State of India's Rivers

for

India Rivers Week, 2016

HARYANA

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Map

Figure

1. Haryana

1.1 Location

Haryana is located in the northwest of India, It is between 27°39' to 30°35' N latitude and between 74°28' and 77°36' E longitude, was carved out of the State of Punjab on 1st November 1966. State is spread over 44212 km^2 area. According to 2011 census of India, the state population is 253.53 lakhs.

1.2 Administrative Divisions:

The State is divided into four divisions for administrative purposes- Ambala, Rohtak, Gurgaon and Hissar. Within these four divisions there are 21 districts viz. Ambala, Kurukshetra, Panchkula, Yamuna Nagar, Faridabad, Palwal, Gurgaon, Mahendragarh, Mewat, Rewari, Bhiwani, Fatehabad, Hisar, Kaithal, Sirsa, Jhajjar, Karnal, Panipat, Rohtak, Sonipat and Jind.

Map No 1: Haryana Political Division Map

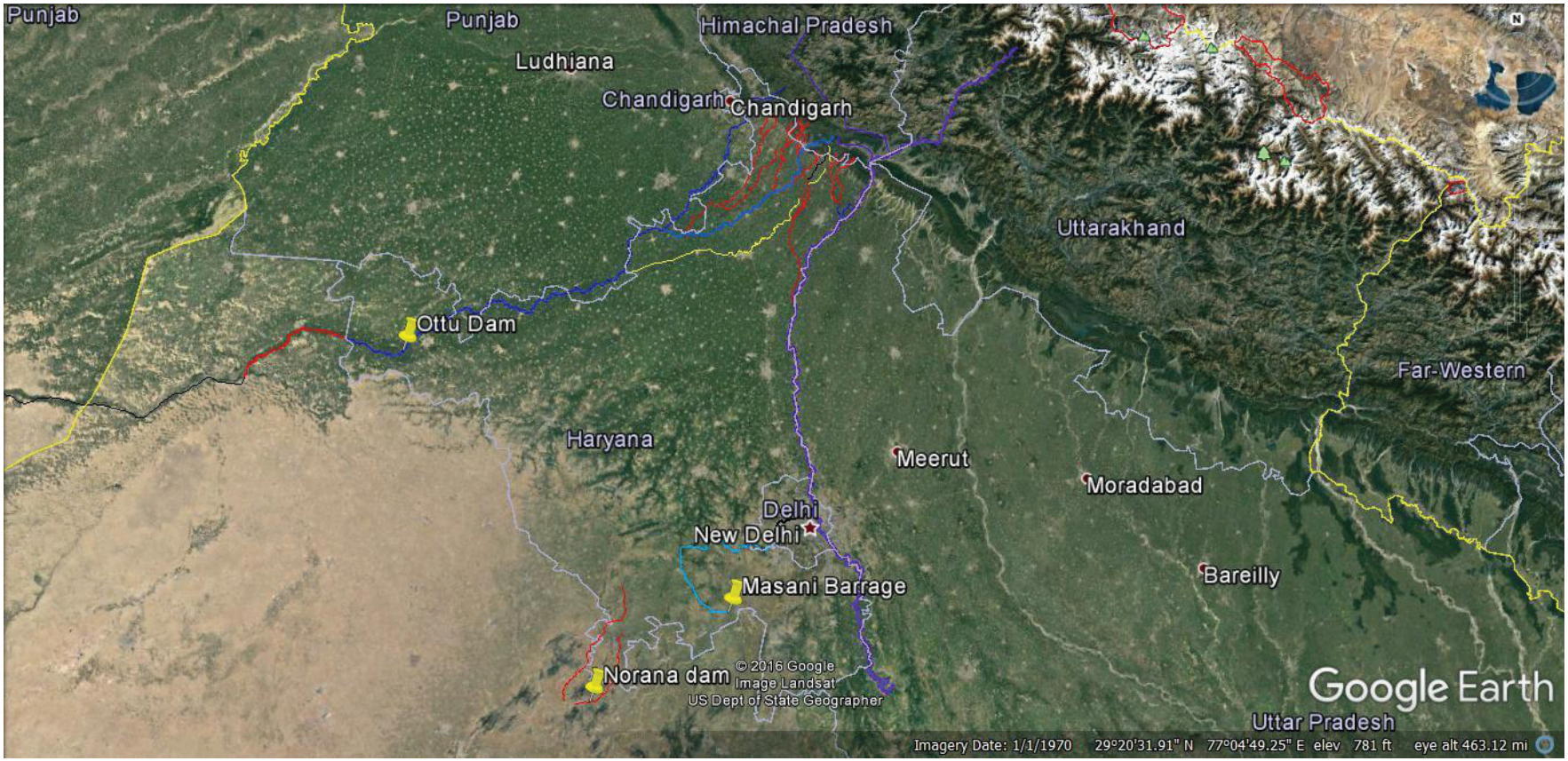
1.3 Geography:

Haryana has four main geographical features:

- Shivalik Hills to the north east
- Ghaggar - Yamuna Plain forming the largest part of the state
- Semi- desert sandy plain in the south west
- Aravalli hills in the south.

The altitude of Haryana varies between 700 and 3600 ft (200 meters to 1200 meters) above sea level. As per India State of Forest Report, FSI, 2013, the Forest Cover in the state is 1586 km2 which is 3.59% of the state's geographical area and the Tree Cover in the state is 1282 km2 which is 2.90% of the geographical area. Thus the Forest and Tree Cover of the Haryana state is 6.49% of its geographical area.

2. Rivers at a Glance



Map No 2: Drain Basin at Haryana

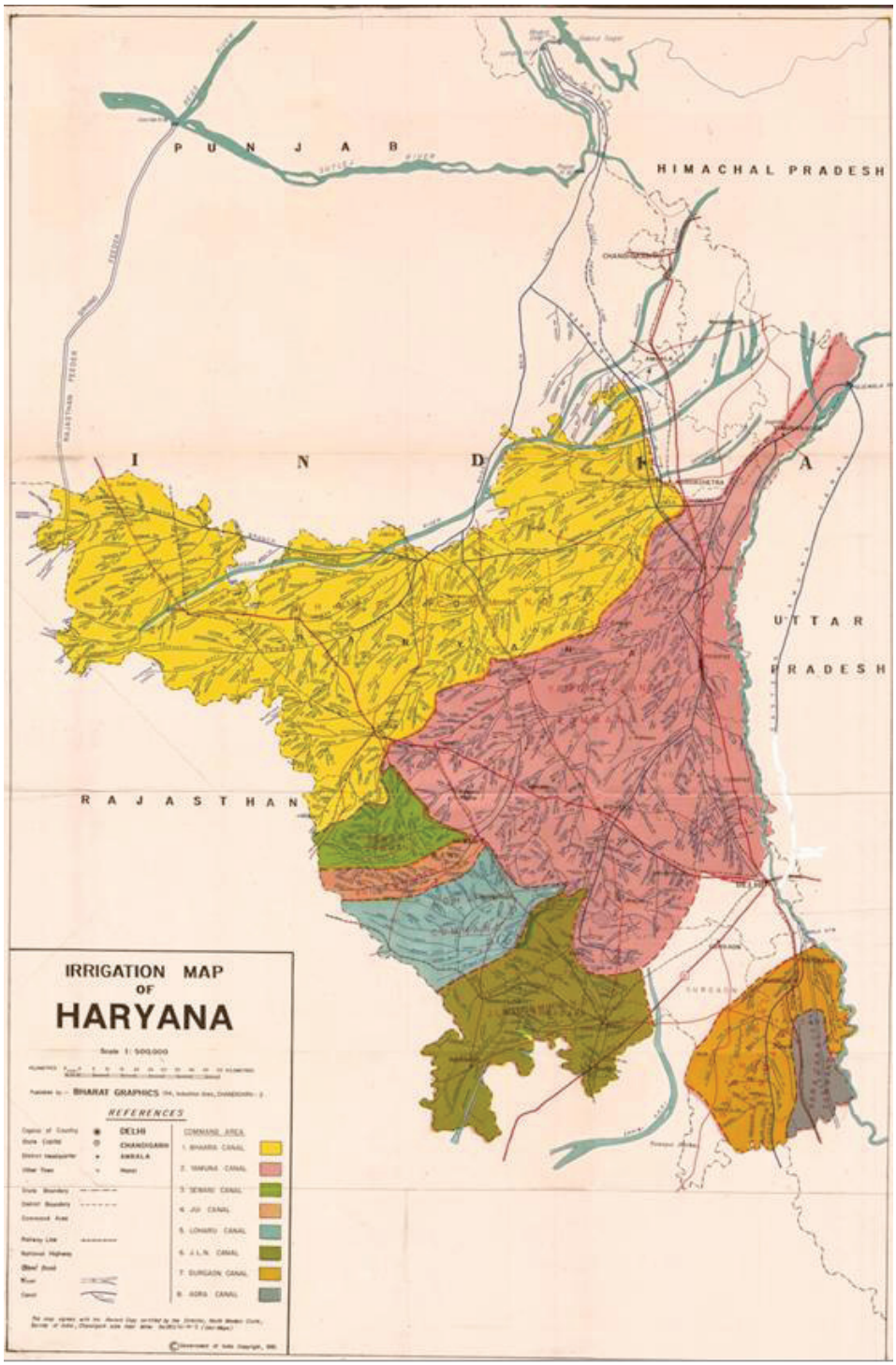
Basin	SN	Name of Rivers	Catchment Area (sq km)	Length* In KM Total / Haryana	Origin	Confluence	Tributaries	Dam/Barrages	Status
Indus	1	Ghaggar Coordinates: 29.5961°N 75.0176°E It forms 3.9% of Indus basin	32,132	Total-489 HP-25 HR-250 RJ-100	Tikar, Solan HP in Shivalik, enters in Haryana ing Malpur Panchkula	Lost in desert in Rajasthan	Markanda Saraswati Kaushalaya	Ottu Barrage in Sirsa	Polluted and dry has turned seasonal Causes immense floods Punjab has proposed a dam on the river near Banur Patiala
	2	Kaushalya River 30°46'35"N 76°54'57"E		Total 30 HP-10 HR-20	Shivalik Hills HP, Enters Haryana in Panchkula district	Ghaggar	No Information	Kaushalya Dam	
	3	Markanda / Aruna 30.3663° N, 77.1492° E		Total-120 HP-30 HR-90	Kala Amb, Shivalik Hill, HP enters in Haryana in Hamidpur, Yamuna Nagar	Ghaggar	Tangri Begna	Barrage at Jalbehra in Kurukshetra	Polluted Dry has turned seasonal
	4	Tangri / Dangri		Total-90 HP-20 HR-70	Shivalik Hill in Ambala	Markanda	Seasonal Shivalik streams	No Information	Polluted Dry Seasonal Causes Floods
	5	Saraswati/ Sarsuti		HR-110	Adi Badri, Yamuna Nagar	Ghaggar	No Information	No Information	Channel not traceable
	6	Choutang		HR-	?	?	?	?	Once considered as River Drisdavati an important tributary to Saraswati River, the river has several channels which functions as storm water drainage.
	7	Dohan / 28°25'0" N 76°9'0" E		Total-150 RJ-100 HR-50	Dohan Protected Forest , Aravali hills, in Alwar Rajasthan	Lost in desert	No Information	Hamidpur Check Dam	

					, Enters Haryana at Hamidpur, Narnaul Town, Mahendergarh				
	8	Krishanvati / Kasunti		Total-90 RJ-60 HR-30	Aravalli Range from Alwar district and Sikar district of Rajasthan, Enters Haryana at Bhedenty village in Mahendergarh	Lost in desert	No Information	Norana Check Dam Rajasthan	
Ganga	9	Yamuna		Total-1376 HR-350	Originate from Har Ki Doon Glacier in Uttarakhand, enters Haryana at Kalesar National Park, Yamuna Nagar	Flows to meet Ganga at Allahabad	Somb, Thapana, Sahibi	Hathini Kund Barrage	Polluted and has turned seasonal
	10	Somb		Total-50 HP-10 HR-40	Adi Badri, in Shivalik Hills , Yamuna Nagar,	Meets Yamuna at Kanalsi, Yamuna Nagar	Pathrala (Bali Nadi)	Dadupur Barrage (Pathrala Barrage)	Dry and has turned seasonal, Used as escape downwards Dadupur Barrage
	11	Thapana		HR-15	Kanyawala in Yamuna Nagar	Meets Yamuna at Kanalsi, Yamuna Nagar	Few local streams	No Structure	Perrinial but threatened
	12	Sahibi / Coordinates: 28°29′N 76°44′E	4,523.67	Total 317 RJ. 157 HR- 120 Delhi-40	Aravali range Jaipur, Rajasthan. It enters Haryana state at Jhabua, near the city of Rewari	Meets Yamuna in Delhi	Sota river, Kotkasim drain and Indori river	Masani	Dry & Heavily Polluted

Figure 1: State Rivers: Main Features

3. Haryana Rivers

Rivers in Haryana fall broadly within Indus and Ganga basins. River Ghaggar sub basin and its tributaries in the west of the state caters to the Indus basin, while river Yamuna and its tributaries in the east make up the portion of the Ganga basin.

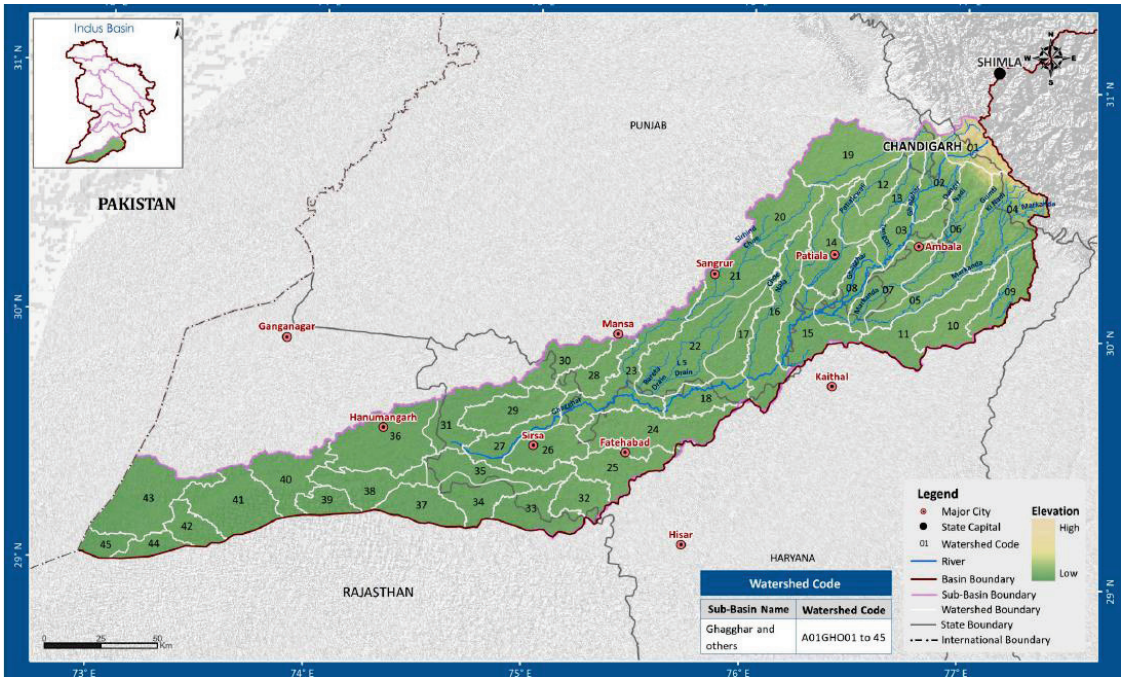


Map No 3: Sub Basin Map of Haryana

Map No 4: River Map of Haryana

The basin wise details of key rivers is as under

4. Indus Basin (Ghaggar Sub Basin)



Map No 5: Indus Basin in Haryana District

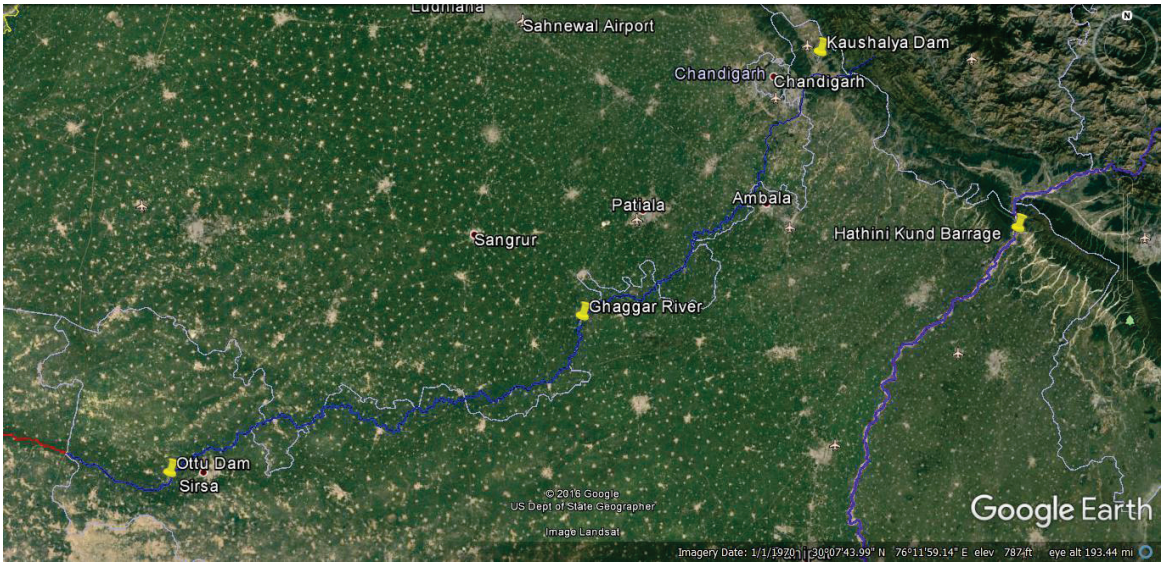
4.1 Ghaggar River:

The river rises in Shivalik hills in Solan district of Himachal Pradesh. It enters Haryana in Panchkula district . Hereafter the river flows making border between Punjab and Haryana for more than 100 Km. After Sirsa district the river leaves Haryana State and reaches Sri Ganga Nagar district, Rajasthan where after a certain length its course becomes untraceable. Once a perennial river, it is now seasonal at best. But during the monsoons, all its tributaries are found to be in flood.

