

Observations along the Sabarmati



Landscape Environment Advancement Foundation
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Forgotten legacy

Many aspects of our environment we take for granted. Oft traveled and traversed, they soon become a blur that cease to register except as a component of a larger composition.

Seminal landscape occurrences that shaped civilization are no different. In the past, features such as mountains, valleys, forests, lakes or rivers formed the anchor that determined how development of human settlements would occur. Settlements found their locations because the landscape provided protection, or succor.

Both these ideas, of protection and sustenance, have undergone a change, to an extent where the very reason why a settlement chose to exist, has ceased to be even registered. Gradually settlements turn their backs to these landscape events. Rivers become drains, mountains are flattened or leavened, and lakes are filled up. The gradual distancing of this dependence and obliteration from the consciousness, is not an urban phenomenon, but is simply a function of the fact that other support systems replace the original ones.

It is a tragedy that the new systems are concealed, and well cloaked, never revealing their character. Water neatly fed through pipes to irrigate the fields is soon taken for granted. Little does it even express the fury of a river in spate, or rarely does it satiate the soul like a gentle river filled from edge to edge. This is unfortunately the truth, and the only way to counter it is to consciously force ourselves to observe such actors in nature.

Ritesh Kamdar, a student of landscape Architecture, chose to travel to selected locations along the river Sabarmati. That it was summer, and hence the seasonal river was dry, did not in any way reduce the value of the exercise.

He selected ten locations along the 371 kms of the river and made simple recordings of the river bed, the soil, crops and birds.

So strong is our pre-occupation to find a conclusive meaning for every effort we undertake, that one is likely to go through the text and question the reason for doing such an effort.

The earlier paragraphs of this text should help ally such doubts. There are lessons learnt in the text; many of them, about the course of the river, the quality of its bed, its edges, the variety of soils and crops.

But more importantly it a reminder to re- look at such landscape features that shaped our civilizations; perhaps a mature contemplation of their nature and fate may allow us to reinterpret their values in our lives again.

Aniket Bhagwat

July 2009

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.

