

# Observations along the Sabarmati



Landscape Environment Advancement Foundation  
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# Observations along the Sabarmati

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## Rivers

By definition, a river is a "natural watercourse which flows towards an ocean, a sea, a lake or towards another river or in some cases it flows into the ground or dries up completely before merging with any other water body". It is however, part of a larger cycle that includes precipitation, topography, surface run off and catchment areas. Surface run off and topography together, determine a river's catchment area. Topography and geology play an important part in determining the rate of flow of the river. While the shape of a river is determined by the regions it flows through, the river in turn also leaves an imprint on these areas. Amount of water in the river, rate of flow, seasonal variations and flooding all affect the banks of the river and the adjacent areas. For example, a river flowing in a steep, mountaineous region cuts a sharp channel. The same river downstream in the plains will form a meandering course due to the shallow gradient. The river thus, at times becomes the most visible and identifiable element of the natural drainage and hydrological cycle of a region. The river system nurtures special flora and fauna and together they form another ecological entity.

## Rivers of India

Major rivers of India Includes Brahmaputra, Narmada, Tapti, Godavari, Krishna, Kaveri, Mahanadi, Ganga, Indus, Yamuna and Sutlej, these rivers along with their numerous tributaries make the river system of India. Most of the rivers empty into the Bay of Bengal. Some of the rivers whose courses take them through the western part of the country empty into the Arabian Sea. Some parts of Ladakh, northern parts of the Aravalli range and the arid parts of the Thar Desert have inland drainage.

All major rivers of India originate from one of the three main watersheds.

1. The Himalaya and the Karakoram ranges
2. Vindhya and Satpura ranges and Chotanagpur plateau in central India
3. Sahyadri or Western Ghats in western India

The rivers of India can be divided into Himalayan Rivers and Peninsular Rivers.

## Himalayan Rivers

The main Himalayan river systems are the Ganges river, the Indus and the Brahmaputra river systems.

Many rivers pass through the Himalayas. The Himalayan rivers form large basins. They perform intense erosional activity up the streams and carry huge loads of sand and silt. In the plains, they form large meanders, and a variety of depositional features like flood plains, river cliffs and levees.

Himalayan rivers are perennial as they get water from the rainfall as well as the melting of ice. These rivers create huge plains and are navigable over long distances of their course. As these rivers are perennial, they benefit the cities which are located on their banks. They provide rich fertile plains for agriculture and endow water for irrigation.

## Peninsular Rivers

The peninsular river systems include the Narmada, the Tapti, the Godavari, the Krishna, the Kaveri, the Mahanadi river systems and their tributaries.

The Peninsular rivers mainly flow through shallow valleys. Majority of them are seasonal as their flow is dependent on rainfall. These rivers mainly have straight and linear courses. The intensity of erosion is comparatively low because of the hard rock bed. Lack of silt and sand does not allow any significant meandering.

## The Sabarmati River

Sabarmati River originates from the Aravalli mountain range in the Udaipur District of Rajasthan of Western India. It is the west flowing river of Gujarat and is approximately 371km. in length. Sabarmati is a seasonal river and gets most of its water during monsoon and remains dry in summer for almost six months. In its initial course Sabarmati is also known as 'Wakal' river.

A major part of the Sabarmati's course flows through the state of Gujarat. The river travels from the Aravalli range towards the westward sloping Mehasana and Sabarkantha districts, and then flows through the south ward sloping Kheda & Ahmedabad districts of Gujarat before emptying in to the Gulf of Khambhat.

## Sabarmati River Basin

Sabarmati river basin falls in the hot arid region in the mid-southern part of Rajasthan and Gujarat, between latitudes 23 degree 25' and 24 degree 55' and longitudes 73 degree 00' and 73 degree 48'. The total catchment area of the basin is 21,674 sq.km. out of which 4,124 sq. km. lies in Rajasthan and remaining 18,550 sq.km. lies in Gujarat state. The Sabarmati basin in Gujarat state covers parts of the districts of Banaskantha, Sabarkantha, Mehsana, Gandhinagar, Ahmedabad and Kheda. The Banas and Mahi basins lie to the east of the Sabarmati basin, Luni Basin lies to the north and west and Banas basin lies to the west of the Sabarmati basin. The Sabarmati river basin extends in the regions of Udaipur, Sirohi, Pali and Dungarpur districts of Rajasthan. The western part of the basin is surrounded by hilly topography belonging to the Aravali range. The rainfall pattern within the basin is uneven and erratic with nearly 95% of the average rainfall occurring during monsoon months from July to October.

