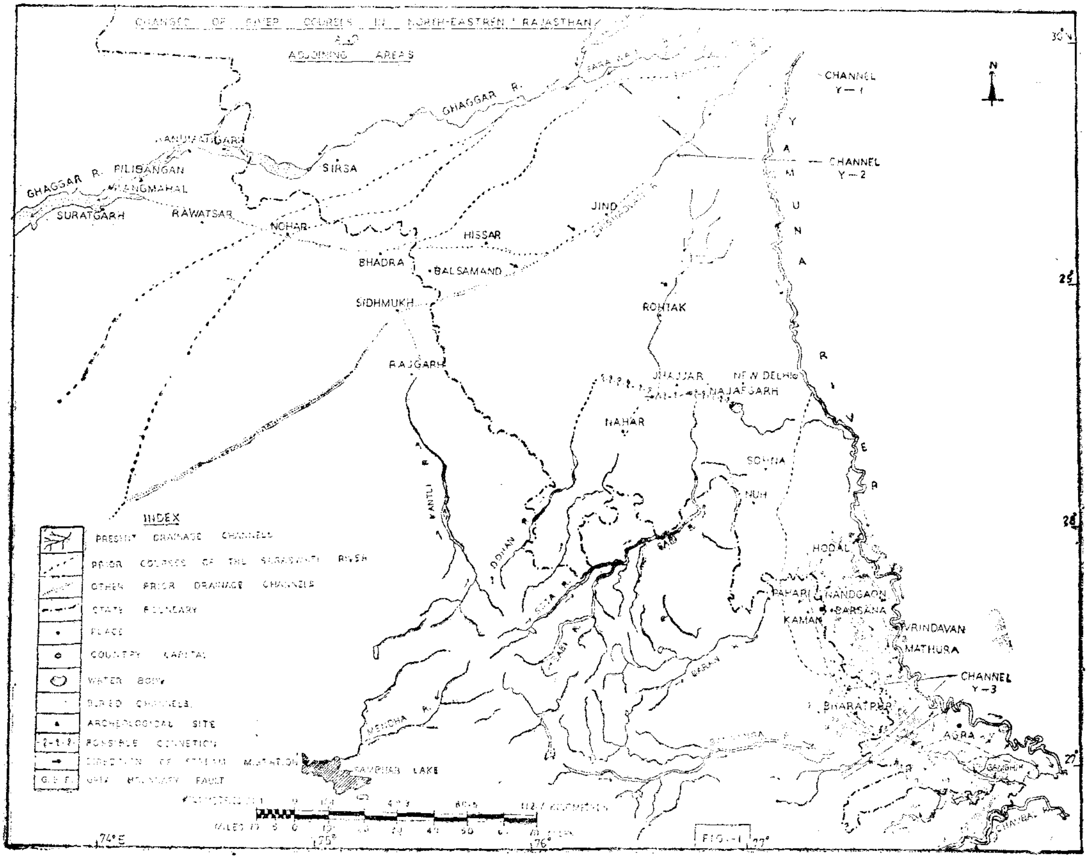
The region lying between the Indus and the Ganga contains incomparable geomorphological and archaeological evidences which bear the testimony of rise and decay of many civilizations. There is considerable literature to explajn the evolution of drainage and changes in river courses of the Ghaggar, Drishadwati and Yamuna and to explain the climatic change. The variety of hypotheses have been put forward by geologists, geomorphologists and archaeologists like Oldham (18 74), Krishnan (1952), Wadia (1966), Singh (1952), Ali (1942), Indras (1967), Stein (1942), Wilhelmy (1969), Raikes (1968), Yashpal and co-workers (1980), Bakliwal and Sharma (1980), Pande (1977), Dikshit (1977), etc. However, no work has yet been done on the evolution of inland drainage basins of the Katli, Sabi, Dohan, Barah and Banganga. The area between the Ghaggar and the Yamuna is characterized by inland drainage pattern and is almost barren, desolate, highly sandy and thinly populated. It experiences an extremely arid type of climate. The rainfall is erratic.

The purpose of the present paper is to identify the paleo-channels of the inland streams and to put forward a hypothesis to explain their possible link with the Ghaggar and Yamuna drainage systems.

Technique

The present study is essentially based on visual interpretation of the landsat imagery pertaining to the period of 1972 77 in a variety of form and formats at the Space Applications Centre (ISRO), Ahmedabad. The paleo-channels stand out clearly because of the vegetation pattern in their beds. However, due to considerable amount of sand dunes and sand sheets in this tract it was difficult to delineate the paleo-channels. Therefore, substantial field work has also been done.