4.2 Projects on Ghaggar River:

There are 2 dams and 5 lift irrigation schemes on Ghaggar River. 2 dams are situated in Shahibzada Ajit Singh Nagar district of Punjab namely Perch Dam and Jainti Dam. This Sub-basin contains only one lift irrigation scheme running in different phases in part of Haryana i.e Naggal Lift Irrigation Scheme Phase-I,II,III,IV,V. There have been efforts from Punjab Govt. to build a dam on the river near Banur, Patiala against which local are protesting. There is also Ottu Reservoir, formerly-small Dhanur lake, located near the village of Ottu, in Sirsa in Haryana. It is a feeder for the two Ghaggar canals (the Northern Ghaggar canal and the Southern Ghaggar canal) that carry irrigation water to northern Rajasthan state. In 2002, a new tourist complex was inaugurated at the barrage, and it was given the honorary name of "Chaudhary Devi Lal Weir". The Ottu barrage was constructed in 1896-97 using low-cost labor that was available due to a famine in the region at that time. Prior to the construction of the barrage and its associated reservoir and canals, agriculture in the then princely state of Bikaner had come under pressure from fluctuating water-supply in the monsoon season caused by diversions in the Ghaggar by riparian farmers further upstream. The

barrage and canals cost 6.3 lakh rupees to construct, 2.8 lakhs of which was paid by the princely state of Bikaner and the remainder by the British-run Government of India.



Map No 6: Ghaggar River Drainage

4.3 Pollution:

River Ghaggar faces severe pollution threats right from its origin. Several industrial units and towns in Himachal discharge their effluents into river. The Story remains unchanged in Haryana where around Mansa, Chandigarh the river has turned black and stinks unbearably. According Agricultural department reports, ground water in 40% of the area around the river has been declared unfit for drinking and irrigation. Villagers have been complaining of rise in cancer like diseases.

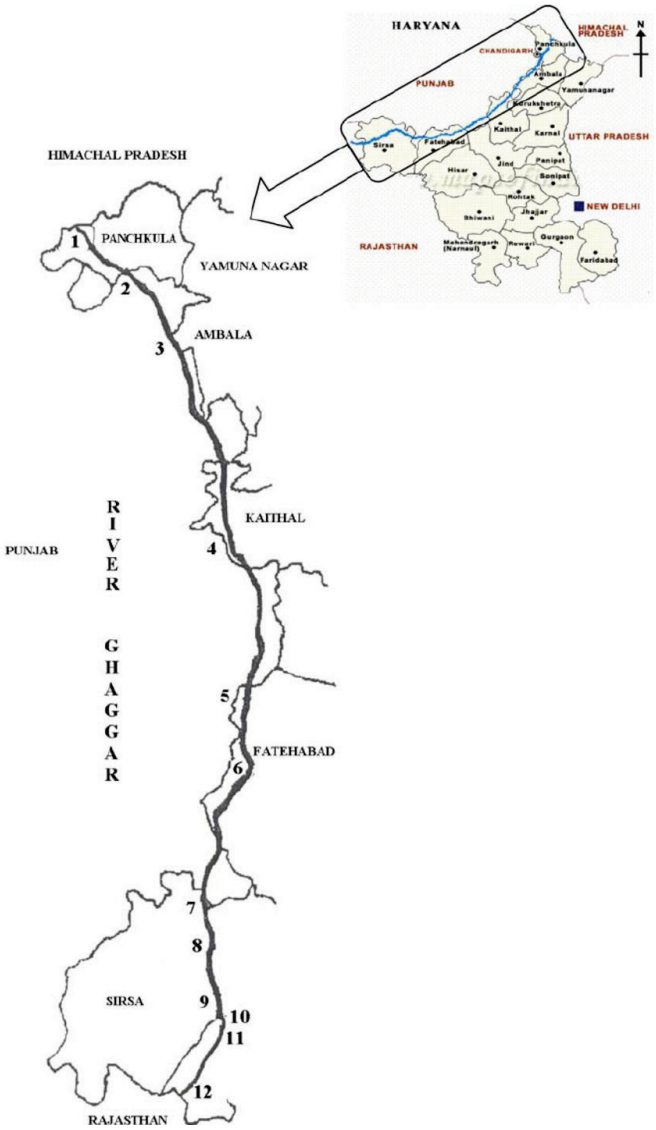
Figure 2: Water Quality of Ghaggar River

Industries and soap factories in Ratia Haryana have also been blamed for the Ghaggar's pollution. On the contrary sewage Haryana says that industrial effluent from Punjab area is entering river Ghaggar through Tangsu Drain, Dera Bassi Drain and Bari Nadi from Mohali, Dera Bassi town and Patiala city respectively.

A study in 2009 titled Pesticide Pollution of River Ghaggar, concluded that the water of river Ghaggar contains both HCH and DDT residues that may be attributed, respectively, to their previous use and continued use, mostly in vector control programs (Joia and Battu 2000) in some catchment areas of the river in three states of Himachal Pradesh, Haryana, and Punjab. It recommended a complete ban on sale and use of banned pesticides like DDT and HCH.

Likewise, a 2010 Central Pollution Control Board report titled Pollution Status of River Ghaggar describing various sources of pollution mentioned the river in highly polluted state.

Similarly a 2012 research paper titled Heavy Metal Pollution of Ghaggar River in Upper Reaches found concentration of heavy metals in the river water way beyond the maximum permissible limits of drinking at many sites. The study also revealed that the Ghaggar River water contained very high concentration of Cd and crossed the desirable as well as maximum permissible limit of BIS.



Map No 7: Ghaggar River and Settlements

In May 2016, the NGT took cognizance of pollution in the Ghaggar after request from the National Human Rights Commission that took a suo moto notice of the problem based on media reports. Responding to NGT notices in September, the Punjab government told the green tribunal that sewage treatment plants in 7 towns Zirakpur, Mohali, Patiala, Banur, Samana, Sardulgarh and Bhikhi were already commissioned and construction was on in Patran, Mandi Gobindgarh, Rajpura, Moonak, Sunam, Lehragaga and Khanauri. The hill state of Himachal, from where the river originates, however, claimed that its contribution of pollutants in the water body was lesser as compared to other states.

(http://www.hindustantimes.com/punjab/untreated-sewage-in-punjab-himachal-polluting-ghaggar/story-JElUppW0dcoHPONsCJAcPK.html)

Himachal has cited sewage load of Parwanoo residents as one of the reasons for the Ghaggar pollution, even as it claims that regular monitoring is done to check discharge of effluents by industrial units there. The affidavit says the deviation in water quality of Ghaggar's tributary Markanda river, which falls in Sirmaur district of the hill state, cannot be ruled out as civic waste is discharged into it from the unplanned growth of Naraingarh, Shahzadpur, Mullana, Shahabad and Jansa towns in Haryana. It also blames domestic and industrial waste from Haryana as the Markanda confluences with Ghaggar in Panchkula district after travelling 50km from Kala Amb in Sirmaur district.

Hearing the case on September 14, 2016 the NGT has given last opportunity to both Haryana and the Chandigarh administration to file status report on pollution in Ghaggar within two weeks. The matter is listed for hearing on October 20.

4.4 Flood

Once considered a lifeline for the villages alongside its bank, the river Ghaggar is now being termed as the 'River of Sorrow' due to the occasional floods it has caused in the past over a decade. Seasonal floods during heavy monsoon are a norm in these areas with loss to both life and property after heavy inflow of water in Ghaggar which then floods nearby villages. In Punjab the river causes the maximum damage in Patiala and Sangrur. 2010 floods caused a huge loss to thousands of residents in the districts. A few decades ago, this river used to spread its water in its banks, which were almost 500-metres-wide at certain places, due to which, the excess water got spread and caused minimal damage. But with the passage of time, illegal buildings came up alongside the river, and the damage increases every year.

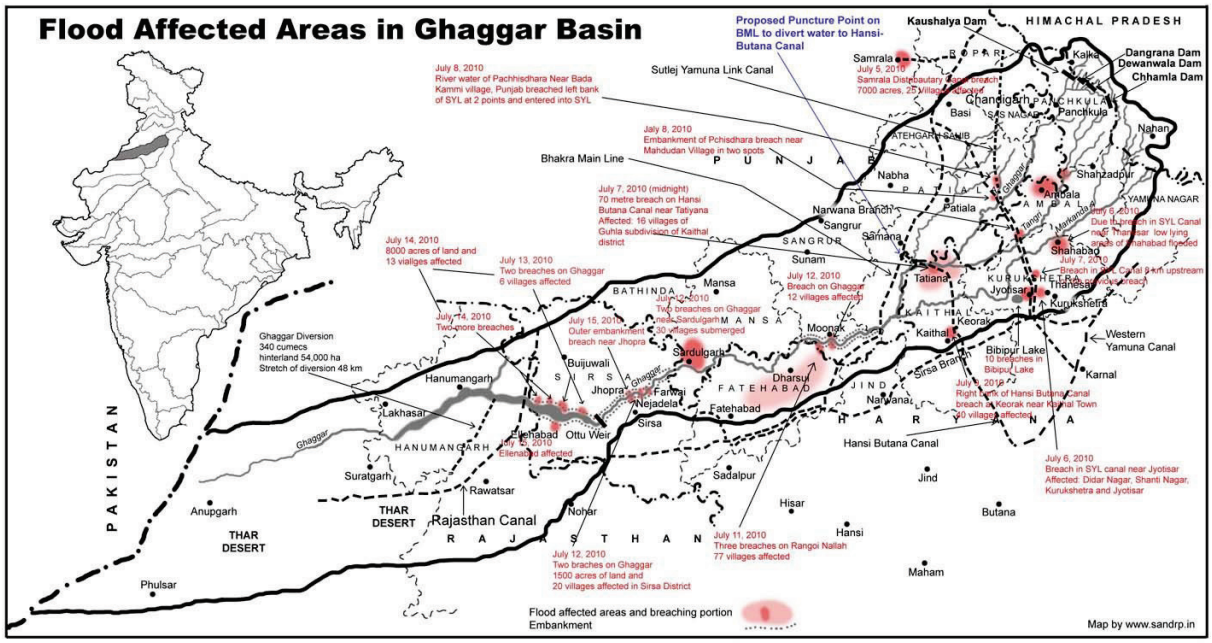
In 2004, around 25 villages in Sangrur district of Punjab were flooded with gushing waters of river Ghaggar. At that time, authorities in Haryana had alleged that Punjab was using portion of SYL canal in their territory as also the Narwana branch of the Bhakra system to drain out and divert flood waters from Punjab into Haryana. In 2011, also a swollen Ghaggar had wreaked havoc in over two dozen villages of Patiala and damaged hundreds of acres of paddy crop.

In Haryana also Ghaggar has caused many floods. While the river wade through Panchkula, Ambala, Kaithal, Fatehabad and Sirsa districts of the state, water is discharged in it at Panchkula, Guhla cheeka, Khanauri, Chandpu and Ottu.

On September 12, 2008, 58,670 cusecs were discharged from Ghaggar; 63,460 cusecs from Guhla cheeka on July 07, 2010; 49,500 cusecs from Khanauri on July 10,2010; 38, 000 cusecs from Chandpur on July 11 ,2010 and 20,700 cusecs on August 13 ,2004 at Ottu. The maximum flow of water in Yamuna was 8,06,464 cusecs on June 17, 2001; Markanda canal 59,000 cusecs on November 3, 2002; Tangri canal 47,818 cusecs on August 3, 2004. During a meeting on 13 January 2016, CM Manohar Lal Khattar had sanctioned 97.09 crores for 105 new flood prevention schemes during 2016-17. Apart from it, total 140 schemes of Rs106.05 crores are being implemented.

During floods, Ghaggar has the propensity to wreak havoc in Ambala (by Tangri river that eventually empties into Ghaggar), Kaithal, Patiala, Sangrur, Mansa, Fatehabad and Sirsa districts of the two states, destroying crops, houses, roads and railway lines and other infrastructure. Fatehabad and Sirsa districts, where the river covers almost 140 km, are among the worst hit. Experts say that the floods in the Ghaggar basin are frequent and furious because of gentle slope and a lack of horizontal drainage. The river has braided channels such as Rangoi Nullah that flow in narrow channels and overflow the banks due to the lack of slope in the eventuality of increasing surface flow. They also point out that floods in the region often become more destructive and have long lasting effects due to encroachments in the river bed and obliteration of surface drainage because of constructions of roads, railway lines, canals and urban expansion. The contours of natural slope and surface drainage have not been taken into account while preparing the layout of infrastructure development.

http://www.tribuneindia.com/news/haryana/ghaggar-s-path-intersects-with-unplanned-infra-development/98100.html)



Map No 8: Flood Effected Area in Ghaggar Basin

SANDRP in its report titled 'Unprecedented flood in Ghaggar Basin' that there are a number of other factors that have contributed to the Ghaggar basin flood disaster. At a number of places the flood plains and even flow paths have been encroached upon by various builders, with the partnership of the bureaucrats, politicians and the engineers. Secondly, the local water harvesting structures have been poorly maintained. The report also found that the ill designed (for example the

siphon over the Ghaggar river) and ill maintained Hansi Butana Canal has played a crucial role in spreading the flood disaster in Ghaggar basin to new areas in 2010. According to report, twenty years ago, a committee was formed named "Ghaggar Standing Committee", which was supposed to work on the flood problems of the basin. The committee is chaired by a Central Water Commission member and includes officials of Punjab, Haryana and Rajasthan.
(http://www.sandrp.in/floods/An_Analysis_of_the_Flood_Disaster_in_Ghaggar_Basin_in_July_2010.pdf)

Dams, Rivers & People

Ghaggar Basin: Some basic figures

Ghaggar Watershed:

Basin	Name of Stream	Area (sq km)
Ghaggar	Dungri Nadi	1138
	Saraswati Saraswati	1511 2272
	Phagna Nadi	2708
	Patiali Rao Jainti Devki Rao	1594 1862
	Choa Nadi	985
Total	Ghaghar	20062 32132 sq km

Source: http://cgwb.gov.in/watershed/cdghaghar.html

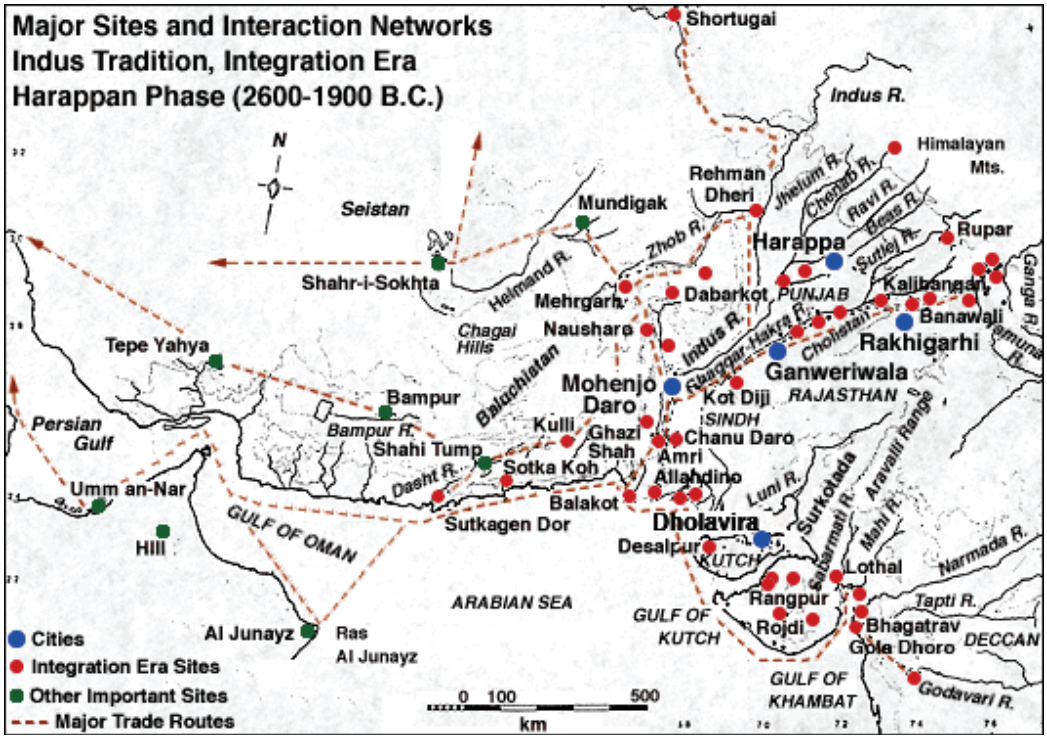
In April 2014, Haryana High Court directed the Central Ghaggar Styanding Committee to resolve the issue of floods caused by Ghaggar River in Punjab and Haryana at the earliest. While hearing a petition in this regard,the high court maintained that it is an "inter state dispute" and should be resolved without delay. Earlier,the court had directed the committee to convene a meeting to resolve the dispute pertaining to non-channelisation of Ghaggar river. In response to the PIL,the Punjab government had blamed Haryana for creating roadblocks in the project. In its affidavit ,it had submitted that out of the total length of the river,40 km from Khanauri to Karail (exit point of Punjab),22.45 km needed to be widened. However, he remaining 17.55 km could not be widened due to "certain objections raised by Haryana",Punjab had claimed. To ensure that no more floods take place due to non-channelisation of the river, the court had repeatedly directed Punjab,Haryana and Rajasthan governments to come up with a solution.
http://indianexpress.com/article/india/india-others/high-court-to-ghaggar-panel-flood-issues/)