## History

The earliest settlement along the banks of Sabarmati river is said to have taken place around 1 to 1.5 lakh years B.C. The settlements along the Sabarmati river in ancient times have been discussed in the sanskrit literature named 'Padmapuran' and 'Sabhramati Mahatmay'. We can find the reference of the river in Hemchandracharya's Dayashray and Rajshekhar's Kavyamimansa, written during 12th century. Voluminous books called Hammirmadmardan and Prabandhchintamani also give the reference of Sabarmati river.

Sultan Ahmed Shah founded Ahmedabad city on the serene banks of Sabarmati river in 1411 AD. Mahatma Gandhi established Sabarmati Ashram as his home on the banks of the river during India's independence struggle. Many famous folk songs on Sabarmati river were written during Mahatma Gandhi's era.

## Methodology for Study

Sabarmati river acts as a lifeline for number of villages located on her banks. The aim of the exercise was to understand the natural system of the Sabarmati river through various parameters. The study also aimed at documenting the nature and behavior of the river course and to observe the various activities taking place along the banks of Sabarmati river.

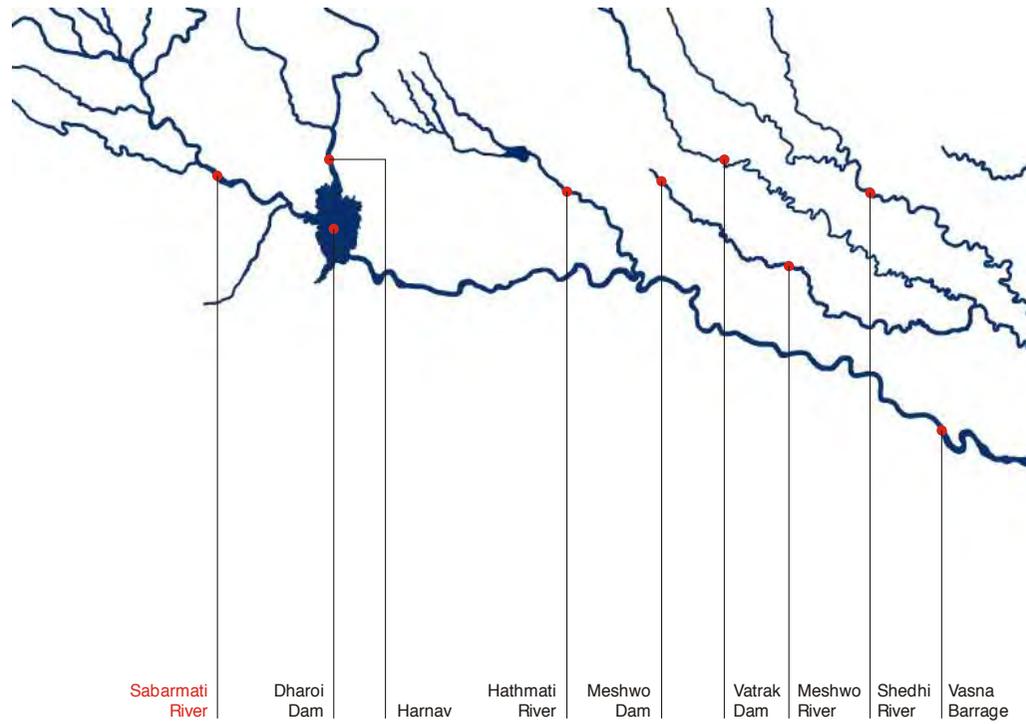
The study identified ten villages located at the banks of the Sabarmati river dispersed at nearly regular intervals. The idea was to record the river bank, agriculture pattern, existing vegetation, settlements and character of river banks at each of these locations. The documentation is through photographs, collection of soil samples and interviews of local people.