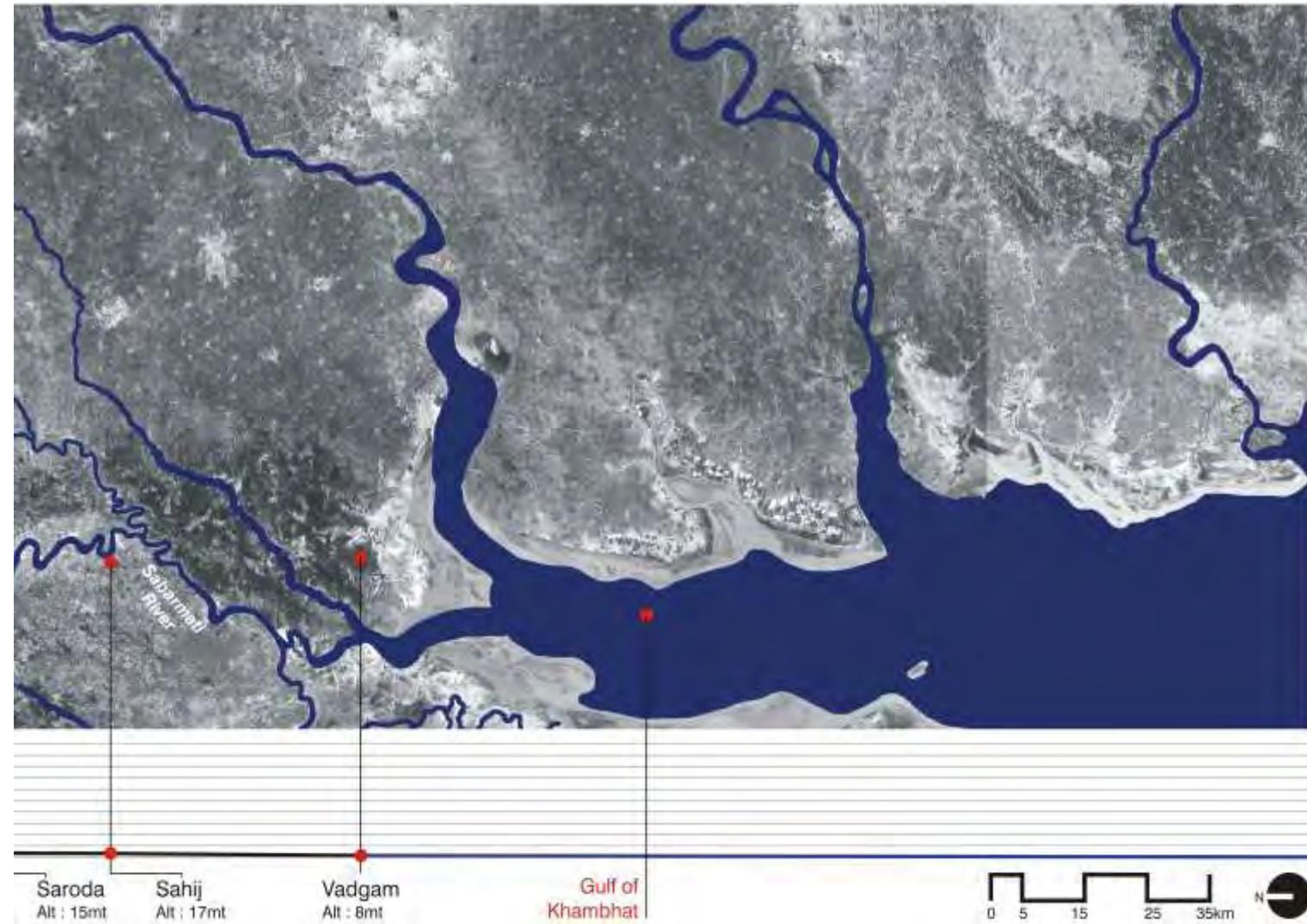
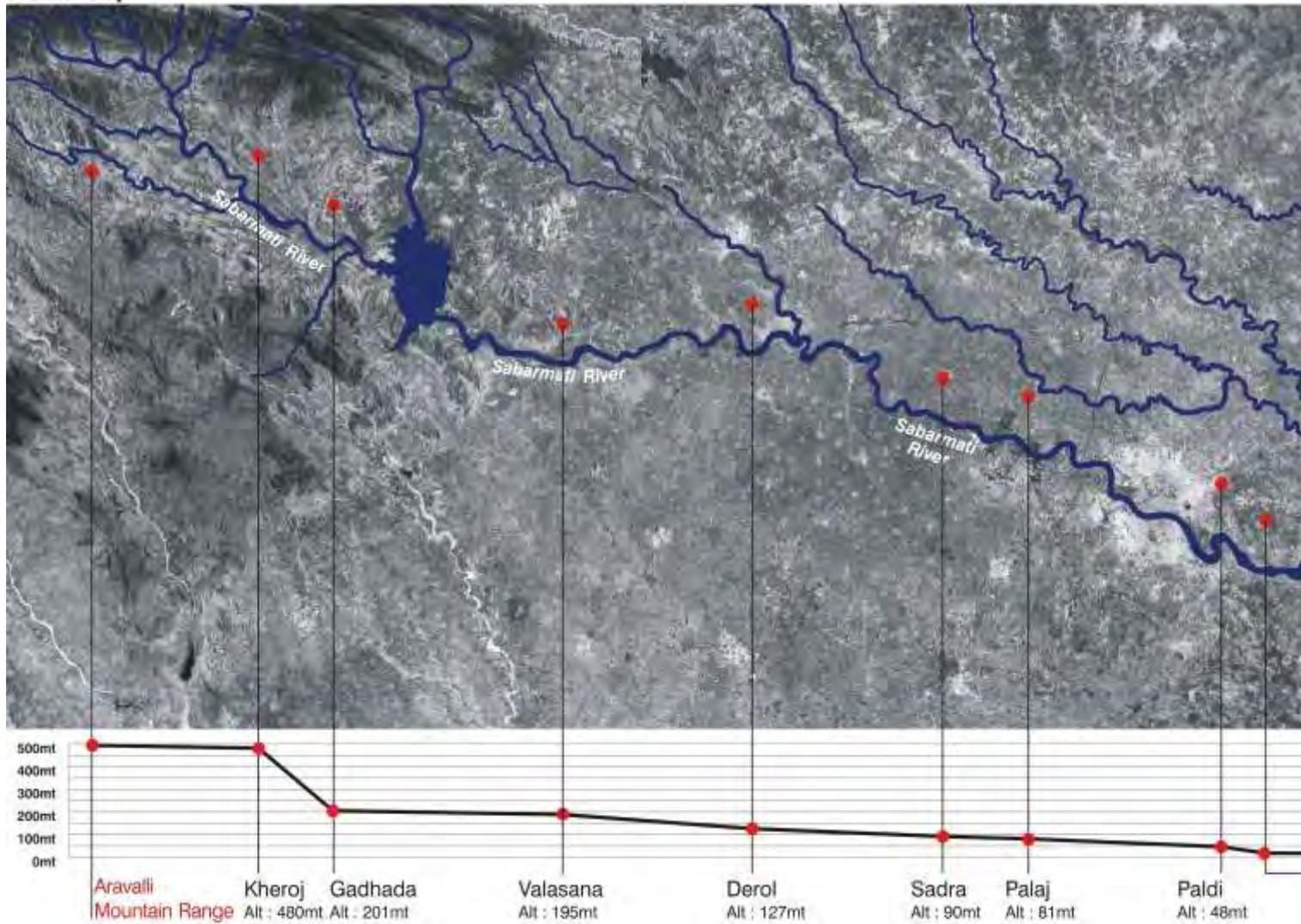