Map No 9: Activity Area along Ghaggar Basin & Indus Basin

4.5 Historical Importance:

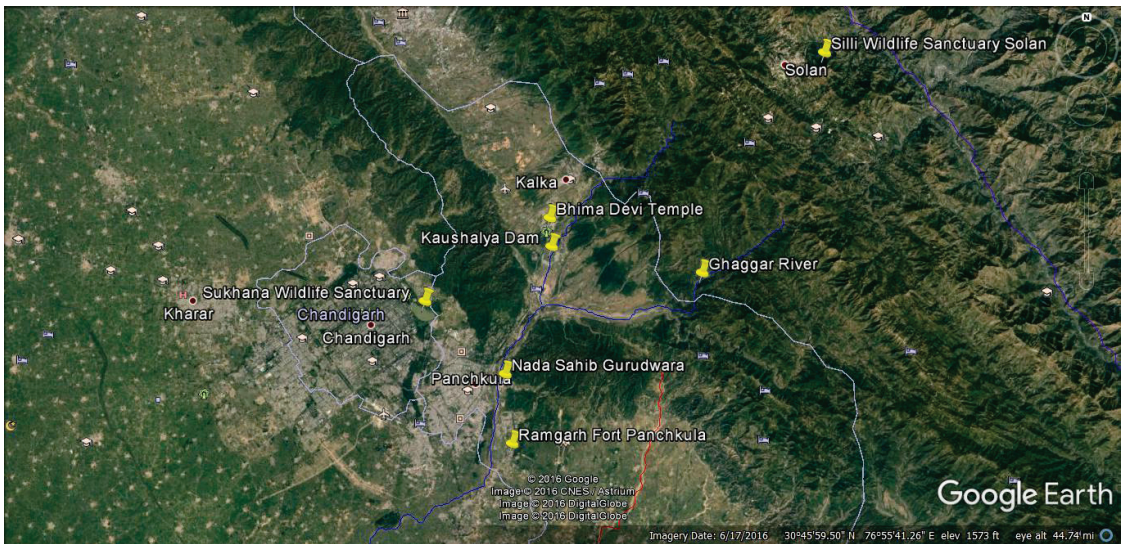
The Ghaggar River is known as Ghaggar before the Ottu barrage and as the Hakra downstream of the barrage. Not only, nineteenth and early 20th century scholars, but also more recent authors, have suggested that the Ghaggar-Hakra might be the defunct remains of the mythological Sarasvati of the Rig Veda. Recent geophysical research does not support this idea. It shows that the Ghaggar-Hakra system was not sourced by the glaciers and snows of the Himalayas, but rather by a system of perennial monsoon-fed rivers.

Along the course of the Ghaggar-Hakra River are many archaeological sites of the Indus Valley Civilization. The wide river bed (paleo-channel) of the Ghaggar river suggests that the river once flowed full of water during the great meltdown of the Himalayan Ice Age glaciers, some 10,000 years ago, and that it then continued through the entire region, in the presently dry channel of the Hakra River, possibly emptying into the Rann of Kutch. It is supposed to have dried up due to the capture of its tributaries by the Indus system and the Yamuna river, and later on, additionally, the loss of water in much of its catchment area due to deforestation and overgrazing.



Map No 10: Indus Trade System

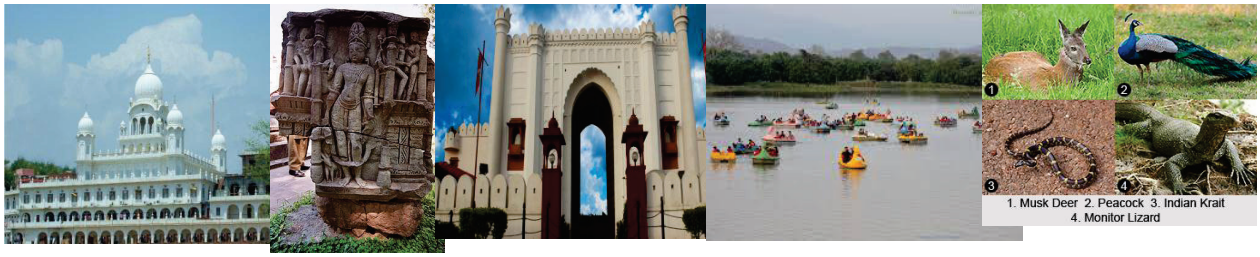
Recent studies show that Bronze Age sediments from the glaciers of the Himalayas are missing along the Ghaggar-Hakra, indicating that the river did not or no longer have its sources in the high mountains. Satellite photography has shown that the Ghaggar-Hakra was indeed a large river that dried up several times. The dried out Hakra river bed is between three and ten kilometers wide. Recent research indicates that the Sutlej and possibly also the Yamuna once flowed into the Ghaggar-Hakra river bed. Painted Gray Ware sites in the Ghaggar river valley indicates that during this period the Ghaggar River had already dried up. Most of the Mature Harappan sites are located in the middle Ghaggar-Hakra river valley, and some on the Indus and in Kutch-Saurashtra. The Indus Valley Civilization flourished in the basins of the Indus and the Ghaggar-Hakra River.



Map No 11: Important places along & around Ghaggar River

Historical, Religious & Wildlife Sites along and around Ghaggar River: Nada Sahib is a Sikh Gurudwara in the Panchkula district of the Indian state of Haryana. Situated on the banks of the Ghaggar-Hakra River in the Sivalik Hills, it is the location where Guru Gobind Singh halted while travelling from Paonta Sahib to Anandpur Sahib after the Battle of Bhangani in 1688.

Bhima Devi Temple The Bhima Devi Temple Complex, nicknamed Khajuraho of North India for its erotic sculptures, comprises the restored ruins of an ancient Hindu temple dating from between 8th and 11th century AD, together with the adjacent 17th-century Pinjore gardens (a variant of Mughal gardens), located in Pinjore town in Panchkula district of the state of Haryana, India. The Bhima Devi temple was sculptured during the reign of Gurjar Pratihars. Most of the comprising sculptures and architectural, which were ruined during Mughal period under Aurangzeb, are of the times of the Gurjar Pratihars.



Nada Sahib Gurudwara | Bhima Devi Temple | Ramgarh Fort | Sukhana Lake | Silli Wildlife Sanctuary

a) Ramgarh Fort

Ramgarh was one of the independent ("Khud-Mukhtyar") Cis-Sutlej states of The Punjab ruled by Chandel Rajputs, whose ancestry goes back to Ramayana and Mahabharata days. Chandel Rajputs had their base of power in Bundelkhand (Madhya Pradesh) and they ruled over the entire Central India in the medieval period before the arrival of Prithviraj Chauhan. World-famous Khajuraho temples were built by them and well-known warriors Aalah-Udal, whose exploits are still evoked through folk songs, were Chandels. Nearly 1,300 years ago, The Ramgarh family's ancestors transferred from there to Punjab and established the state of Kot Kahloor. The capital was later shifted to Bilaspur and one branch of the family of the Raja of Bilaspur came to Ramgarh nearly 360 years ago and laid the base of Ramgarh. These are also Cactus Garden, Pinjor, Yadavindra Garden tourist spots in Panchkula districts.

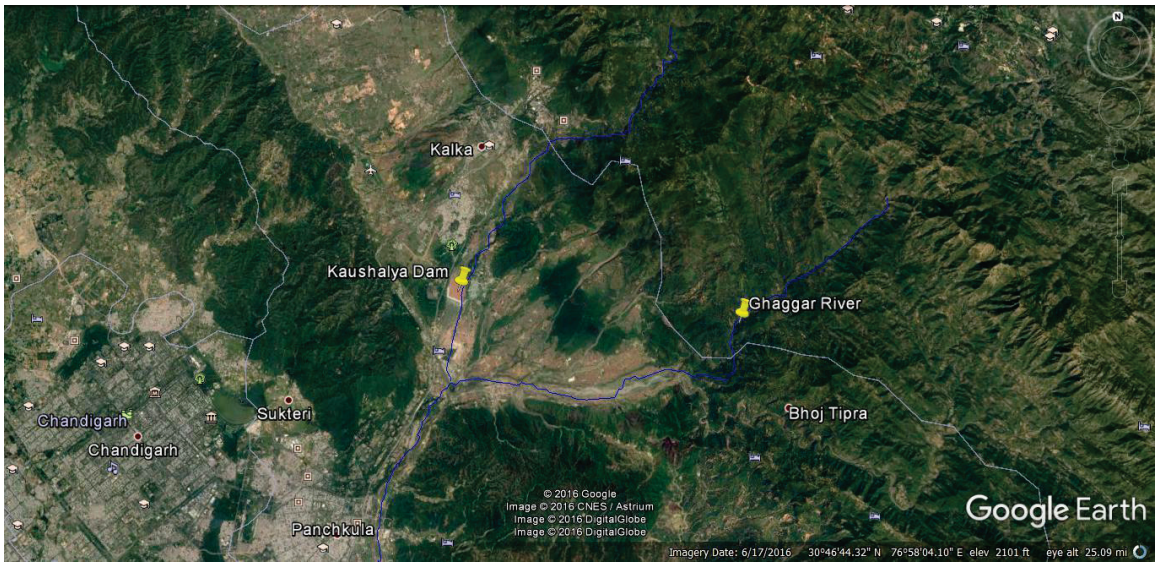
b) Sukhna Wildlife Sanctuary

Sanctuary is spreading over an area of 2600 ha. It is situated at 1 Km. in the North-East of Sukhna Lake. It forms the part of Sukhna lake catchment area falling in Shivalik hills. Shivalik hills are ecologically sensitive and geologically unstable and thus are highly prone to soil erosion during rains. The soil in the Shivaliks is sandy, embedded with pockets of clay which is highly susceptible to erosion by surface run off. Sukhna Lake was constructed in 1958 and in sixties & early seventies, the rate of siltation of the lake was very high due to high rate of soil erosion from its catchment area.

c) Silli Wildlife Sanctuary Solan, Himachal

Shilli Wildlife Sanctuary, Himachal Pradesh was established in 1963 in order to preserve the Himalayan Black Bear which is an endangered creature. Deodar and Fir forests, along with medicinal plants as well as wild animals including Musk Deer, Leopard, Flying Squirrel and other animals are existent here. Shilli Wildlife Sanctuary is considered to be one of the most picturesque locales of Himachal Pradesh which is based at a distance of nearly 5

kilometres away from Solan District. Shilli Wildlife Sanctuary was set up during 1963 and was aimed at conserving the endangered animals of that time, particularly the Himalayan Black Bear.



Map No 12: Location of Kaushalya Dam

5. Kausalya River

The Kaushalya a tributary of Ghaggar river, is a river in Panchkula district. The Kaushalya river rises in the Shivalik hills on the border of Haryana and Himachal Pradesh, and flows through Panchkula district and confluences with Ghaggar river near Pinjore just downstream of Kaushalya Dam.

The Kaushalya Dam is an earth-fill embankment dam, in Pinjore. It was constructed between 2008 and 2012 with the primary purpose of water supply. The first plan, which never materialized, for a dam on Ghaggar river was first proposed by the British raj in the mid 19th century to provide drinking water to Ambala Cantonment.

The proposal was revisited only in the 1960s to construct a dam on Ghaggar river at Gumthala near Chandimandir to provide water to Chandigarh and control floods in Punjab, this plan was abandoned in 1999 as it would have submerged over 4,000 acres of land resulting in relocation of a large number of people. In 2005, the revised plan to build series of smaller dams on the tributaries of Ghaggar river was approved by the Government of Haryana and the construction of the Kaushalya dam commenced in 2008 which was completed in 2012.

The dam, built by the Government of Haryana at the cost of 217 crore, is a 700 meters long and 34 meters high earth-filled dam. It was built for providing 40 cusecs or 25 MGD (million gallons per day) of raw water to Panchkula city, recharge ground water, check flash floods, promote tourism and fisheries in reservoir area. Now, it has become an important wetland that is home of many endangered migratory birds.

In a 2012 study titled "A study of water quality of Kaushalya River in the submountaneous Shivalik Region" river water samples were collected and analysed for physicochemical and bacteriological evaluation of pollution of Kaushalya River in Parwanoo. The water quality was studied quarterly at two sites at upstream and downstream regions during 2011 in the months of January, April, July and October. Most of the parameters analysed for Kaushalya River were in acceptable range except COD, Alkalinity, Hardness, Total Coliform and Faecal Coliform which showed human, animal and agricultural activities as the main sources of pollution. Trace metal and pesticides levels were low suggesting low contamination of the river by industrial wastes and toxics. However due to presence of a water treatment plant in the village Kamli from where the water of Kaushalya river is supplied to different sectors of

Parwanoo, the river is suitable for drinking, bathing, recreation, irrigation and industrial uses, etc. Thus the overall water quality of the study site remained within the safe limits throughout the study period. Though the river is safe, still some of the conservation and management plans are proposed to reduce the sewage and the agricultural impacts on the river.
(http://www.ijstr.org/final-print/sep2012/A-Study-of-Water-Quality-of-Kaushalya-River-In-The-Submountaneous-Shivalik-Region.pdf)

In July 2014 Comptroller and Auditor General (CAG) raises questions on the success of the Kaushalya. CAG said that the objective of providing drinking water to Panchkula town from the Kaushalya dam constructed at a cost of Rs 208.37 crore could not be achieved. (http://www.nyoooz.com/chandigarh/2563/cag-raises-questions-pours-cold-water-on-kaushalyadam)

In December 2005, the Haryana government approved a project for construction of an earthen dam across river Kaushalya near Pinjore for Rs 51.37 crore with a view to supply drinking water to Panchkula town, recharge ground water, check flash floods, promote tourism and fisheries in reservoir area. The administrative approval was revised to Rs 217 crore in September 2011 due to increase in the cost of land, height and top width of the dam to provide passage for residential sectors being developed by HUDA on the other side of river. The dam was finally constructed with a 34-metre height and a 30-metre top width at a cost of Rs 208.37 crore till May 2013. However, CAG pointed out that the fact remains that the envisaged benefits from the project were not achieved as the envisaged quantity was 40.3 cusecs/day (16 July to 30 September) and 18.4 cusecs/day (1 October to 15 July). In June 2013, the water level in the reservoir was at elevation level of 456.90 metre against the bed level of 450 metre, whereas the outlet from where water was to be supplied to HUDA was at 460 metres. As such no water could be supplied to HUDA.
Elaborating on the manner in which the contractor was unduly favoured, CAG pointed out that as per the contract, liquidated damages at the rate of 10 per cent of value for the work/final contract price were to be levied against the agency for non-completion of work in stipulated time. Extension in time was granted to the agency up to March 31, 2011. But the agency failed to complete the work even within the extended time limit which was completed by June 2012. In March 2015 CAG while raising the same concerns again termed the dam project scam-ridden. These concerns were again raised by CAG in March 2015. In the summer of 2016 the Dam ran dry causing water crisis in the Panchkula district.

Figure 3: Kausalya Dam

Kaushalya dam goes dry, panchkula too facing water shortage

With the rain-fed Kaushalya Dam that supplies around 18 cusecs to the city drying up due to scanty rainfall in winter, the summer could bring testing times for residents. With no supply from the dam for over a week and the summer rising to its peak, the city could either live with water shortage or run its tubewells for 22-23 hours a day, leading to more electricity consumption. The dam has previously been supplying 5-6 cusecs.

The dam being non-functional means that around 36 million litres a day (MLD) are not available to the system (1 cusec translates into a flow of around 28 litres per second). Even by a conservative estimate, the shortage can be put at around 10% of the demand. The total demand of Panchkula has been put at 155 MLD with roughly the same supply coming in, but summers usually do see some shortage.

The water from the dam, built at a cost of Es 200 crore, is being supplied to Sectors 1, 2, 3, 4, 5, 6, 7, 8, 9 and 11 in the city. With this supply not available, tubewells are being run around the clock. It is also unsure that how will the dam authorities meet their commitment of providing 40 cusecs in rainy season, after the town somehow manages to tide through the summer.

Irrigation department executive engineer Vinod Garg has a different version. “Kaushalya river is fed through rains. This time there was little rain in winters. This has forced us to halt supply. In the past, we have been able to provide as much water as Haryana Urban Development Authority (HUDA) has demanded. It is wrong to say that we have been providing less water.”