Recently on the *Lost Saraswati* and migration of Yamuna, commendable work has been done by Yashpal et. al. and Bakliwal and Sharma using remote sensing, aerial and geomorphological surveys. The vast width (6-8 kilometers wide) of the



Ghaggar bed can be explained by assuming that at some time major tributaries were flowing into it in the past. According to these workers the Sutlej was also flowing through the Saraswati. The other major river systems contributing water to the Ghaggar may have been some prior channel of the Yamuna. The evidence regarding the paleochannels of the Sutlej–Yamuna have been indentified in the following manner. The three paleo-channels Y_1, Y_2 and Y_3 shown in Fig . 1 rapresented courses of some sizable ancient rivers which flowed south-east of the river Markanda and into the Ghaggar or into the Chambal. Y_1 joined the ancient bed of the Ghaggar, channel Y_2 flowed into Chautang (Drishadwati) and channel Y_3 flowed through the present course of the Yamuna down to Delhi and then connected the small lake near Bharatpur (Ghana) and finally joined probably the Chambal. They have named this vagrant river as paleo-Yamuna. It would therefore, mean now that the palaeo-Yamuna changed its course three times before assuming the present one. In the first instance it flowed through channel Y_1 into the ancient Ghaggar. Later on, it flowed through channel Y_2, which includes the present Chautang, and met the Ghaggar near Suratgarh. The third time it went south-ward and passed through the channel joining the Ganga through the Chambal.

The changes in the configuration of the palaeo-channels have been attributed to the neo-tectonism by Yashpal and co-workers and have discarded the earlier views of Raikes who explained the vagrancy of the Yamuna by coriolis force.

The history of migration of the Yamuna in the area lying between Delhi and Agra has been traced by Bakliwal and Sharma. The past course of the Yamuna has been identified which flowed through Hodal in the north and Bharatpur in the south. They have considered accretion of sediment as principle cause of migration.

The purpose of reviewing the history of migration of the Yamuna and changes in the course of Ghaggar system is that if we accept the validity of these hypotheses put forth by above workers then it would not be difficult to identify the paleo-channels of the inland streams of north–eastern Rajasthan and to link them with the Ghaggar-Yamuna systems.

Inland Basins and their Geomorphic Significance

The Katli, Sabi, Dohan, Barah and Banganga form inland drainage basins in the northern and eastern part of Rajasthan. These streams originate from the Aravalli hills (Torawati, Jaipur and Alwar Hills) and flow in a radial fashion. These are seasonal streams but during monsoon they create flood in different parts. The Katli originaating from the Torawati hills losts in dunes near Naurangpura and it bifurcates in three desert *nallahs* up to Dhinwali and Inskhela Johra. It has been investigated that in the year 1960–62 the water of this river flowed up to Nesal and Bairasar near Rajgarh. The fluvial sand in Rajgarh and Sidmukh indicate the possible link of this river with Drishadwati. Similarly the Dohan and Sabi become very notorious during monsoon, losts west of Nohar, Jhajjar and Najafgarh west of Delhi. The tendency of these streams during monsoon suggest their link up to above places which might have possible connection of the Yamuna during the pasing stage from Y_2 to Y_3. The Archaeological sites on the existing stream flowing from north to south through Rohtak and the Archaeological mounds west of this stream are sufficient evidences to link these streams with bigger drainage system. The Barah ends near Pahari. Its palaeo-channel may further be traced up to south of Hodal. The Banganga, a major stream of eastern Rajasthan becomes braided near Bharatpur. This area is evidenced with numerous ancient oxbow lakes and paleo–channels supporting its possible link either with the Chambal or the Yamuna.

Discussion

If we put a curved line from Jhajjar in the north to Bharatpur in the south connecting Nuh and Pahari it would coincide with the existing trend of flow of the Yamuna. Thus, it may be suggested that the Dohan, Sota, Sabi, Baran and Banganga were formerly a part of Ghaggar–Yamuna system. The Katli which is an extreme westerly stream, was a tributary of the Drishadwati which was supposed to be probably the second stage of migration of the Yamuna. If we accept the possible link of these streams with a bigger system, it may further be suggested that due to migration of the yamuna as a result of cymateogenic upwarping or the Ghagger–Yamuna Divide and subsequently due to imposition or onset of aridity and encroachment of sand, the courses of these streams have been chocked and were left as beheaded streams.

Conclusion

Further field work is, however, required for the confirmation of the above hypothesis. Already some archaeological data are available on the paleo–channels of the streams in this region, but more intensive work needs to be done for inferring the age of these paleo-channels and the process of behadation.

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