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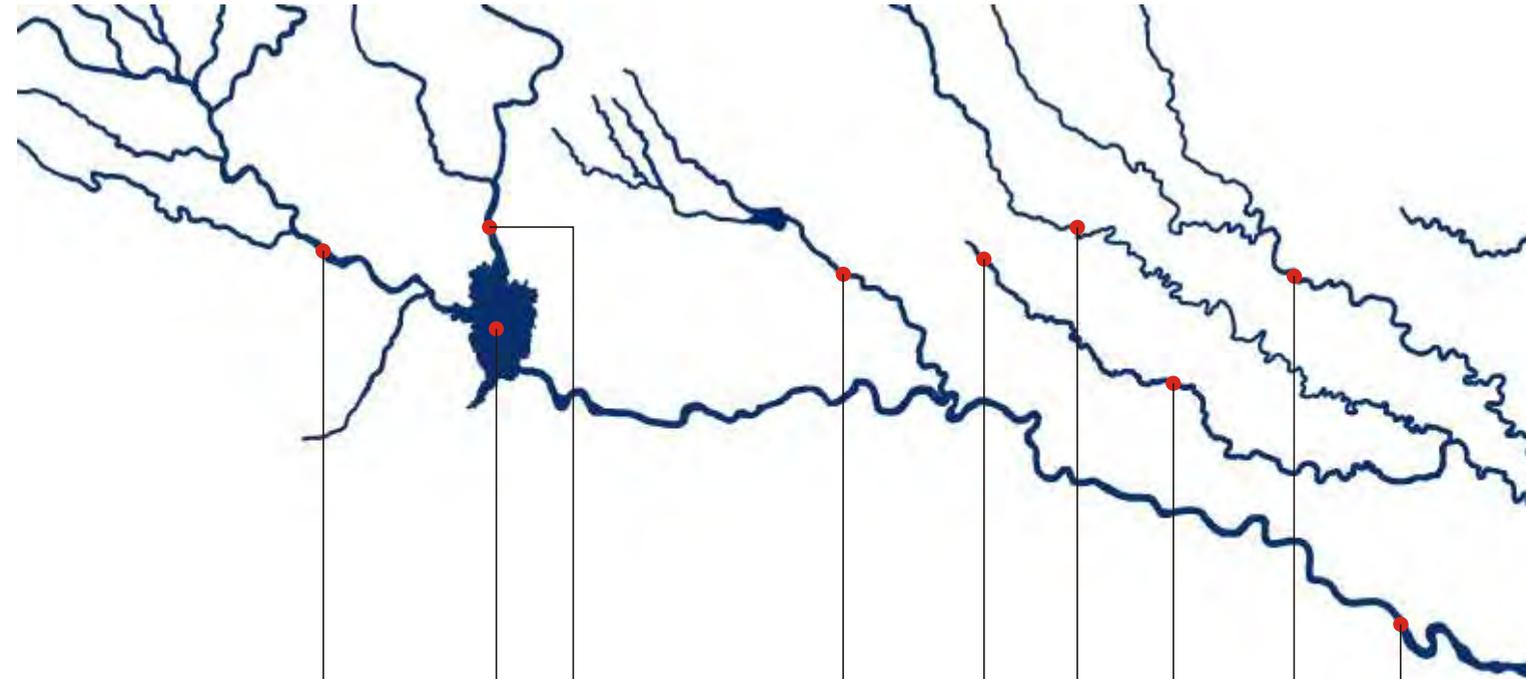
Along the Sabarmati