Shortage also from other sources

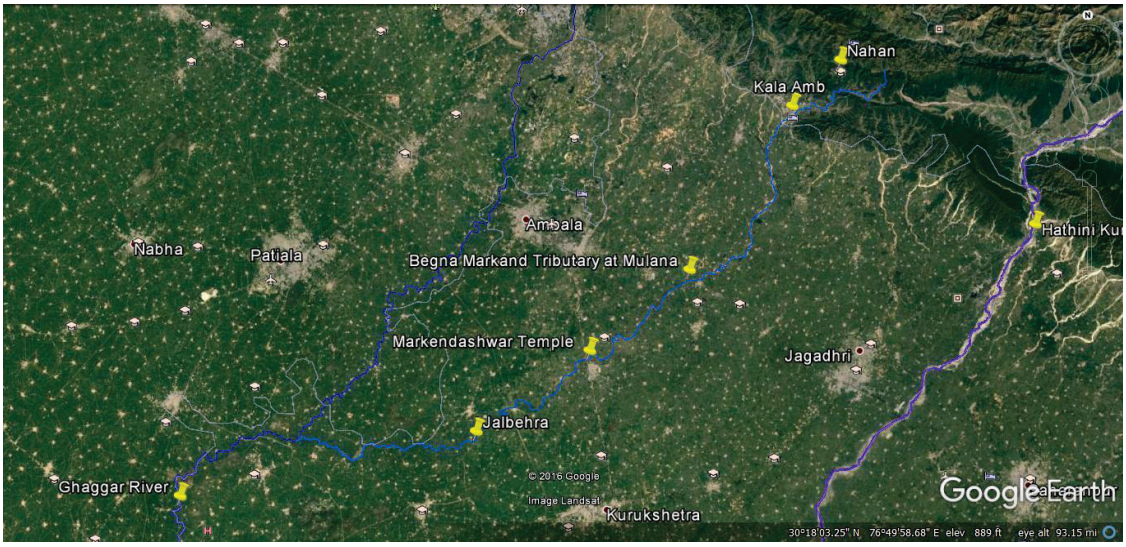
From Kajauli waterworks too, Panchkula is getting just 9 cusecs though there is a commitment of 12 cusecs. “They (the dam authorities) have not given any specific reason for not providing remaining 3 cusecs,” said Ajay Bansal, SDO, HUDA.

One of the solutions to avoid any shortage could be the use of tertiary treated water for uses like watering of golf courses. Now, potable water is being used for such purposes. HUDA executive engineer Karn Singh said, "We expect to start supply of tertiary treated water by May. When the supply starts, we will be able to save 25 MLD of potable water."

Panchkula is also expecting additional 6 cusecs of water from Kajauli as pipes have been laid between Sector 39 and Sector 1 waterworks in Panchkula. HUDA SDO Bansal confirmed that demand-supply situation in Panchkula was broadly in sync, but summer has traditionally tended to present a challenge.

One of the solutions to avoid shortage could be the use of tertiary treated water by big establishments for uses like watering of golf courses, etc. Currently, potable water is being used for such purposes. HUDA executive engineer Karn Singh said, "We expect to start supply of tertiary treated water by May. Such a connection has been made for the golf course and the process of other parks in process. When the supply starts, we will be able to save 25 MLD of potable water."

(Source: http://www.hindustantimes.com/punjab/kaushalya-dam-goes-dry-panchkula-too-facing-water-shortage/story-jm1clZomtjwFbJOfca7QJN.html)



Map No 13: Important location along River

6. Markanda River

Markanda River is a main tributary of the Ghaggar River. It originates in the Shivalik hills on the border of Haryana and Himachal Pradesh State, and flows westward through Haryana and finally joins River Ghaggar from right side at the out circuit of Ckeeka town in Kaithal district.

The ancient name of river is Aruna and it used to feed Saraswati River. In present time, Tangri and Begna are its tributaries. Over the years the river has turned seasonal but during monsoons, it swells up into a raging torrent, which is notorious for its devastating power brings floods to villages and towns located along it course. The surplus water is carried on to the Sanisa Lake where the Markanda joins the Saraswati. There is a water storage structure built on river at Jalbehra in Kurukshetra district. Industries and towns discharge polluted water into the river. The River plays a significant role to meet the demand of farmers for irrigation in this particular region.

		
Jalbehra Barrage	Markendashwar Temple	Begna Tributary

The much revered has come under a threat from the unplanned industrial growth in the neighbouring Nahan and Kala Amb town of Himachal. With a number of multinational companies setting up units there, huge quantities of effluents are being released into the Markanda, which have completely destroyed the biotic life in the river.

The Kala-amb region in district Sirmour has about 350 industrial units and most of the units are situated around Markanda River. The major industries in these areas include pharmaceutical, chemicals, ghee industry, food industry, ferroalloy, paper & pulp etc. These industries but are discharging their effluents in the nearby natural drains and are being ultimately collected in Markanda River. The bio-chemical oxygen demand (BOD) is 200 milligram per litre as against the permissible limit of just 3 mg per litre now. Increasing industrialization and urbanization in these areas are resulting in the degradation of natural resources. The disposal of effluents generated by the industries into river, can pose a great threat to life. Water from handpumps of a large number of villages along the river bank was been rendered unfit for human consumption. The Haryana Pollution Control Board had taken up this matter with the HP government a number of time but to no avail. The matter was also brought to the notice of the Central Pollution Control Board and was also raised in state Assembly.

मारकंडा में अचानक उफान टूटा तटबंध, मची तबाही **(Dainik Bhaskar 16 Aug. 2013)** आखिरकार मारकंडा ने अपना रौद्र रूप दिखा ही दिया। मारकंडा नदी अचानक उफान पर आ गई। पानी ने तटबंधों को तोड़कर भारी तबाही मचाई। गांव अरुप नगर, कठवा, गुमटी, कलसाना, कठवा और मुगल माजरा और कई डेरों में पानी घुस गया। मारकंडा के साथ लगते डेरों के बाशिंदों को अपने घरों की छतों पर चढऩा पड़ा। नदी किनारे स्थित एक गौशाला पानी में डूब गई। इसके चलते आधा दर्जन से ज्यादा गायों की मौत हो गई। मारकंडा के उफान पर होने के चलते पहले से ही लोगों की नींद उड़ी हुई थी। पानी ने प्रशासन के दावों की भी पोल खोल कर रख दी। प्रशासनिक लापरवाही का खामियाजा लोगों को भुगतना पड़ गया। आसपास के सैकड़ों किसानों की फसलें पानी में डूब गई। मारकंडा के साथ के गांवों के लोग पहले ही तटबंधों के कमजोर होने के चलते मरम्मत की मांग कर रहे थे। खासकर दामली बांध के टूटने की आशंका पहले ही लोग जता चुके थे। लेकिन सिवाए दावों के कुछ नहीं हुआ। मंगलवार रात से नदी का जलस्तर बढऩे लगा था। बुधवार सुबह पानी खतरे के निशान को पार कर गया।

High alert sounded in Ambala after heavy rains flooded Tangri, Markanda rivers
(UNI 23 July 2016 High alert has been sounded after heavy rains in Morni hills floods the Tangri river flowing through the district. The Markanda river has also been flooded by rain water from the mountainous region of Shivalik hills. Every year both the rivers start flowing above the danger mark on rains in the mountains.

Industrial effluents polluting the Markanda River in Sirmaur

The HP State Pollution Control Board failed to nail down the free flow of industrial effluents polluting the drinking water in the down streams as local resident's of Sirmaur complaint.

More than half dozen residents of Ambwala, Sainwala, Moginand etc falling downstream of Kala Amb industrial area in Sirmaur district of Himachal Pradesh alleged that their cattle were under the spate of various water borne diseases. They were facing the apathy of State Pollution Board which could not force the paper units and pharmacy firms to release their industrial effluents after treating it in sewerage treatment plants as many of them were openly flouting the norms.

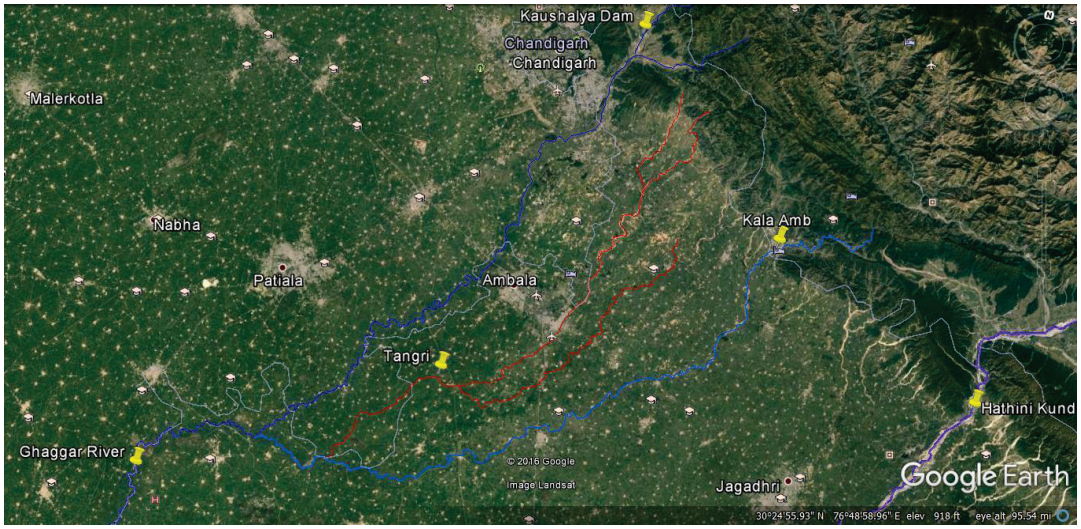
Villagers lament that they were becoming victims of various skin diseases as they have to use the polluted water of this river for bathing and washing clothes daily.

Now the villagers viz. Mr. Asha Ram, Kundan Singh, Prem Singh, Hari krishan, Roop Ram etc. urged the district administration Sirmaur and State Pollution Board to take the sample of effluents for testing the level of pollution as many industries have virtually converted Markanda river into sewerage pool engendering lives of animals and human beings.

Additional Deputy Commissioner Sirmaur Mr. Manmohan Sharma told that after having complaints from the villagers, the administration will act swiftly taking action on the industrialists if found guilty of contaminating the rivers with its industrial waste and chemical effluents form their units.

(Source:http://www.himvani.com/news/2016/02/19/industrial-effluents-polluting-the-markanda-river-in-sirmaur/)

There is a mythical temple Markandeshwar Mahadev along Markanda River. It's a Lord Shiva temple and located in the town of Shahabad Markanda, in Kurukshetra district. The name Markandeshwar is associated with Maharishi Markandeya, a great devotee of Shiva. The river derives its name from Maharishi Markandeya as well and several ancient ashramas of Rishi Markandeya can be seen along the banks of the river in the neighboring districts. The Markandeshwar Mahadev temple is supposed to be the place where the young Markandeya was praying to Shiva in order to win over his destiny. This is where Shiva fought with Yama and blessed Maharishi Markandeya with the boon of immortality. The original temple dated back to pre-Mahabharat times and was founded in the third millennium B.C. The current structure is more recent and dates back to the early 20th century. Pilgrims turn out to visit the Markandeshwar Mahadev temple in large numbers on Sundays and during the month of Shravan.



Map No 14: Basin of Markanda River

7. Tangri River

The Tangri River rises between Ghaggar and Markanda in Shivalik hills in Ambala district. The river also pronounced as Dangri first meets the Markanda from left side and then after flowing about 15 kilometers together both river merges with Ghaggar. The river has become seasonal, though it has a good network of smaller streams. Unfortunately all the feeder creeks are rain fed and largely carry storm water during monsoon. As a result the river has become notorious for causing floods in the region. (Here is link to a 2010 You Tube video showing Tangri river in full spate. In 2010, the river breached the embankment and caused unprecedented flooding in Ambala and Kurukshetra.

Overflowing Tangri river causes flash flood
Ambala | Thursday, Sep 23 2010 IST

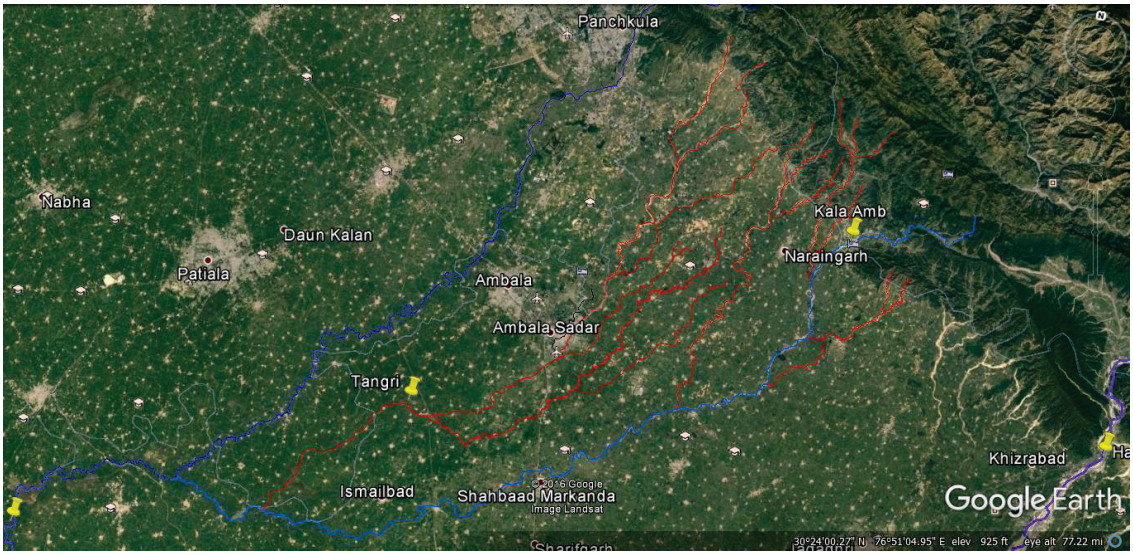
The catchment area of Tangri river in Ambala Cantonment was flooded and the rail and road traffic disrupted for over three hours due to a flash flood today.

Flood water from the overflowing Tangri spread on Ambala-Dehradun National Highway around Maheshnagar bridge and entered residential houses, marriage palaces, a school and a pharmaceutical factory, besides low lying areas.' Houses on the river bank and within the bed of river were submerged and residents were seen sitting on the roof tops till water started receding. There was knee-deep water flowing on both sides of the bridge and traffic was affected for more than three hours. The traffic on railway line between Ambala and Saharanpur stations was also affceted after flood water submerged the track on a bridge.

(Source: http://news.webindia123.com/news/articles/India/20100924/1593978.html)

Since the river remains dry for most of times, its floodplain has been encroached. In July 2016 this year, fearing flood damage during floods, district administration Ambala asked the Residents of colonies built on the Tangri river bed in Ambala Cantonment are living under the fear of floods. The residents however said that the property dealers have sold the land to them at cheaper rates. And there were more than 1700 families reside on the river bed. For Government the houses were illegal but residents claimed to have legal water and electricity connections and were paying house tax. It was found that there has been negligence on the part of the Town and Country Planning Department and the Municipal Corporation that they didn't object and let illegal colonies mushroom on the river

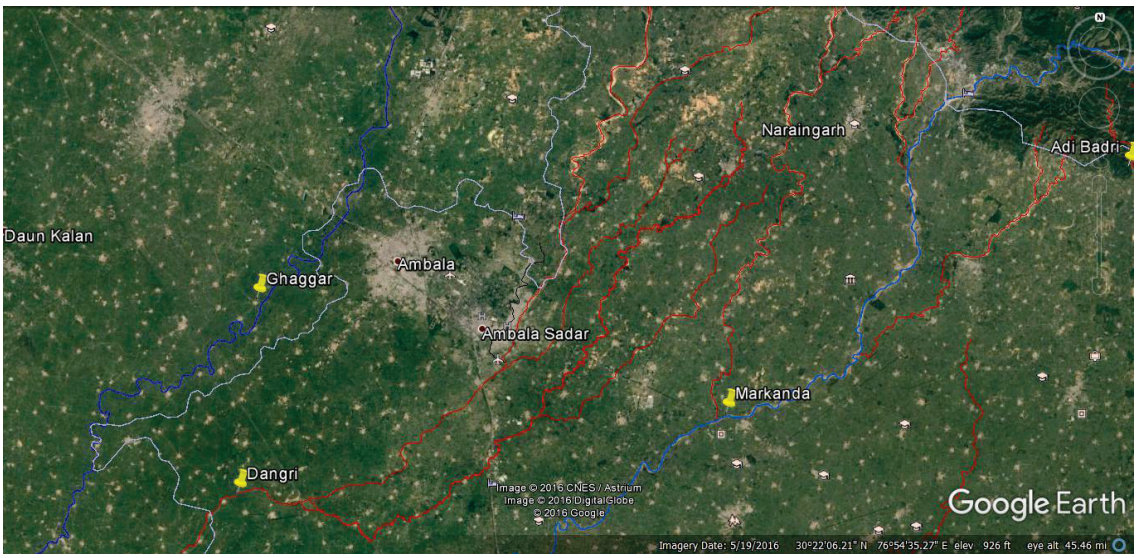
bed. As a result, the size of the river has squeezed. As per rules, no one can construct a house on the river bed. To safeguard the residents, de-silting of the river is in progress. A few years ago, people had lost their belongings when water entered their homes.



Map No 15: Tangri River Basin

Local people say that a large number of illegal houses, godowns, workshops etc have come up on the riverbed in the last few years. Demanding regular vigil and checks they said that by just putting notices, the government department cannot wash its hands of the responsibility to keep river bed intact and free from encroachment.

Unfortunately the residents were not relocated and faced flooding during July 2016. The foundation of several houses has weakened because of water entering houses over the years. The majority of the residents are daily-wagers and they are not in a position of getting raising a house somewhere else. Affected people appealed to the administration to make announcements when it gets the information about the water being released in the river so that they got ample time to evacuate.