The study material collected from ten villages is represented in this book in a manner in which one can understand the overall nature of the Sabarmati river. District rainfall data, soil key map and crop chart is included in the appendix for the better understanding of natural system along the Sabarmati river.

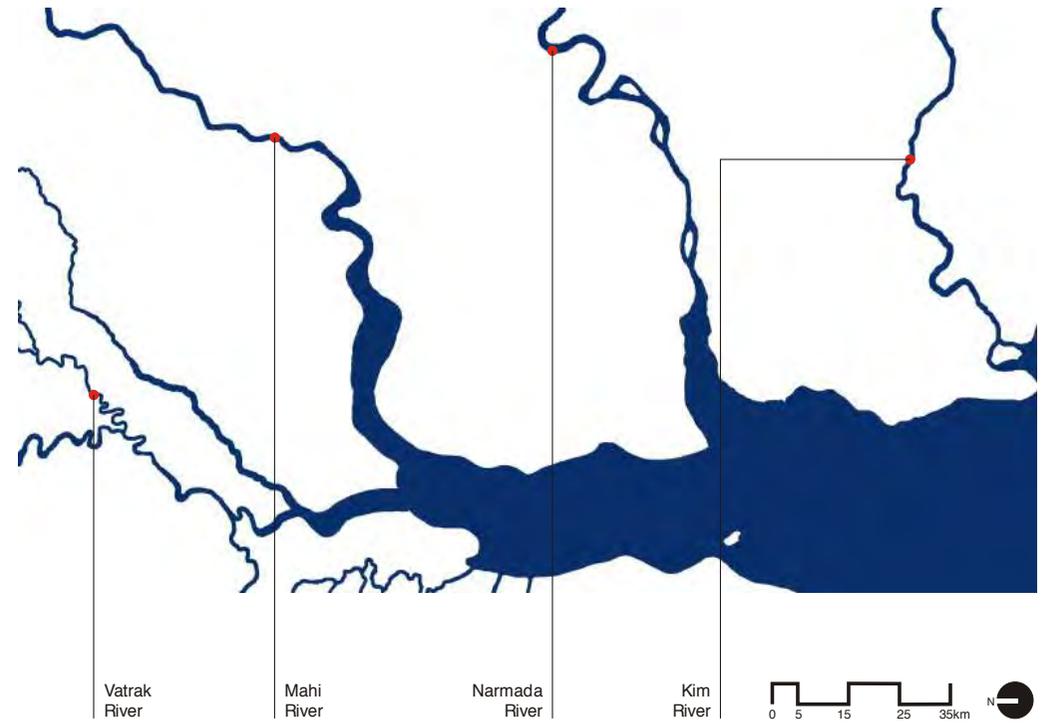
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Dams and Tributaries along the Sabarmati River



\* Mahi, Narmada and Kim are not tributaries. Like Sabarmati, they also drain into the Gulf of Khambhat



**Kheroj; Ambaji**



View taken from the over bridge looking downstream towards Khedbrahma

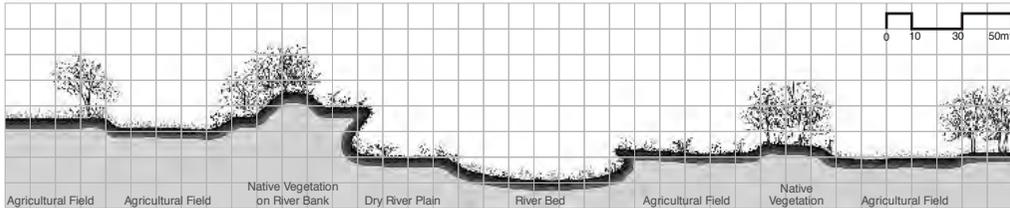


View taken from the river bank looking at agricultural fields marked on the river bed



View taken from the over bridge looking upstream towards Ambaji

**River Cross Section**



Vasantbhai

The river course meanders towards the left side while flowing downstream towards Khedbrahma. Because of this, the left river bank faces heavy erosion in the monsoon.