- 01. Places observed
- 02. Tributaries and dams

Route Map



Dams and Tributaries along the Sabarmati River



Sabarmati River

Dharoi Dam

Harnav

Hathmati River

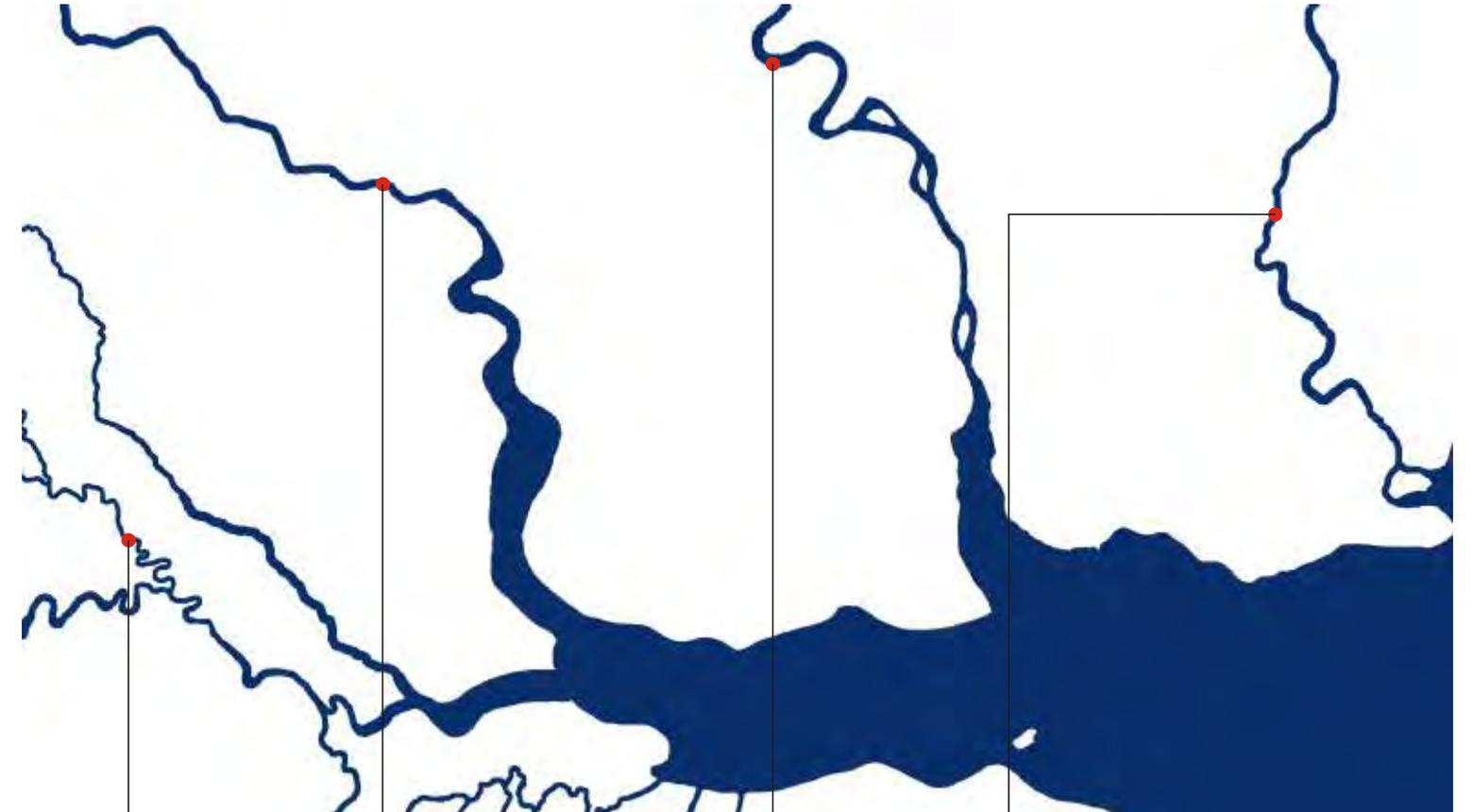
Meshwo Dam

Vatrak Dam

Meshwo River

Shedhi River

Vasna Barrage



Vatrak River

Mahi River

Narmada River

Kim River



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

Edges of the River

01. Kheroj; Ambaji
02. Gadhada; Khedbrahma
03. Valasana; Idar
04. Derol; Himmatnagar
05. Sadra; Gandhinagar
06. Palaj; Gandhinagar
07. Paldikankrej; Ahmedabad
08. Saroda; Bavla
09. Sahij; Dholka
10. Vadgam; Khambhat

Kheroj; Ambaji



View taken from the over bridge looking downstream towards Khedbrahma

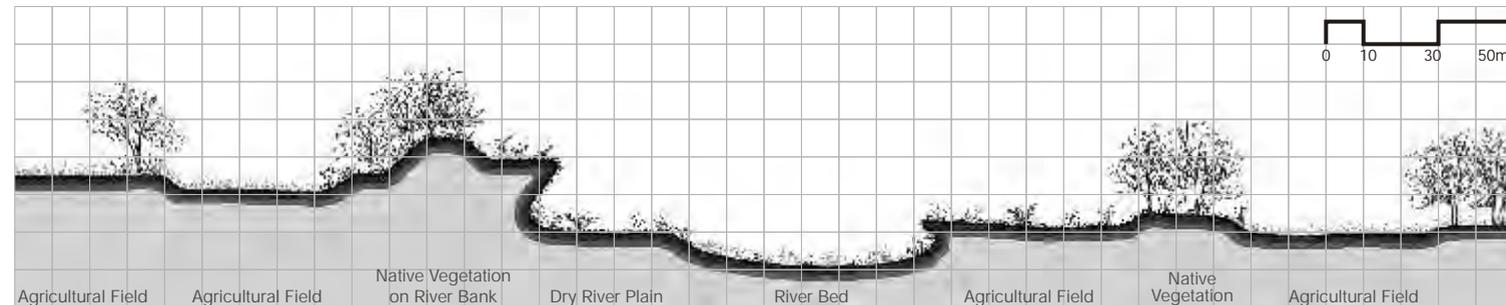


View taken from the river bank looking at agricultural fields marked on the river bed