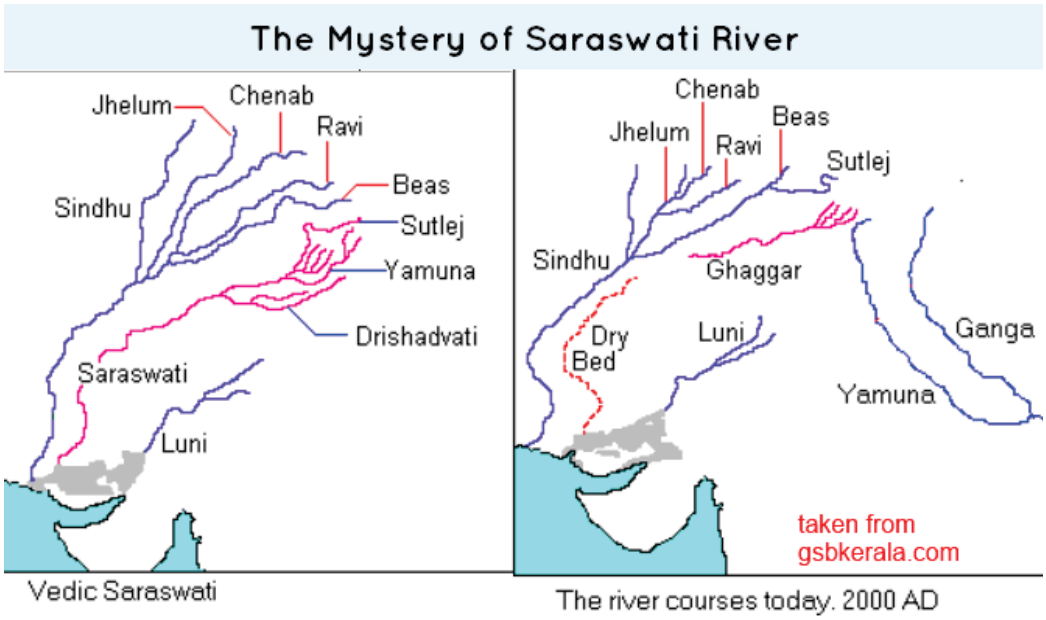
Map No 16: Various Seasonal Streams Running Through Ambala

In August 2016 the State Government has decided to notify the 7-km stretch from Boh village to Ghasitpur to keep a check on the mushrooming of illegal colonies on the Tangri river bed. While the administration calls the colonies

illegal, residents are miffed at the situation and claim they had been issued water and electricity connections. They also claimed they had been paying house tax. They asked why no action was taken when the colonies were being built. The residents said the government should rehabilitate them.

8. Saraswati / Sarsuti

The legendary Saraswati River has been subject of discussion for over few decades. Volumes of research work have given different theories of its existence. Study of paleochannels by Indian Space Research Organization has confirmed presence of a river emanating from Shivalik Hills and then flow through Haryana, Rajasthan parallel to Satluj and then falling in the ocean in Little Runn of Kutch.

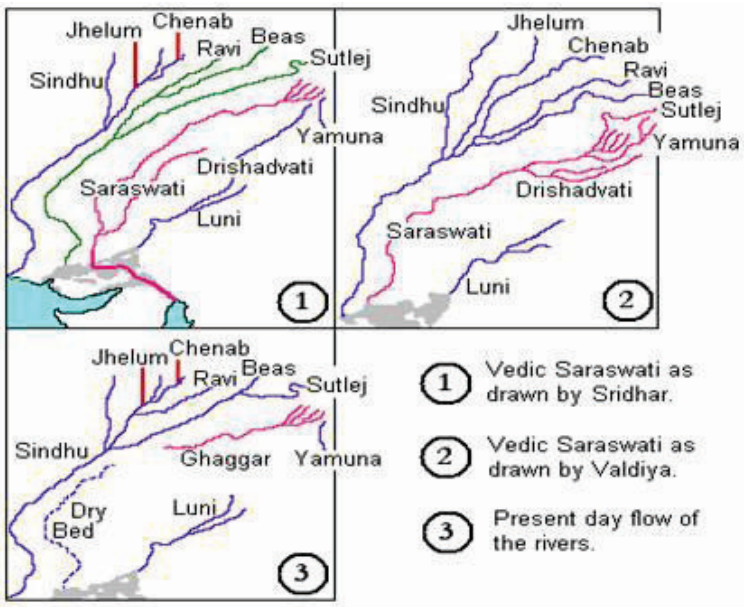


Map No 17: Dry Bed of Saraswati River

The river has been linked closely to Vedic civilization. Several Harappa sites along the river course have been discovered. Rich data has also been collected on historical and mythical evidences mentioning the 'disappeared' river. However confusion still prevails over origin place of river. Not all the scholars agree that it was a glacier fed river. Similarly there are various reasons being given behind disappearance of the river, which fails to dispel mysteries doing round in general public.

In Vedic era, it was believed to be one of the strongest rivers with Great Satluj and Yamuna joining as feeder from either direction. The tectonic event occurred during 5000 BC led to Saraswati going dry with course broken and Satluj and Yamuna tributaries moving away to join Indus and Ganga respectively.

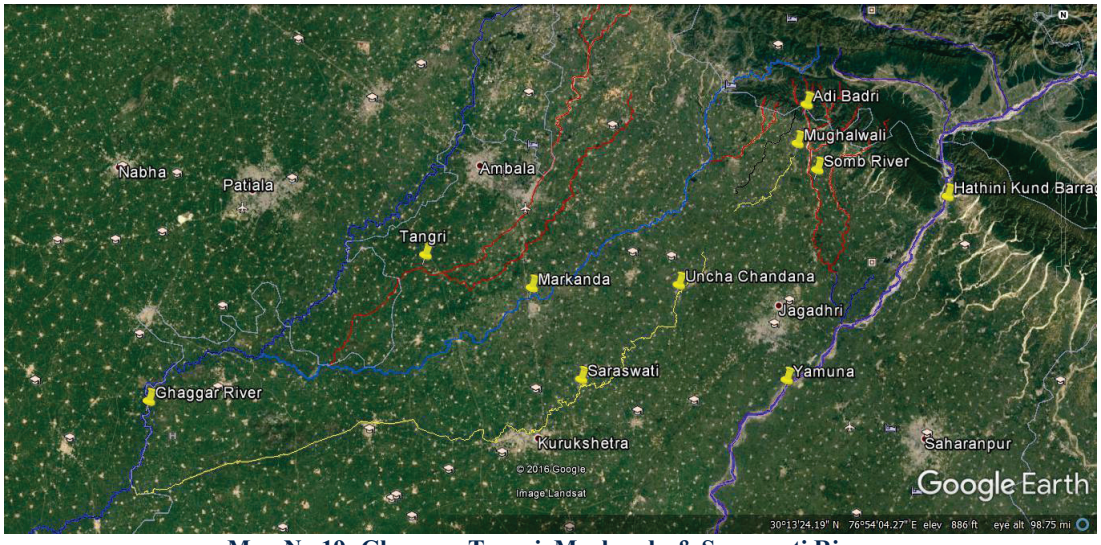
Today, Ghaggar, Markanda and even Chautang Rivers are mentioned to be original course of Saraswati river by various scholars. The river has also been described as a part of Ghaggar-Hakra System.



Map No 18: Saraswati River Detail

Recently the a Committee constituted by Central Government under geologist K.S. Valdiya has on the basis of paleo channel observations concluded that Saraswati river was in existence in past. Voices of discontent are also growing against reviving the river with borrowed water and short cut measures. State Government Haryana is also facing criticism for spending crores and paying much attention to a bygone era river and showing negligence towards cleaning and revival of exiting rivers.

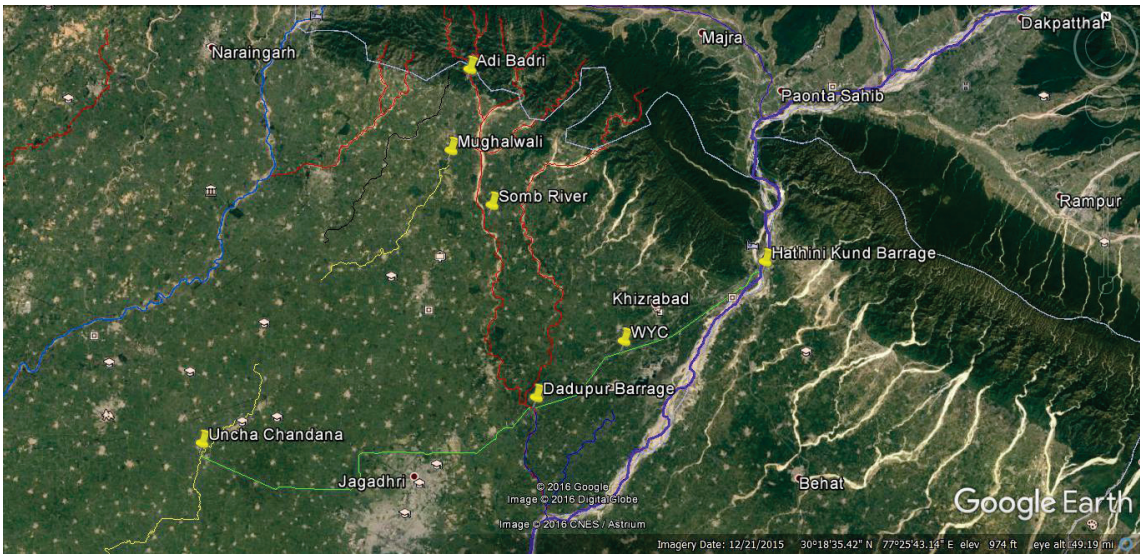
At present, Adi Badri a natural water pond is considered as the origin place of Saraswati. The river then appears to follow in the course of Somb or parallel to Somb. Then the River course is untraceable as Somb flowing towards South-East soon joins River Yamuna.



Map No 19: Ghaggar, Tangri, Markanda & Saraswati River

The efforts of reviving the Saraswati River by Central and State Government of Haryana, begins from Mugalawali village in Vilaspur Block of Yamuna Nagar. From here excavation has been taken up of a supposedly buried water channel believed to be of Saraswati River. The ground water through pumps will be / is being put in this channel as

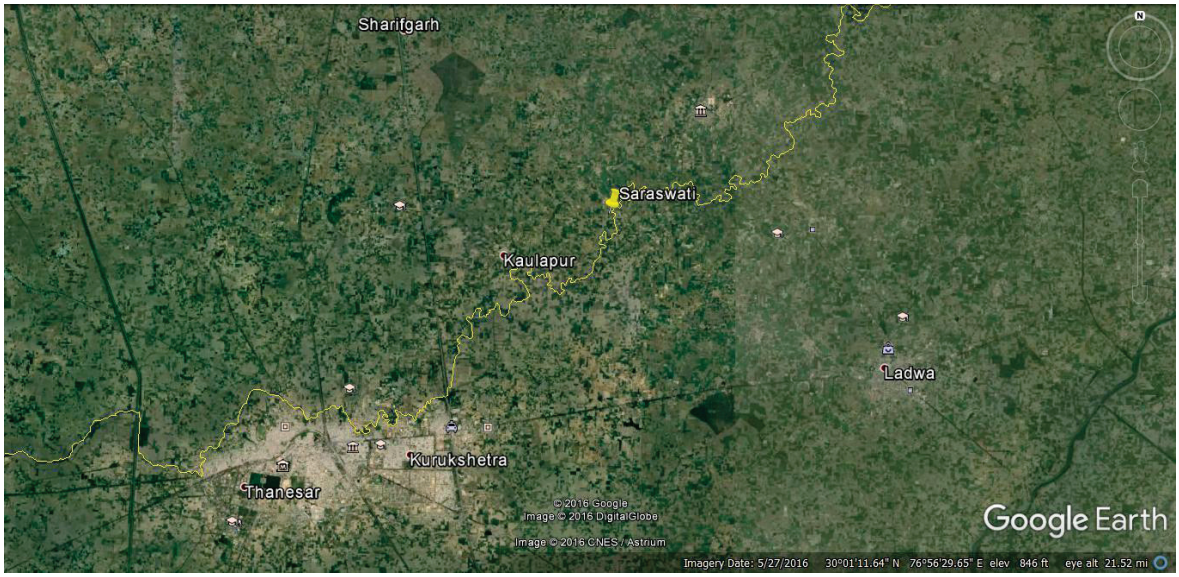
part of Saraswati Revival work. A Saraswati Yamuna Link (SYL) link has also been created. Under this link Yamuna water diverted from Hathini Kund Barrage is diverted again from Dadapur barrage built on Somb River into to defunct Dadupur-Nalvi canal which happens to cross over the river at Uncha Chandna in Jagadhari. There is also plan to create a run-off water storage structure on Somb river to be released intermittently in Saraswati River.



Map No 20: Yamuna Saraswati Link Map

The river channel remains untraceable for a length of 30 km from Muglawali to Uncha Chandana in Yamuna Nagar. Same is the case with Choutang Nala believed to be a tributary of Saraswati river. There are several storm water channel known as Choutang which facilitate drainage of rain water in the district.

Sarsuti known as Drishdawati in ancient time flows close to Kurukshetra. Some believe that the Sarsuti is the original Saraswati course. Presently the defunct stream is in highly polluted state as several villages and towns along its course have been discharging waste water into it. Downstream Pehowa town Kurukshetra this wonderfully meandering stream is suddenly runs straightened and get linked to Ghaggar River.



Map No 21: Meandering Sarsuti/ Saraswati at Kurukshetra

9. Dohan & Krishnavati Rivers

The Dohan and Krishnavati rivers originate from Western slope of Aravalli hills situated in Alwar and Sikar districts of Rajasthan. After flowing north east these rainfed streams enter Haryana at Hamidpur and Dostpur village. Length of the river is approximately 70 and 50 km. After running a good courses both channel disappears in Narunual and Mahendragarh districts. Haryana Government blames construction of water storages structures by Rajasthan Government behind turning the rivers dry even during monsoon. These streams were believed to be part of Saraswati River. The non-perennial rivers used to flow during rainy season and were a major source of recharging of groundwater reservoir. Both rivers were considered lifeline for southern Haryana, especially Mahendergarh district.

Haryana to meet Rajasthan over stopping of river waters

CHANDIGARH: More than three decades after Rajasthan stopped the flow of water of two rivers to Haryana, chief minister Manohar Lal Khattar has taken up the matter with his Rajasthan counterpart Vasundhara Raje. Both the states would soon hold a meeting to resolve the issue.

Two rivers – Krishnawati and Dohan – were considered lifeline for southern Haryana, especially Mahendergarh district. But Rajasthan stopped flow of water by constructing 'bunds (earthen barriers)' on these rivers. It led to a crisis of irrigation and drinking water in Mahendergarh. In 1981, the Haryana government had taken up the matter with Rajasthan government, but failed to get its share of 50% water from these rivers.

Now, days after the BJP came to power in Haryana, state irrigation minister Om Prakash Dhankhar asked the officials to take up the matter with their counterpart in Rajasthan.

On November 11, state irrigation department wrote a letter to Rajasthan chief engineer (water resources) Sumnesh Lal Mathur, urging him to convey a suitable date of meeting to solve the problem amicably. "During the rainy season, no water is available for Haryana for recharging of groundwater reservoir through these rivers of district Mahendergarh. As a result, the sub soil water level of district is depleting rapidly with each passing year. This has even precipitated crisis of drinking water," reads the letter.

It also made mention of an inter-state meeting called by the Union ministry of irrigation and power on January 5, 1966 regarding sharing of water of these rivers. The decision of the meeting read: "It was agreed that Rajasthan will abide by the decision... regarding sharing of Krishnwati water... Haryana agreed to pay 50% of the total cost of the Krishnawati bund besides the pro-rate cost of channel carrying Haryana's share of water to their border."

Mathur told TOI on Saturday that they were ready to convene a meeting to resolve the issue in public interest.

According to the Haryana government, the ground water level has reached critical level in 98 blocks of the total 119 blocks in the state. The situation is more serious in Mahendergarh where the groundwater level has gone to 1,500-2,000 feet beneath the earth in some areas. The area is arid and receives very low rain. Due to sandy terrain, rainwater cannot stay for a long time.

Haryana had started construction of Hansi-Butana canal to take water from the Bhakra mainline to its southern parts after Punjab passed the Termination of Agreements Act in 2004, suspending the Satluj-Yamuna link (SYL) canal project. The canal was built in 2007 with a cost of Rs 300 crore, but it couldn't be put to use after Punjab filed a case in the Supreme Court to stall the release of water in the canal.