There is abundant stunted vegetation on the left bank of the river course; but it seems to give very little resistance to erosion during the monsoon.

In summer, all the water from the surface of the river evaporates because of the excessive heat, leaving the river bed completely dry. This enables the people living in the area to do farming in the river bed, which is very fertile.

Cash crops are predominantly grown in the river bed. During the dry season, one can see the agricultural fields marked in the river bed.

There are fields adjacent to the river bed as well. However, these get flooded in the rainy season and the surface is getting eroded gradually every year.

The soil type in the region is loamy-skeletal, well drained, loose in structure and severely prone to erosion.



Agricultural field in the river bank



Agricultural field in the river bed



Complete dry river bed

“અંબાજીનો વિસ્તાર ડુંગરાળ છે અને સાબરમતી નદીમાં પાણી ઓછું હોવાથી ખેતી માટે આ જગ્યા નો ઓછો ઉપયોગ થાય છે. હું અહીં પાપથા પર રહું છું, ખેતી માટે ડુંવાનું પાણી અને વસ્ત્રાદ પર નિર્ભર રહું છું. હું ખેતી મોટે ભાગે ડુંગર પર કરું છું અને આ કામ બહુ મેહનત માગી લે છે, જેના ધાર્થી પરિણામો પણ બહુ ઓછા જોવા મળે છે. હું આ વિસ્તારમાં નાના બંધ તૈયાર કરું છું અને કટકા કટકામાં પાક ઉગાડું છું. વસ્ત્રાદની ઋતુમાં જમીન ધોવાઈ જાય છે અને આખી મેહનત હરી કરવી પડે છે. સાબરમતી નદીના કિનારે આવી કોઈ તકલીફ નથી, પણ પાણીના અછતના કારણે કિનારા પાસે ખેતીનું પ્રમાણ ઓછું થઈ રહ્યું છે, તમે માયો લેવો લઈને બધું છાપવાના છો?”

“Ambaji is a hilly area and as the Sabarmati carries less water, the fields are not much used for farming. I stay at the base of the mountain and I am dependent on wells and rainwater for agriculture. I do farming on the hilly region; it is a lot of hard work and I rarely get desired results. I make small bunds and grow crops in small patches. In rainy season everything gets washed off and I have to do all the hard work again. There is no such problem for farmers who are practicing agriculture near the banks of the Sabarmati River, but because of scarcity of water there, farming is reducing. Are you going to take my photo and publish it in newspaper?”



- Altitude - 480m (1600.0ft.)
- Average annual rainfall - 625mm

Temp	In Summer	In Winter
Min.	20 - 23°C	8 - 10°C
Max.	42 - 44°C	34 - 36°C

**Kheroj; Ambaji**



Clayey loam      Silty      Fine sand      Fine loam      Coarse loam

**Soil Type Description**

**Type - 004**  
Shallow, well drained, loamy-skeletal soils on undulating piedmont with severe erosion and moderate stoniness; associated with very deep, well drained, coarse-loamy soils on very gently sloping lands with moderate erosion.

**Type - 008**  
Very deep, well drained, fine loamy soils on very gently sloping piedmont plain with moderate erosion; associated with very deep, well drained, coarse-loamy soils with moderate erosion.

**Gadhada; Khedbrahma**



Silty      Clayey loam      Coarse sand      Coarse sand      Coarse sand

**Soil Type Description**

**Type - 012**  
Shallow, well drained, loamy soils on very gently sloping piedmont plain with narrow valleys with severe erosion; associated with shallow, well drained, clayey soils with moderate erosion.

**Type - 004**  
Shallow, well drained, loamy-skeletal soils on undulating piedmont with severe erosion and moderate stoniness; associated with very deep, well drained, coarse-loamy soils on very gently sloping lands with moderate erosion.