View taken from the over bridge looking upstream towards Ambaji

River Cross Section



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



Vasantbhai

“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 કુંવાનું પાણી અને વરસાદ પર નિર્ભર રહું છું. હું ખેતી મોટે ભાગે ડુંગર પર કરું છું અને આ કામ બહુ મેહનત માગી લે છે, જેના ધાર્યા પરિણામો પણ બહુ ઓછા જોવા મળે છે. હું આ વિસ્તારમાં નાના બંધ તૈયાર કરું છું અને કટકા કટકામાં પાક ઉગાડું છું. વરસાદની ઋતુમાં જમીન ધોવાઈ જાય છે અને આખી મેહનત ફરી કરવી પડે છે. સાબરમતી નદીના કિનારે આવી કોઈ તકલીફ નથી, પણ પાણીના અછતના કારણે કિનારા પાસે ખેતીનું પ્રમાણ ઓછું થઈ રહ્યું છે, તમે મારો કોટો 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 - 480mt (1600.0ft.)
- Average annual rainfall - 625mm

	400	450	500	550	600	650	700	750
•Temp Min.								
•Temp Max.								
	In Summer			In Winter				
	20 - 23°C			8 - 10°C				
	42 - 44°C			34 - 36°C				

Derol; Himmatnagar



View taken from Derol village looking at the turn of the river course downstream towards Sadra

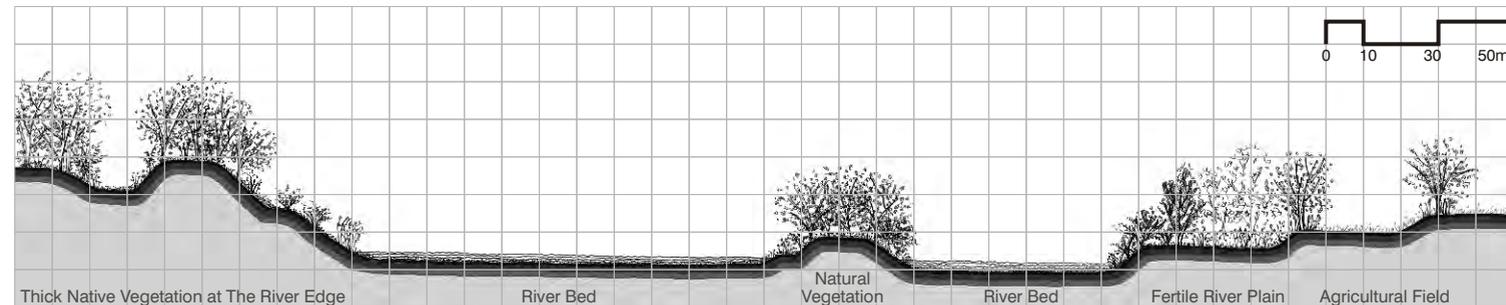


View taken from Derol village looking closely at the sharp turn of the river



View taken from one bank of the river looking towards the other bank

River Cross Section



In this region, the river meanders slightly towards right bank as the right bank has flat terrain. But the left bank has a very hard rocky stratum. The left bank has thick native vegetation adjacent to it and the right bank supports scrub vegetation.

The river is deep in the central portion which supports fishing activity. Due to hard stratum towards left bank, water accumulation is seen in that part.

During monsoon water gets filled up nearly up to the upper level of the rocky stratum on the left bank of the river course.

During monsoon, many times pieces of rock from the banks fall off and the bank gets heavily eroded. This has increased the width of the river bed.

Soil here is somewhat excessively drained, coarse loamy-type and severely prone to erosion.