RIVERS OF DISPUTE

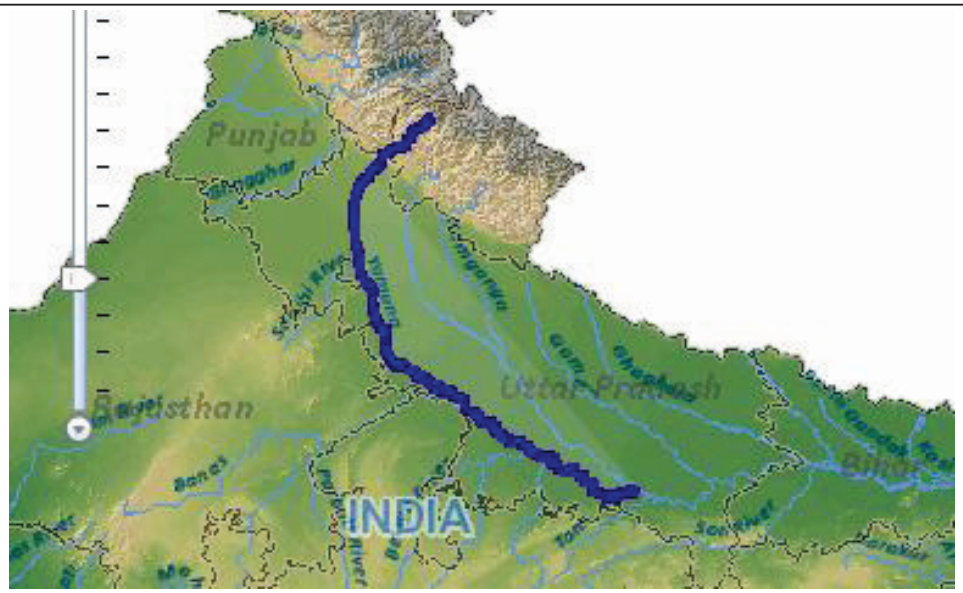
Non-perennial rivers Krishnawati and Dohan originate in Rajasthan. Dohan enters Haryana near village Hamidpur, about 10km to the northwest of Narnaul town, while Krishnati enters the state near Bhedenty village in Mahendergarh. These rivers used to flow during rainy season and were a major source of recharging of groundwater reservoir. Two years ago, the local administration had planned to revive these defunct rivers along with river Chhalak

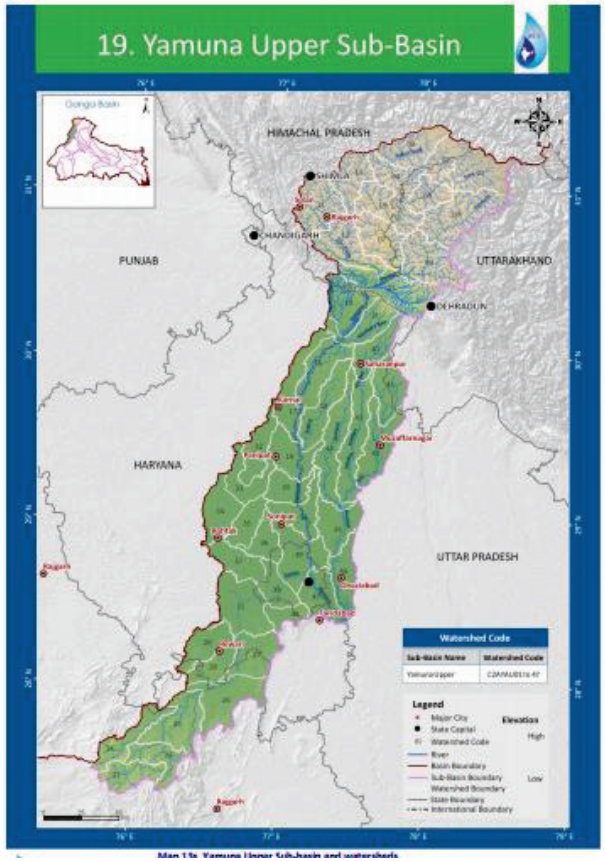
(Source: http://timesofindia.indiatimes.com/india/Haryana-to-meet-Rajasthan-over-stopping-of-river-waters/articleshow/45399754.cms)

10. Ganga Basin (Yamuna Sub Basin)

Yamuna River originates from Bandar Punch glacier in Uttarkashi district of Uttarakand. The river flows through about 200 kilometers before reaching Haryana State at Shivalik Hills in Yamuna Nagar district. In the same district the river is trapped in Hathini Kund Barrage located in Kalesar National Park.

River Yamuna accounts for 7.10 % of the total geographical area of the country. The Haryana state forms 6.5% of the river basin. In a whole the river drains an area of 366,223 square km in the Gangetic plain and constitutes 40.2% of Ganga Basin. River Yamuna provides sustenance to about 57 million people throughout its course. The river annually carries 10,000 cubic billon meters (CBM) of water of with 4400 cbm is used for irrigation. It also supplies 70 percent of Delhi's potable water. Yamuna river basin forms the upper sub basin of Ganga river the total area of which is 35798.19 square km comprising of 47 water sheds





Map No 22: Ganga Basin in Haryana

10.1 Mythology, Religious and Cultural significance

The name Yamuna seems to be derived from the Sanskrit word "yama", meaning 'twin'. The Yamuna is mentioned at many places in the Rig Veda, which was composed during the Vedic period between ca. 1700–1100 BC, and also in the later Atharvaveda, and the Brahmanas including Aitareya Brahmana and Shatapatha Brahmana. It is also said that lord shiva was the main reason for the colour of the Yamuna River. After the death of Sati Devi, lord shiva couldn't tolerate the sadness around him and used to roam here and there. And At last when he went to Yamuna river, it became so black as it absorbed all his sorrow.

The tale is further detailed in the 16th century Sanskrit hymn, Yamunashtakam, an ode by the philosopher Vallabhacharya. Here the story of her descent to meet her beloved Krishna and to purify the world has been put into verse. The hymn also praises her for being the source of all spiritual abilities. And while the Ganges is considered an epitome of asceticism and higher knowledge and can grant us Moksha or liberation, it is Yamuna, who, being a holder of infinite love and compassion, can grant us freedom, even from death, the realm of her elder brother. She rushes down the Kalinda Mountain, and verily describes her as the daughter of Kalinda, giving her another name, Kalindi, the backdrop of Krishna Leela. The text also talks about her water being of the colour of Lord Krishna, which is dark (Shyam). The river is referred as Asita in some historical texts. In Mahabharata, Indraprastha, the capital of Pandavas was also situated on the banks of Yamuna, it is considered to the modern day city of Delhi.

Geological evidence indicates that in the distant past the Yamuna was a tributary of the Ghaggar River (also known as the Vedic Sarasvati River), but that it later changed its course eastward due to a tectonic event, becoming a tributary of the Ganges.

The goddess of the river, also known as Yami, is the sister of Yama, god of death, and the daughter of Surya, the Sun god, and his wife Saranyu. Yamuna, referred to respectfully as Yamunaji, holds a very important position in Pushti Marga, a sect of Hinduism based on the Shuddh Advaita, in which Shri Krishna is the main deity, propagated by Vallabh Acharya / Maha Prabhuji, and having a large following in India.

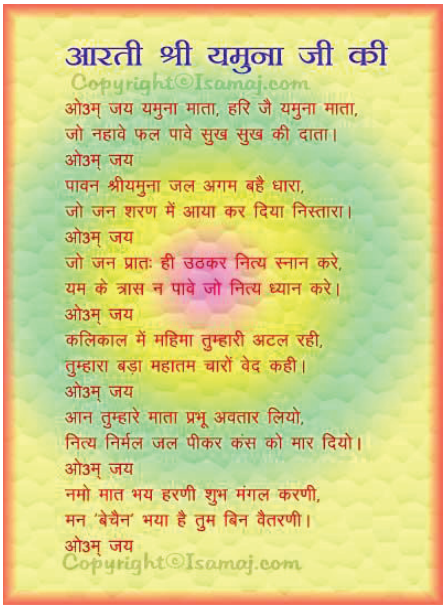
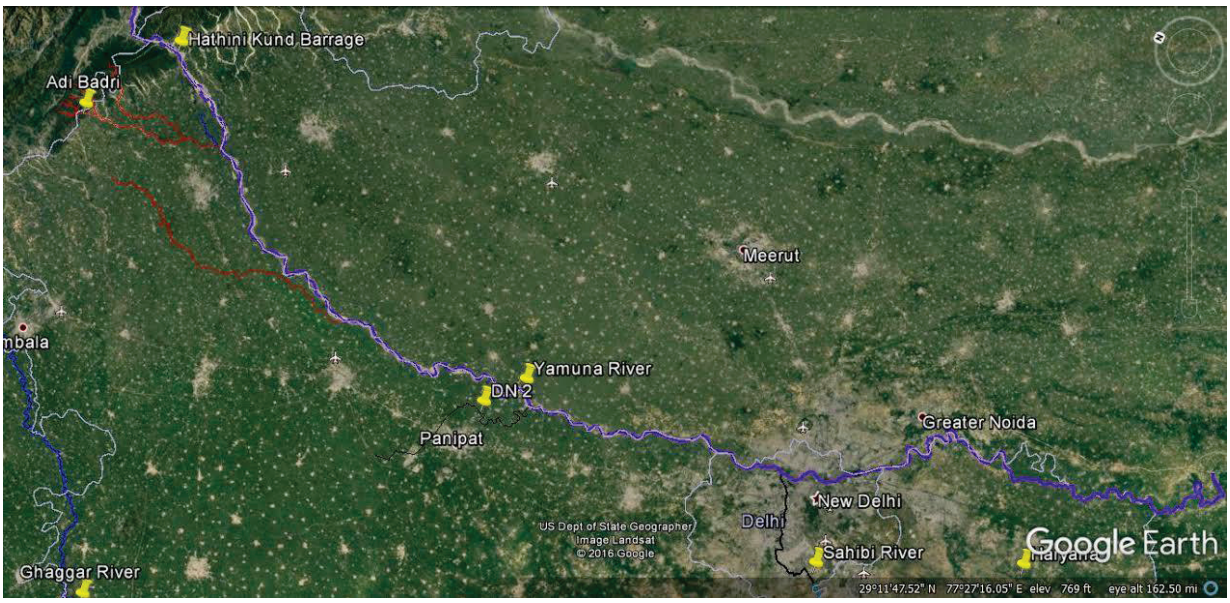


Figure 4: Yamuna Aarti

In "Pushtimarg" Yamuna is worshiped as his fourth consort (chaturth Patrani) and is the goddess who ordered Shri Vallabhacharya to recite Shrimad Bhagwat near her banks. It is for Yamuna, Vallabhacharya composed Shri Yamunashtakam. In Pustimarg Yamuna River have three forms: spiritual, physical and of a goddess and without River Yamuna worshipping rituals are considered incomplete.



Map No 23: Basin of Yamuna River

Every year on the sixth day of summer Navratra, the birthday of Yamuna is celebrated as Yamuna Jayanti. The festival of Bhaiya Dooj is also devoted to the love of Yamraj and Yamuna River. Besides this thousands of people every month take dip in Yamuna River at various places on occasion of full moon and no-moon nights and during Sunday and Saturday to get rid of sins and worldly woes. There are occasions when devotees are unable to bath in the river due to non availability of water in the river.

There are several sites of great religious and spiritual significance along river Yamuna in Haryana. Most of them are linked to Saraswati River & Mahabharata era like Adi Badri, Kuruskhetra. The five villages demanded by Pandavs namely Panipat, Sonipat, Baghpat, Tilpat & Indraprastha, three lies in Haryana.

There are several ghats along the course of Yamuna in Yamuna nagar, Karnal, Panipat & Sonipat where people from faraway places pay a visit during religious occasion to have a holy dip. Mass bathing events on occasion of Makar Shankranti, Somvati Amavasya, Ganga Dashara are held in Yamuna particularly at Panipat & Sonipat.

10.2 Historical Importance

The first town in Yamuna Nagar Buria is of historical importance. Buria is an ancient town in district Yamunanagar, situated not far from the river Yamuna. Here at Buria exists a fort built by Sikh rulers. This fort stands on a raised ground with special featured basins. The town of Buria was closely associated with Mughal rulers. A chief courtier of Emperor Shah Jahan built a pleasure house at Buria, a three-storied palace popularly known as Rang Mahal. Birbal, one of the close aides of Emperor Akbar was supposedly born at Buria. The presence of Birbal Dwar (Birbal Gate) in the town also indicates that the town was once governed by Birbal. Other attractions include The Pataleshwar Mahadev Shiv Mandir, The Sanatan Dharam Hanuman Mandir (both Hindu temples) and a Gurudwara (Sikh

temple) in remembrance of the ninth Sikh Guru Tegh Bahadur. The town was part of a princely state before Indian independence and was ruled by Ratan Amol Singh, whose family still resides in the town.

10.3 Flow

Much of water of the river is diverted into Western Yamuna Canal and Eastern Yamuna Canal from the barrage. As a result the river has become seasonal downstream the barrage and remains dry for most part of year. The chart shown below shows how over the last few decades extraction of Yamuna water has increased and simultaneously flow in the main river has gone down. Downstream Okhala barrage at Delhi Haryana border, the river flows in highly polluted state all through Faridabad district.

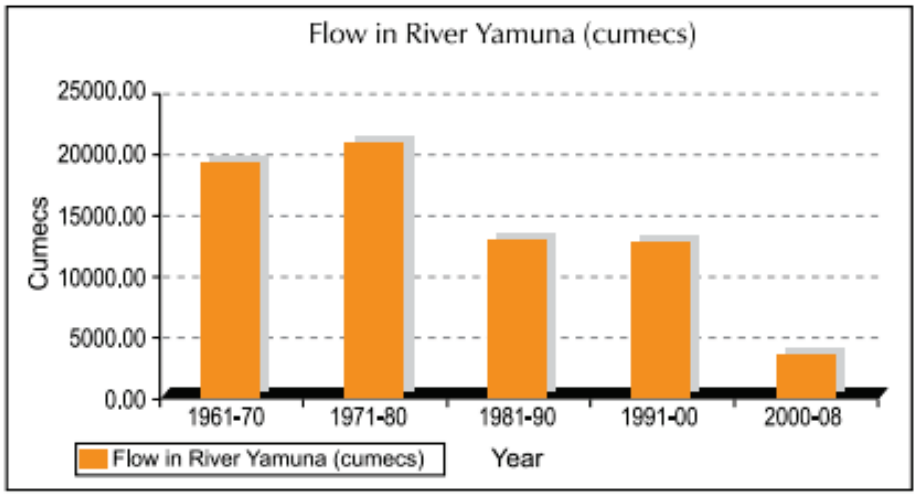


Figure 5: Flow in River Yamuna *(Source: Panwar 2009)*

Figure 5: Flow of Yamuna River

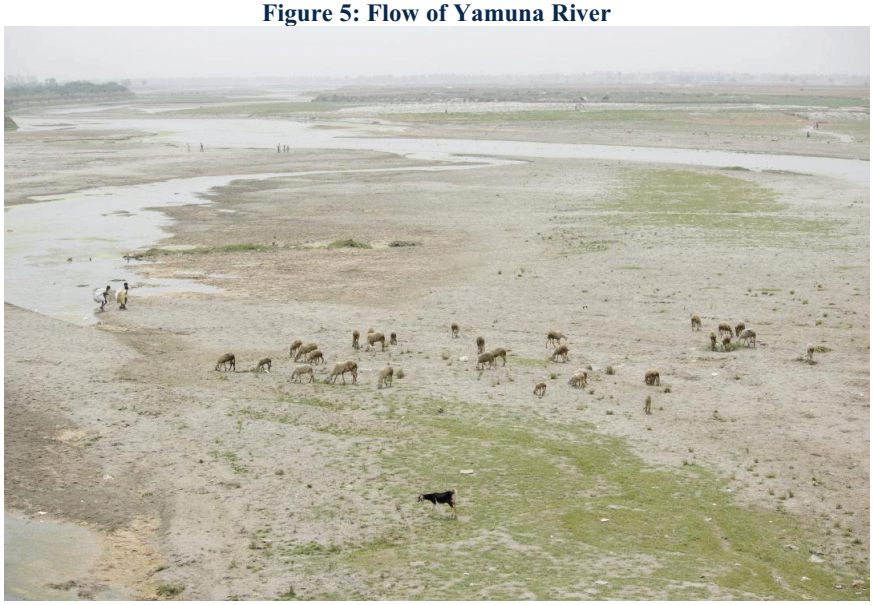


Figure 6: Flow less Yamuna Riverbed, Sonipat, April 2016

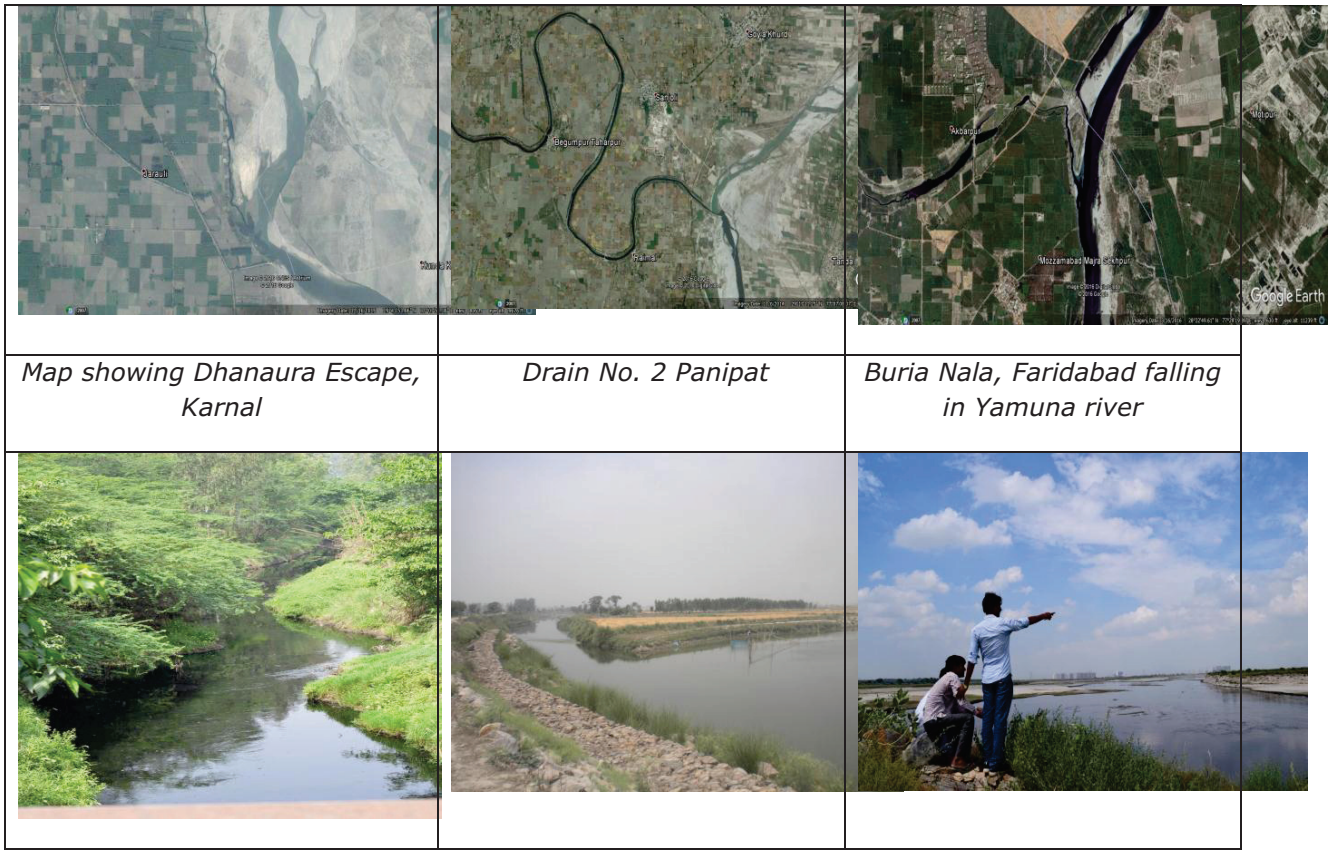
Out of its 1376 km length 300 km falls in six districts in Haryana which are as Yamuna Nagar, Karnal, Panipat, Sonipat forming about 200 km river length upstream Delhi and Faridabad, Palval districts constituting remaining about 100 km. Between Hathini Kund Barrage and Wazirabad Barrage Delhi, River Yamuna has turned seasonal

flowing for few months in a year. Lack of flow in river has severely impacted the river, including the variety of aquatic life. However few fishermen obtain fishing permit from Haryana Fisheries Board and report recurring annual losses due to non availability of waters in the river. The water intensive and chemical farming in the catchment area is also negatively impacting the river.