**Kheroj; Ambaji**



*Bubulcus ibis*  
Linnaeus

**Cattle Egret**



*Alba Egretta*  
*garzetta*  
Linnaeus

**Large Egret**



*Dicrurus*  
*adsimilis*  
Bechstein

**Black Drongo or King Crow**



*Himantopus*  
Linnaeus

**Black winged stilt**



*Saxicola*  
*torquata*  
Linnaeus

**Collard Bushchat**

## Types of soil along the Sabarmati River

- Codes and descriptions of the soil types are identified from the Soil map of Gujarat.
- Soil samples collected from the river side has more silt content and samples collected from the agriculture fields has more clay content.
- Variation in colour of similar soil types is because of the amount of humus content present in it.
- In total 15 soil types are identified along the stretch, whose description is as given below.

### Type - 004

Shallow, well drained, loamy-skeletal soils on undulating piedmont with severe erosion and moderate stoniness; associated with very deep, well drained, coarse-loamy soils on very gently sloping lands with moderate erosion.



### Type - 007

Very deep, somewhat excessively drained, calcareous coarse loamy soils on very gently sloping piedmont plains with narrow valleys with moderate erosion; associated with very deep, somewhat excessively drained, coarse loamy soils with moderate erosion.



### Type - 008

Very deep, well drained, fine loamy soils on very gently sloping piedmont plain with moderate erosion; associated with very deep, well drained, coarse-loamy soils with moderate erosion.



### Type - 012

Shallow, well drained, loamy soils on very gently sloping piedmont plain with narrow valleys with severe erosion; associated with shallow, well drained, clayey soils with moderate erosion.



### Type - 013

Moderately deep, well drained, fine soils on very gently sloping piedmont plain with moderate erosion; associated with very deep, well drained coarse loamy soils with moderate erosion.



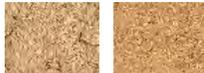
### Type - 074

Very deep, somewhat excessively drained, calcareous, coarse-loamy soils on very gently sloping dissected flood plain with severe erosion; associated with very deep, well drained, calcareous, fine-loamy soils with moderate erosion.



### Type - 078

Very deep, imperfectly drained, calcareous, coarse-loamy soils on very gently sloping dissected flood plain with moderate erosion and strong salinity; associated with moderately deep, imperfectly drained, calcareous fine soils



### Type - 079

Very deep, moderately well drained, calcareous fine loamy soils on very gently sloping flood plain with slight erosion and slight salinity; associated with deep, moderately well drained, calcareous fine soils with slighter erosion and slighter salinity.



### Type - 088

Very deep, somewhat excessively drained, coarse-loamy soils on nearly level alluvial plain with slight erosion; associated with very deep, excessively drained, calcareous sandy soils with moderate erosion.



### Type - 089

Very deep, somewhat excessively drained, coarse-loamy soils on very gently sloping alluvial plain with moderate erosion; associated with very deep, excessively drained calcareous, sandy soils with moderate erosion.



### Type - 097

Very deep, well drained, fine-loamy soils on very gently sloping alluvial plain with moderate erosion, associated with very deep, moderately well drained calcareous, fine-loamy soils with moderate erosion.



### Type - 098

Very deep, well drained, fine loamy soils on very gently sloping alluvial plain with moderate erosion; associated with very deep, well drained, coarse-loamy soils with moderate erosion.



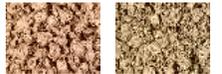
### Type - 100

Deep well drained, fine loamy soils on very gently sloping alluvial plain with slight erosion and salinity; associated with deep moderately well drained, calcareous, fine soils on gently sloping lands and moderate erosion.



### Type - 115

Moderately deep, well drained, calcareous, fine soils on very gently sloping alluvial plain with slight erosion and slight salinity; associated with deep, moderately well, drained, calcareous, fine soils with moderate erosion.



### Type - 116

Moderately deep, well drained, calcareous, fine soils, on very gently sloping alluvial plain with slight erosion and moderate salinity; associated with deep, moderately well drained, calcareous, fine soils with moderate erosion.