Suryakantbhai

“મને અહિયાં વસવાને સાડત્રીસ વર્ષ થયા. દેરોલ ગામ ઘણું ખરૂં એક બાજુ ડુંગરાળ છે અને બીજી બાજુ સપાટ જમીન થી ઘેરાયેલું છે. અહીં સાબરમતી નદીનો વિસ્તાર ઉંડો છે અને અમે અહીંયા કિનારા ઉપરજ ખેતી કરીએ છીએ, થોડી બહુ ખેતી ડુંગરાળ વિસ્તારમાં પણ થાય છે. અહીં બે વ્યવસાય એક સાથે ચાલે છે ખેતીવાડીનો અને માછીમારીનો નદીની એક બાજુ વિશાળ પથરાળ વિસ્તાર હોવાથી પાણી નું આખું દબાણ સપાટ જમીનની બાજુ રહે છે જેથી એ બાજુની જમીન વરસાદ માં દર વર્ષે ધોવાતી જાય છે અને નદીનો પટ મોટો થતો જાય છે. મારા બન્ને છોકરાઓ વધુ પૈસા કમાવવા શહેર જતા રહ્યા છે અને આવી સ્થિતિ બીજા ઘણા એવા ખેડુતો અનુભવી રહ્યા છે જેથી ખેતીવાડીનું કામ આવતા થોડા વર્ષોમાં બહું ઓછું થઈ જવાની શક્યતા છે.”

“I have been staying here for the last thirty seven years. Village is surrounded by hilly region on one side and a flat terrain on the other side. The river is deep here and we do agriculture next to the river bed, some farmers do farming on the hilly areas. People here have two main occupations agriculture and fishing. On the left bank of the river there is a high rocky stratum so the pressure of water remains on the flatter side. In rainy season due to excessive pressure of water, soil erosion takes place on the flatter side because of which the width of the river bed is increasing. Both my sons have gone to the city in search of better employment. Many farmers are facing this problem and hence, in coming years the practice of agriculture will get reduced.”



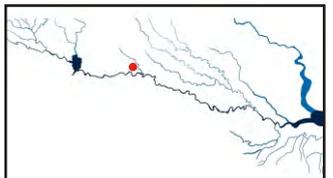
Meandering of the river



River course



High rocky stratum at the bank



- Altitude - 127mt (423.30ft.)
- Average annual rainfall - 630mm

	400	450	500	550	600	650	700	750
•Temp Min.		23	25	°C				
•Temp Max.		40	44	°C				
		In Summer			In Winter			
		7	10	°C				
		32	36	°C				

Sadra; Gandhinagar



View taken from one of the old forts at the river bank looking towards the river course

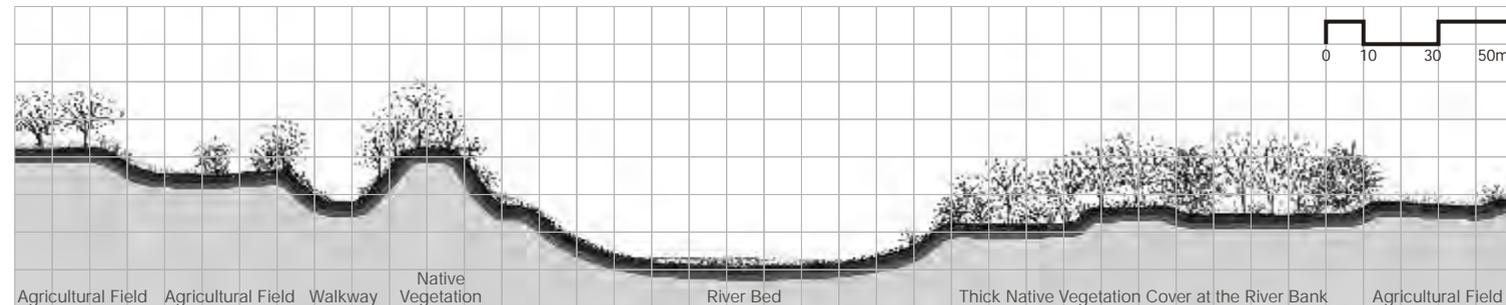


View taken from the river bed looking upstream towards Sadra village



View taken from the river bed looking downstream towards Palaj village.

River Cross Section



As the river banks are not very high in this region, Sabarmati river dries up completely during summer.

The right bank of the river along Sadra village is much higher than the bank on the left side.

Agricultural fields are thus, located on the higher, right bank of the river. River banks are very steep on this side and gentler on the opposite, left bank of the river.

Illegal mining of river sand occurs in the river bed. Because of this mining the soil of the river bed loosens up and becomes severely prone to erosion.

The native vegetation on the river banks has reduced a lot due to excessive erosion in the monsoon.

In the rainy season because of the loose soil structure, the river bank gets highly eroded and hence, the width of the river course increases which adversely affects the agricultural fields along the river.

The soil type of the region is somewhat excessively drained and coarse-loamy type.