In addition to meet increased industrial and irrigational water need, it is also learnt that water is augmented in from Hathini Kund Barrage to run about half a dozen hydro power projects built on Western Yamuna Canal and Augmentation canal. It is also worth to mention that hydro power potential in Haryana is low and projects on age old irrigational canal has been ineffective apart from causing damages to local villagers by flooding cropland during avoidable breaches.

10.4 Pollution

ndustrial pollution from Yamuna Nagar, Karnal, Panipat & Sonipat the adjoining HR districts is disposed relentlessly in the river by Dhanura Escape (Karnal), Drain number 2 (Panipat) , Drain number 6 (Sonipat), Buria Drain (Faridabad) in turn.



Map showing Dhanaura Escape, Karnal	*Drain No. 2 Panipat*	*Buria Nala, Faridabad falling in Yamuna river*

Figure 7: Major Drain in Haryana

10.5 Y'nagar, Jagadhri effluents harm 27 Karnal villages

Parveen Arora
Tribune News Service
Dhanaura (Karnal), March 3

Polluted water discharged from Yamunanagar and Jagadhri industries has endangered the lives of thousands of residents of 27 villages situated near Dhanaura escape.

The metal and chemical content in the water has made the quality of groundwater poor. It has also affected soil fertility and farmers are facing financial losses due to this. Villagers alleged industrialists living in Yamunanagar and Jagadhri were making money at the cost of their health.

The toxic water enters the district through the Dhanaura escape near Dhanaura village, around 45 km from the district headquarter. It then enters the Yamuna near Kunjpura village after passing through Kalri Jagir, Dabkoli, Mundogarhi, Bjidpur, Nalikhurd, Mahamedpur, Khirajpur, Sadapur, Majra, Chora, Modipur, Dalwala, Andheda, Shergarh, Jadauli, Dabarki, Garhi Birbal and others villages, jeopardising the clean Yamuna mission.

Narinder Kumar, former sarpanch of Jadauli village, said the water flowing in the escape was black and emitted foul odour. "It makes it impossible for us to pass from near this escape," said Baljeet, a farmer of Jadauli village.

The contaminated water is also taking a toll on people's health. Many people in these villages were suffering from skin problems, said Dilbag Singh of Dabkoli village.

"We have raised the issue with the authorities several times, but no action has been taken to solve the problem," said Shyam Lal, a farmer.

Rattan Mann, state Bhartiya Kisan Union (BKU) president, said they had taken up the issue with the district authorities and also handed over a memorandum addressed to CM Manohar Lal Khattar and Union Minister Uma Bharti to Deputy Commissioner J Ganesan a few days ago.

He said the OSD to the CM had assured them that a high-level committee would be constituted to solve the issue.

(Source: http://www.tribuneindia.com/news/haryana/y-nagar-jagadhri-effluents-harm-27-karnal-villages/49260.html)

The unchecked pollution from these drains has played havoc with the everyday lives of hundreds of villagers. Groundwater along the drains has been contaminated. Farmers report frequently of crops damage. Villagers suffer of numbers of diseases due ground water contamination.

10.6 Illegal Sand Mining

Illegal and unscientific sand mining is happing in all districts of Haryana along River Yamua. Supreme Court and National Green Tribunal taking objection to unregulated mining have imposed a ban on it but to no avail. In 2010 unsustainable sand mining led to damage of famous Tajewala Barrage. It has also caused fall in ground water table apart from hampering of recharge of shallow aquifers which feed the river during lean season. Continued sand mining has also posed threats to new Hathini Kund Barrage thus Delhi's potable water supply.

Figure 8: Mining News Article

10.7 Sand mafia builds bridge on Yamuna as link to Faridabad

A thriving sand mafia in the national capital region does not want the Yamuna to get in the way of a multi-crore trade.

Authorities in Uttar Pradesh's Gautam Budh Nagar district caught about 30 labourers this week who were busy building a temporary bridge across the river to ferry sand being mined illegally in the area.

A third of the 300-metre-long structure had been constructed near Noida's Chak Basantpur village for trucks and dumpers carrying the coveted natural resource, while the administration seized around 6,000 sandbags, several concrete pipes and an excavator.

Sand is precious to the real estate industry and the mafia is known to ravage riverbeds and land with heavy equipment to dredge up tonnes of earth and sell it at steep discounts to builders, shaving lakhs of rupees off construction costs.

Sources say the entire Gautam Budh Nagar region has become a safe haven for the sand syndicate with rampant illegal mining along the floodplains of the Yamuna and Hindon rivers.

A young IAS officer, Durga Shakti Nagpal, took on the powerful mafia in Noida but was suspended in July 2013, just months into her assignment. The move had prompted opposition parties to accuse UP's Samajwadi Party government of acting under the mafia's pressure.

According to officials, 300 truckloads of sand is mined daily from the Yamuna's banks in Noida with the business raking in nearly Rs 50 lakh every day.

Following Wednesday night's arrests, authorities lodged an FIR in Noida against Faridabad resident Dinesh Tyagi for damaging ecology and public property through the illegal act of building a bridge that blocked the natural flow of the river.

A police sub-inspector, a constable and a Lekhpal, or a district administration official, were suspended while the partially-constructed structure was torn down.

"The bridge was being built for the last 10 days," said NP Singh, district magistrate of Gautam Budh Nagar. "Sand mafia from neighbouring Faridabad was building this bridge to mine sand from the Noida floodplains and transport it to Haryana. We got information from Noida's farmers about an illegal bridge being constructed."

Officials said the firms involved sell plots on the Yamuna's coastal plains in Noida as well as Faridabad and develop luxurious farmhouses on demand.

HT tried to reach Tyagi, but his mobile phone was switched off.

Despite a National Green Tribunal (NGT) order two years ago restraining all sand mining

activities without environmental clearance, illegal quarrying continues unabated along rivers with mighty water bodies like the Ganga and Yamuna dying a slow death.

The sand lobby saw an opportunity to build the bridge when local police were deployed in large numbers near Bisada village where a mob lynched a Muslim man last month over cow-slaughter rumours, sparking sectarian concerns.

Gautam Budh Nagar authorities said the mafia constructed another 300-metre-long bridge near Dadasiya village in Faridabad.

"I have written to the UP irrigation department about this illegal bridge," said NP Singh. "They will write to their Haryana counterparts to dismantle this bridge. We cannot do it because it is out of our jurisdiction."

(Source: http://www.hindustantimes.com/noida/sand-mafia-builds-bridge-on-yamuna-as-link-to-faridabad/story-yuubRTDAhdhpc8wUgvAnWM.html)

The river banks have also become unstable resulting in flood water frequently invading adjoining farmlands during monsoon. Remaining aquatic life and river ecology have suffered tremendously due to ongoing sand mining. Mining mafias are also often reported of blocking river channels by laying down bridges inside riverbed.

10.8 Floods & Floodplains

Floods have been a recurring phenomenon in Yamuna River. The 1977, 1978, 1980, 1983, 1988, 1993 and 1995, 1996 were flood years in the State which were mainly caused by Yamuna. The floods of 2010 & 2013 were latest in the series. Villagers along river Yamuna mentions of 1978, 1988, 2010 & 2013 floods as biggest floods in their memory. The 2010 floods razed down Taje Wala barrage built by Britishers. Since there were no embankments the flood spread of 1978 was upto 10 km in Haryana side.

The situation of Yamuna floodplains is worrisome in Haryana. In districts upstream of Delhi floodplains are extensively under pressure due to intensive farming. Downstream Delhi Yamuna floodplains are being rapidly converted into real estate. On 20 Oct 2016 Uttar Pradesh government has informed the Green Tribunal that large scale encroachment of Yamuna floodplains has taken place in National Capital Region.

10.9 Floodplains being encroached in Delhi-NCR: UP board

A "flood" of multi-storeyed buildings have been constructed on the floodbanks of Ganga and Yamuna over the years without devising any mechanism for waste disposal, the Uttar Pradesh Pollution Control Board (UPPCB) told the National Green Tribunal on Thursday.

The state pollution control board told the green panel that floodplains have been encroached upon in Delhi, Noida and Greater Noida to build apartments and housing societies.

The UPPCB alleged that these buildings released tonnes of solid waste and untreated water,

which went directly into the rivers causing pollution, and said those living in them should be directed to have their own sewage treatment plants (STPs).

"Over the years, there has been a flood of residential and commercial buildings along the floodplains of Yamuna and Ganga. But the sewerage capacity has not changed.

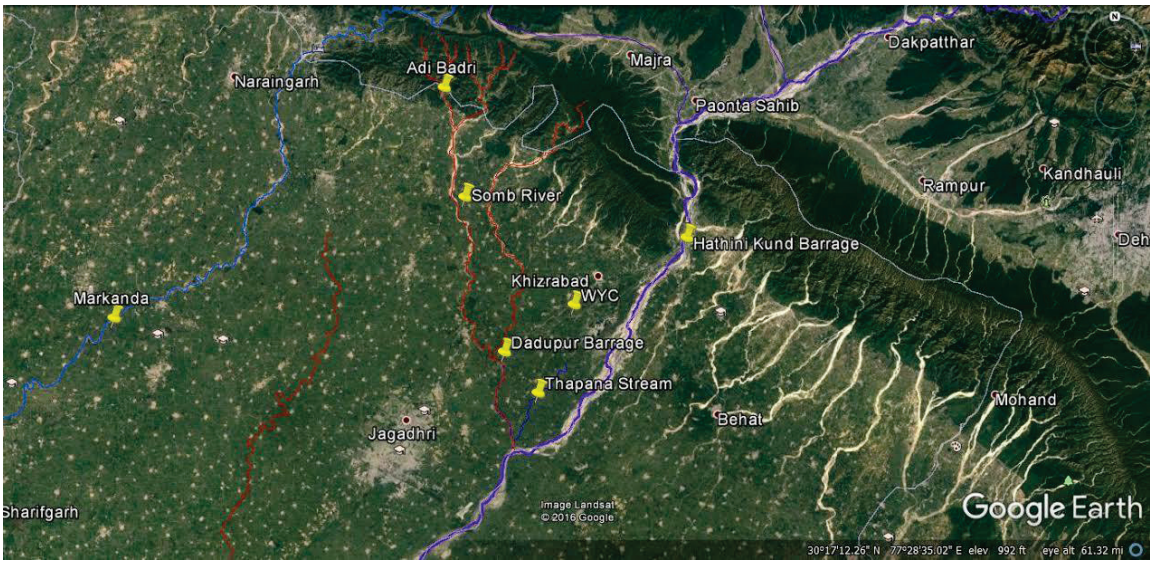
Presently, they take environmental clearance (EC) and discharge their solid waste and other garbage in the sewer lines in collusion with local bodies. Local authorities take money and grant them permission to discharge all waste in the sewer lines. Also, there is no site for dumping of municipal solid waste. When you plan a new residential area like Greater Noida there must be an independent site. Whenever any colony, multi-storey building, apartment is constructed, it should be made mandatory in their EC condition that they must have their own STPs," UPPCB told the NGT.

The hearing remained inconclusive and will continue on Friday.

The Tribunal had on Wednesday lamented that the Ganga rejuvenation project, which is of national importance, was being carried out by officials "who do not know" how many drains are polluting the river.

While setting up a panel to collect information on the quantum and quality of waste being released into the river, the NGT had said "a project of national importance is being carried out and all authorities including Centre and state government do not know how many drains are polluting Ganga."

(Source: http://www.asianage.com/delhi/floodplains-being-encroached-delhi-ncr-board-379)



Map No 24: Major Stream on Yamuna Sub Basin

10.10 Tributaries

Only three tributaries Somb, Thapana and Sahibi join the Yamuna River in a length of about 300 km. Somb river rising from Shivalik hills in Yamuna Nagar is a seasonal stream. Downstream Dadupur barrage Yamuna Nagar the river functions as an escape channel. Thapana though a very small stream, mostly flows round the river feeding the Yamuna River in Yamuna Nagar district. Both streams in turn joins the Yamuna river at Kanalsi Yamuna Nagar.

नदी दिवस पर विशेष

थपाना जैसी स्व-प्रवाहित नदियां दुर्लभ हैं देश में

प्रदेश की एकमात्र स्व-प्रवाहित नदी है थपाना
विशेषज्ञों ने की नदी बचाने पर विशेष चर्चा
लंदन से भी पिछले दिनों पहुंचे थे शोधकर्ता

बेहद समृद्ध है थपना की जैव विविधता

जैविक खेती पर दिया

विशेषज्ञों ने बल

कन्यावाला खादर है उद्गम स्थल

थपाना कम से कम अपनी नदी तो है

यमुना सेवा समिति के सहयोग से लंदन से पीएचडी कर रहे शोधार्थी ने नदी का सर्वे शुरू किया

यमुना की एकमात्र नदी, जिसका प्राकृतिक स्वरूप बचा हुआ

भास्कर न्यूज . यमुनानगर

थपाना अपनी नदी है। यहीं से निकलती है। यहीं पर यमुना में समा जाती है। नदी अपने प्राकृतिक स्वरूप में है। इंसानी छेड़छाड़ से परे। यह तथ्य नदी के सर्वे में सामने आया। सर्वे का काम किंग्स कॉलेज के शोधार्थी निशिकांत ने शुरू किया। सर्वे का मुख्य उद्देश्य नदी की वर्तमान स्थिति का पता करना है। साथ ही यह भी पता करना है कि नदी में जैव विविधता की स्थिति क्या है। ध्यान रहे इस नदी का पता इसी साल चला था। यमुना सेवा समिति ने नदी को खोजा था। हालांकि नदी काफी समय से बह रही है, लेकिन कभी इस ओर ध्यान ही नहीं दिया। शुरुआत में तो इसे बरसाती नदी ही मान लिया गया था, लेकिन यमुना सेवा समिति ने जब नदी की खोजबीन की तो पाया कि यह बरसाती नदी नहीं है। खास बात यह है कि इस नदी में गर्मी के सीजन में भी पानी रहता है।

निशिकांत ने बताया कि नदी अपने प्राकृतिक स्वरूप में है। पानी की मात्रा भी ठीक है। यह नदी यमुना नदी की सहायक नदी है। उन्होंने बताया कि अभी सर्वे का आधा काम हो चुका है, लेकिन इतने में ही महसूस हो रहा है कि यह महत्वपूर्ण नदी है। जिसे बचाए व बनाए रखना बहुत जरूरी है। निशिकांत ने यह भी बताया कि हथनीकुंड बैराज के बाद यमुना में जो थोड़ा बहुत पानी दिखाई देता है। वह इसी तरह की नदियों का पानी है। जो यमुना के अस्तित्व को बनाए रखे हुए है।

निशिकांत के अनुसार यह यमुनानगर की अपनी नदी है। भले ही आदि बद्री में सरस्वती नदी लुप्त हो गई हो, लेकिन कम से कम जिले में अभी भी एक नदी तो बची है। जो सही हालत में है। अलबत्ता उनका कहना है कि इस नदी की ओर ध्यान दिया जाने की जरूरत है।

लोगों ने नदी को संभाला है

नदी को कनालसी और मंडौली के निवासी संभालते हैं। कैसे? ग्रामीणों ने यहां शिकार पर पूरी तरह से पाबंदी लगाई हुई है। यहां का पानी खराब न हो। इसका पूरा ध्यान रखा जाता है। नदी को प्रदूषण से बचाने के लिए लगातार काम हो रहा है। यहां तक की गर्मी में जब नदी में पानी कम हो जाता है तो अपने खर्च से नदी में पानी भरते हैं। इससे फायदा यह होता है कि नदी की मछलियां बच जाती हैं। जो पूरी जैव विविधता को बनाए रखने में खासी कारगर साबित होती है।