River course



Left river bank



Right river bank



Nitinbhai

“સાદરા ગામમાં સાબરમતી નદીના કિનારાનો વિસ્તાર મોટા ભાગે પથરાણ છે જેથી સાબરમતી નદીને અડીને ખેતી ઓછી થાય છે. અહીં થતા પાકોમાં શાકભાજી અને અન્ય ખેતી થાય છે પણ પ્રમાણમાં બહુ ઓછું. ગરમીની ઋતુમાં અહીં ફૂલોનો વ્યાપાર થાય છે, ઘણાં ખેડુતો ફૂલો ઉગારીને નજીકના શહેરમાં વેચે છે જેમાં તેમને સારા એવા પૈસા મળી રહે છે. ગરમીની ઋતુમાં સાબરમતીના પટ પર પણ ખેતી થાય છે. હવે પટ ઉપર છેલ્લા થોડા વર્ષથી ગેરકાયદેસર ખોદકામ થાય છે, જેથી જમીનની ફળદ્રુપતા ઓછી થતી જાય છે માટે ખાતરનો વધુ ઉપયોગ કરવો પડે છે, બીજું કે જમીન ઢીલી પડી જવાથી વરસાદમાં એનું ખાસા પ્રમાણમાં ધોવાણ પણ થઈ જાય છે જે ખેતીવાડી પર બહુ માઠી અસર કરે છે.”

“In Sadra village the Sabarmati River flows through a rocky area due to which farming is not possible along the river bed. Most of the fields are far from the river. We grow vegetables here but the production is very low. In summer, many farmers grow flowers and sell them to the nearby city. They make good money out of it. We also do agriculture in the river bed but in last few years because of illegal mining on the river bed, the fertility of the soil has decreased and we are forced to use more fertilizer. Secondly, because of mining the soil loosens up and thus, erosion increases during the monsoon which adversely affects the agricultural practice.”



- Altitude - 90mt (300.0ft.)
- Average annual rainfall - 675mm

	400	450	500	550	600	650	700	750
•Temp	In Summer		In Winter					
Min.	20 - 24°C		8 - 11°C					
Max.	35 - 43°C		26 - 30°C					

Palaj; Gandhinagar



View taken from the river bed looking upstream towards Palaj

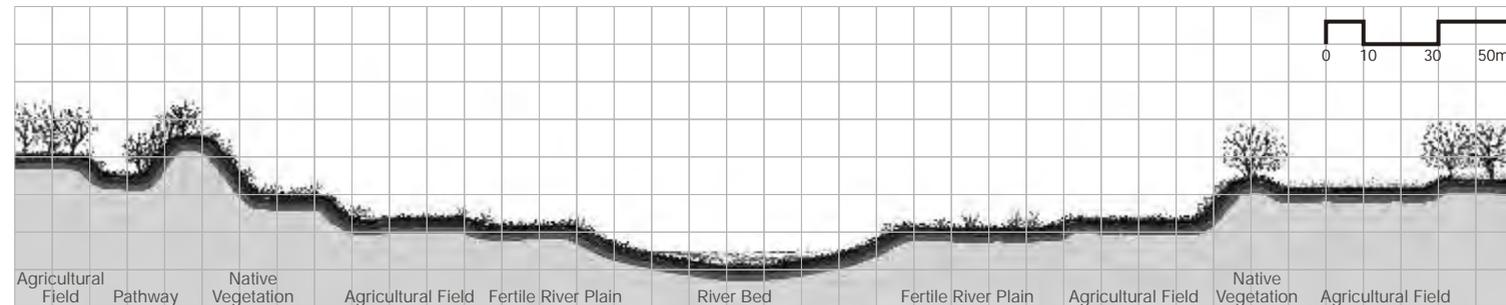


View taken from the river bed looking downstream towards Dholka



View taken from the river bed looking at the left bank of the river

River Cross Section



The river banks here are very high. The river bed thus, appears deep and there are small water bodies present in the river bed.

A part of the river bed is filled up with some water; otherwise the river is completely dried up.

Agricultural fields are present on both the side of the river banks.

Industries discharge their polluted liquids in the river. The stream of the water here stinks and has high level of fluoride content. People use the contaminated water for irrigation, unaware of the fact that this water is adversely affecting the fertility of the soil.

Most part of the river banks is highly prone to the erosion because of the very loose soil structure.

The river bed is severely eroded. The situation is getting worse because of illegal mining and transportation of river sand. Because of this, the river bed has further loosen up and is prone to severe erosion during monsoon.

The soil here is of calcareous, coarse loamy type and prone to erosion.