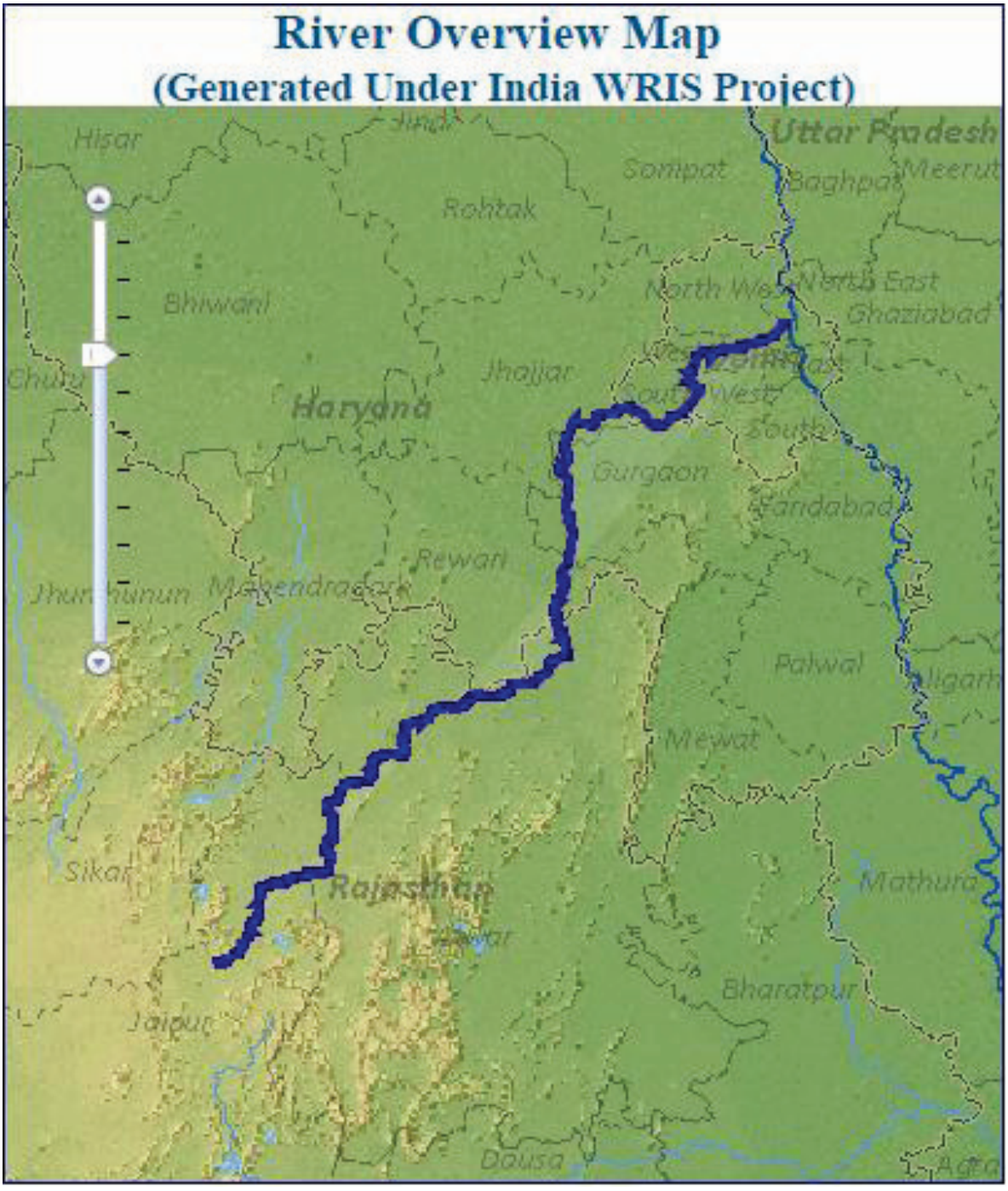
सर्वे का आधा काम पूरा हुआ : निशिकांत

निशिकांत बताया कि सर्वे का आधा काम पूरा हो गया है। अभी आधा काम बाकी है। सर्वे की फाइनल रिपोर्ट सर्वे खत्म होने के बाद ही बनाई जाएगी। लेकिन इस सर्वे में यह पता चला है कि नदी सही हालत में हैं। जो बड़ी बात है। खास तौर पर तब जबकि यमुना का पानी हथनी कुंड बैराज में रोक लिया गया हो।

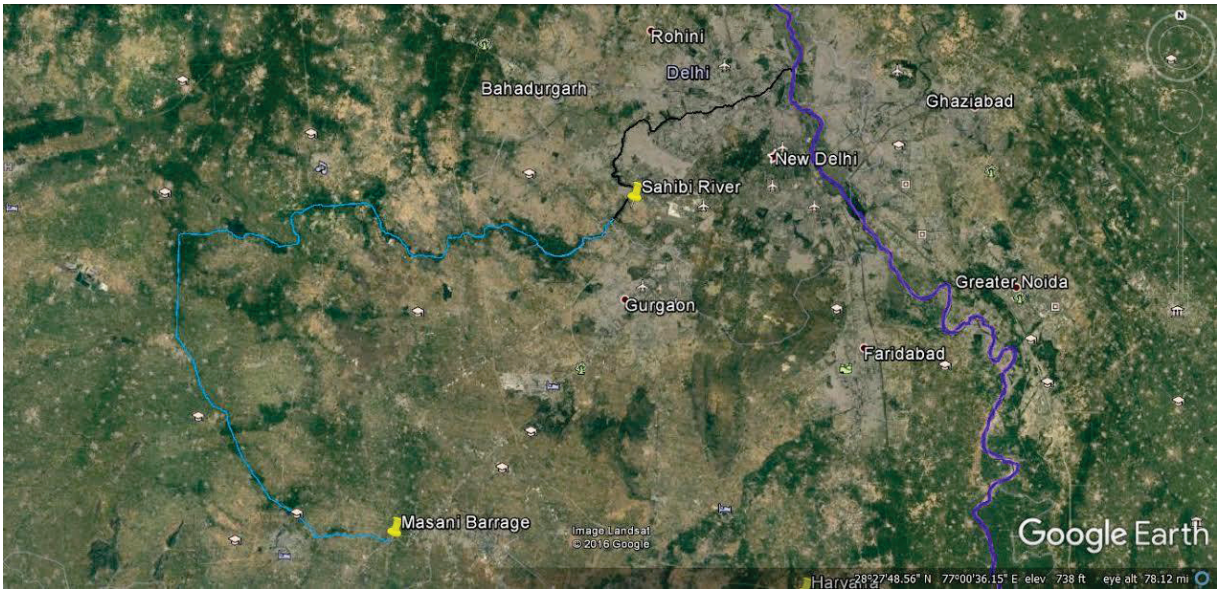
Figure 9: News Article about Yamuna River

11. Sahibi River

The Sahibi a rain-fed river originates from Aravalli Range in Sikar district of Rajasthan state. After covering about 157 km distance in the Rajasthan. It leaves Rajasthan state beyond Kotkasim in Alwar district near village Ujauli and covers a total distance of about 222 km up to Dhasa Bund. The main tributaries of Sabi are Sota river, Kotkasim drain and Indori river (Indori Nallah).



Map No 25: Sahibi River Basin



Map No 26: Sahibi River & Masani Barrage Location

It enters Haryana state at Jhabua, near the city of Rewari in Rewari district, after which it re-enters first Rajasthan state near Kotkasim, and then Haryana again near the village of Jarthal. The dry riverbed near Jarthal is 2 kilometres wide. During light monsoon rainfall, the river's flat and sandy bottom absorbs all rainwater. During heavy rains, the river has defined course up to Pataudi railway station and branches off into two smaller streams to Jhajjar, finally reaching the outskirts of Delhi through Najafgarh drain and ending at the Yamuna River.

The catchment area of the Sahibi River encompasses the following cities and towns: Sikar, Jaipur, and Alwar in northeastern Rajasthan state; Bawal, Rewari, Pataudi, and Jhajjar district in southern Haryana state; and Delhi state.

The Najafgarh Drain or Najafgarh Nallah is another name for the Sahibi River, which continues its flow through Delhi where it is channelized for flood control purposes. The Najafgarh Drain gets its name from the once famous and huge Najafgarh Lake near the town of Najafgarh in southwest Delhi. The Najafgarh Drain is the capital's most polluted body of water due to the direct inflow of untreated sewage from surrounding populated areas. Assessing the water quality of wetlands in wildlife habitats, a January 2005 report by the Central Pollution Control Board rated the Najafgarh Drain under category D, along with 13 other highly polluted wetlands.

Regulators at the Keshopur Bus Depot on the Outer Ring Road are wide with thick and high embankments. A vast amount of water is retained in this widened drain by closing the Kakrola regulators under Najafgarh Road to recharge the local groundwater table.

Prior to 1960, the rain-fed Sahibi River entered Delhi near Dhansa and spilled its overflow in the Najafgarh Jheel basin, creating a seasonal lake. A vast area more than 300 square kilometres was submerged in some seasons. In the following decades, the Sahibi River flow reaching Dhansa was channelized by digging a wide drain and connecting it directly to the Yamuna River, completely draining the seasonal Najafgarh Jheel.

The Sahibi River flooded in 1977. In response, the Masani barrage dam was constructed. Several smaller dams have also been constructed throughout the hills of Rajasthan to store rainwater. The construction of dams has restricted the flow of water on the Sahibi River and it is now rare for water overflow from monsoon rains to reach up the Masani Barrage.

Harrapan period earthenware (Pottery) found on the Sahibi riverbed by INTACH-Rewari, at Hansaka village, Rewari District, 2012. Among the finds are handmade and wheel-made pottery dated dated to 3309–2709 BCE and 2879–2384 BCE found on the banks of the Sahibi River at Jodhpura. Other findings include pottery found on the Sahibi riverbed at Hansaka in the Rewari district by INTACH-Rewari.

A red stone statute of Vamana Dev, now displayed at the Shri Krishna Museum, Kurukshetra was unearthed in 2002 on the Sahibi riverbed near Bawal. In various other places on Sahibi riverbed, many artifacts have been found, including arrowheads, fishhooks, spearheads, awls, and chisels.

12. Conservation efforts:

Peace Institute Charitable Trust in past has done remarkable for generating awareness among masses towards degrading condition of Yamuna River. Yamuna Sewa Samiti, Kanalsi a village level organization formed by Peace Institute has been doing appreciable work for conserving Yamuna River in Yamuna Nagar district.

प्रकृति : समिति आसपास के गांवों के लोगों को अपने साथ जोड़ रही, प्राकृतिक रूप से निकलती है नदी की जलधारा

थपाना को जीवनदान देने में जुटे कनालसी के लोग

जागरण संवाद केंद्र, यमुनानगर : आधुनिक युग में जहां इंसान केवल स्वार्थ के चलते नदियों का सीना चीर रहा है, वहीं जिले के कनालसी गांव की यमुना सेवा समिति नदी को बचाने के प्रयास में जुटी है। समिति के लोग थपाना नदी को जीवन प्रदान करने के लिए एकजुट हैं। संस्था ने करीब दो वर्ष पूर्व यह शुरूआत की थी, अब इनके साथ ग्रामीणों की संख्या बढ़ गई है।

मजादवाला से निकल रही थपाना नदी को जीवन दान देने में यमुना समिति के लोग जुटे हैं। प्राकृतिक रूप से निकलने वाली थपाना को बचाने के लिए समिति के साथ अन्य लोगों को कारवां भी जुड़ गया। इस नदी को ग्रामीण अपनी मानते हैं। इसको बचाने के लिए हर संभव प्रयास कर रहे हैं।

थपाना को बचाने में यमुना सेवा समिति से जुड़े लोग कार्य कर रहे हैं। समिति के सदस्य नदी बचाने के लिए लोगों को जागरूक कर रहे हैं। लोगों को जागरूक किया जा रहा है कि वह नदी में गंदगी न डाले। थपाना, पथराला, सोम तीनो यमुना की सहायक नदियां हैं। जब यह तीनों नदियां जीवित रहेंगी तभी यमुना जीवित रह पाएगी, क्योंकि इन तीनों का जल यमुना में मिलता है। यमुना यमुनोत्री से निकल रही है। जबकि इसकी सहायक नदी थपाना प्राकृतिक स्रोत से निकल रही है। अधिकतर नदियों का उद्गम स्थल पहाड़ी क्षेत्र है। लेकिन थपाना नदी की विशेषता यह है कि यह समतल मैदानी क्षेत्र से निकल रही है।

इन गांवों से होकर गुजर रही नदी

लाकड़, हल्दरी, नवाजपुर, सौंधेबांस, दमोपुरा, मंडोली से होकर मेहर माजरा, कनालसी के नजदीक सोम नदी में मिल जाती है। जो बाद में यमुना नदी में मिल जाती है।

यह पाए जाते हैं जलीय जीव

थपाना नदी में पाए जाने वाले जलीय जीवों में नौ प्रकार की मछलियां पाई जाती हैं। इनमे महाशेर, सुअं, कालाबांस, कैटफिश, राहु, कतला, पाईप फिश, छोटी मछली, स्नेक फिश पाई जाती है। इसके साथ ही कछुआ, केकड़ा, जलीय सर्प, जलीय मेढ़क पाया जाता है।

जैविक खेती से नदी बचाने का प्रयास

रसायनिक के प्रयोग से भी नदियों का जल प्रदूषित हो रहा है। यमुना सेवा समिति थपाना को बचाने के लिए जैविक खाद का प्रयोग किया।

जैविक खाद का प्रयोग कर नदी को बचाने के प्रयास में संस्था प्रथम पुरस्कार से सम्मानित की जा चुकी है। सेवा समिति से जुड़े सदस्य खेतों में जैविक खाद का प्रयोग कर गेहूं, धान, आलू उगा रहे हैं। इसका मकसद जल को विषैला होने से बचाना है।

सूखे में नदी में रहा पानी

गत वर्ष प्रदेश में उम्मीद से कम बरसात हुई थी। इसी के चलते प्रदेश में सूखा पड़ा था। थपाना नदी का प्राकृतिक स्रोत होने से यहां जल धारा बहती रही। इस नदी में काफी संख्या में जलीय जीव वास करते हैं। नदी के आसपास ठोकरी बत्तख, लाल सिर पोचार्ड, सुर्खाब, चकवा, चकवी, सामान्य जल मुर्गी, खीमा जल मुर्गी, छोटा बड़ा जल काग, पन पकव्वा, बगला, अंजन, गोलायाथ अंजन, छोटा बगला, टिटहरी, लाल लोलकी टिटहरी, अबाबील, छोटा व बड़ा किलकिला, कोड़ियाल, झाड़ पिद्दा, श्यामा पक्षियों का वास है।

नदी के तटों पर रसायनिक खेती सबसे बड़ा संकट है। प्राकृतिक वनस्पति को नष्ट करना। बीचपड़ी में थपाना को पाटकर खेत बनाए गए। नदी किनारे पेड़ों का कटान जारी। इसके साथ ही अवैध खनन। नदी में अजैविक कचरा डालना। समिति ने नदी के नजदीक कूड़ादान रखवा दिए हैं, ताकि लोग इसमे कचरा न डालें। इन जीवों से ग्रामीणों को लगाव है। इसी लगाव के चलते नदी पर शिकार करने पर पाबंदी भी लगा रखी है।

जिस जगह कम पानी ग्रामीणों को दिखाई दिया ट्रैक्टर से पानी उसमे छोड़ दिया गया। इससे जलीय जीवों की जान बच गई।

34 प्रकार की पाई जाती है वनस्पति

थपाना दी में 34 प्रकार की वनस्पति पाई जाती है। ग्रामीणों का प्रयास है कि इस नदी के साथ वनस्पति बची रहे।

Few individuals and groups in Yamuna Nagar and Panipat are raising the issue of Yamuna pollution for past many years. Aditya Jain a retired Coal India official has been working as vigilant against dumping of waste in water streams particularly Western Yamuna Canal in Yamuna Nagar. One more press reporter Manoj Thakur in Yamuna Nagar officially and personally involved in several issues causing damage to Yamuna Rive. Janak Rawal at Panipat with his groups often organizes awareness campaigns against dry and polluted Yamuna. Gandhi Ashram,

Patti Kalyana, Smallkha at Panipat few years back initiated a public movement against rampant sand mining in Panipat and Sonipat region.

In present scenario, when the prime stakeholder Haryana Government like other States is primarily bothered about meeting its ever increasing water demands from the already wrenched out river. After diverting fresh water flow from river, river is left at the mercy of sand miners. Final nail in the coffin is put by discharge of voluminous industrial and domestic waste water dumped in the river via Dhanaura Escape Karnal, Drain Number 2 Panipat and Drain Number 6 Sonipat. As a result irreversible damage is being done on physical and biological properties of the river resulting in an ecologically dying river Yamuna in Haryana.

13. Red, Pink, Blue Rivers [River Health Assessment]

Thapana, a small (15 km) tributary of river Yamuna in Yamunanagar district is perhaps the only BLUE river in the state since it has no anicuts or barrage on it or any major source of pollution. The only threat is non point agricultural runoff. Local people have taken upon themselves to protect it.

All the other rivers in the state fall under the RED category on account of high diversion, almost complete non monsoon dessication and high to very high levels of industrial pollution.

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