Water bodies at the river bank



River bed



Eroded part on the river bed



Ranchhodhbhai

“મને પાલજમાં રહેતા સત્યાવીસ વર્ષ થઈ ગયા અને અહીયા મારૂ મુખ્ય કામ ખેતીવાડી છે. છેલ્લા સત્યાવીસ વર્ષમાં જોઈએ તો સાબરમતી નદીમાં પાણીનું પ્રમાણ ખાસુ એવું ઓછુ થયેલ છે, પહેલા સાબરમતી નદીના આ ભાગમાં વર્ષમાં છ થી આઠ મહીના પાણી રહેતું જેથી ખેતીમાં અમે સારો પાક ઉગાડી શકતા હતા, સારા પ્રમાણમાં પાક થવાને લીધે અમને સારા એવા પૈસા મળી રહેતા જેથી અમારૂ જીવન યાપન થઈ રહેતું. હવે તો નદીમાં માંડ ત્રણ મહિના પાણી રહે છે, જેથી ખેતીના ઉત્પાદનમાં બહુ ઘટાડો થયો છે જે જીવન યાપન માટે પૂરતું નથી. ખેતીવાડીમાં પૈસા પૂરતાં ના મળવાથી ગામનાં યુવાનો શહેર તરફ જઈ રહ્યા છે જેને લીધે ખેતી વ્યવસાય ધીરે-ધીરે ઓછો થઈ રહ્યો છે.”

“I have been staying in Palaj for last twenty seven years and agriculture is our main occupation. Earlier there used to be water in Sabarmati river for six to eight months because of which we were able to grow good amount of crop, but in the last twenty seven years water level of Sabarmati river has decreased substantially. Earlier because of the production of good amount of crop we faced no financial problems but as now Sabarmati dries up in three months and remains dry for the rest of the year, production of crop has become very less and therefore the money we get from that is not sufficient to run our family. Youngsters are heading towards the city in search of the better employment, which is adversely affecting livelihood from agriculture”.



- Altitude - 81mt (270.0ft.)
- Average annual rainfall - 700mm

	400	450	500	550	600	650	700	750
Temp								
Min.								
Max.								

Saroda; Bavla



View taken from the over bridge looking downstream towards Khambhat

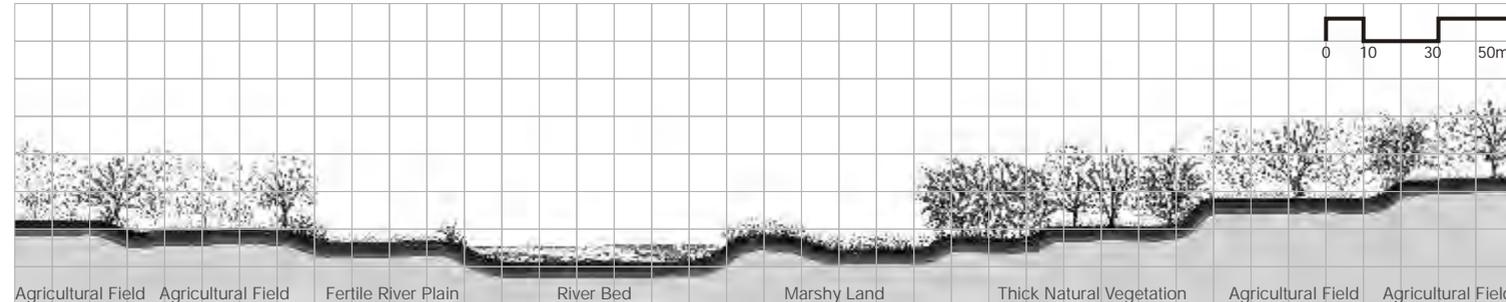


View taken from the over bridge looking upstream towards Paldikankrej



View showing the river bank

River Cross Section



The irregular shaped terrain seen here was earlier a vast agricultural field which has almost been washed away because of the heavy erosion. River bed has increased in width because of which water percolates, spreads and evaporates faster.

Thick vegetation is present on the river bank. Vegetation cover helps in decreasing the erosion but is not able to stop it completely. Just adjacent to the vegetation cover there are agriculture fields which get filled with water during monsoon and are prone to erosion.

Part of the land here has a hard stratum below. Because of this, the land gets submerged during monsoon but does not get washed away.

As the upper layer of the soil is fertile and deep enough for farming, farmers grow cash crops on it for almost six months in summer.

The soil type here is well drained, calcareous, with moderate salinity and is moderately prone to erosion.



Jethabhai

“ મે અહીયાં મારી જીવનની ત્રણ પેઢી જોઈ છે. હું સાબરમતી નદીના કિનારા પાસેજ ખેતીવાડી કરું છું. સાબરમતી નદીનો અહીયાં નો ભાગ ઉડો હોવાથી નદીમાં પાણી બારેમાસ રહે છે. ખેતીવાડીની જમીન નદીને એકદમ અડીને હોવાને લીધે વરસાદની ઋતુમાં મોટા ભાગે તેમાં પાણી ભરાઈ જાય છે. જમીન ફળદ્રુપ હોવાથી તેમાં અમે શાકભાજી સાથે બાકી ધણી વસ્તુઓનો પાક લઈએ છીએ, પાણીની અછત રહેતી નથી પણ વરસાદમાં પાણીનો પ્રવાહ વધારે હોવાથી જમીન ધોવાતી જાય છે અને ખેતીમાટે ઉપયોગમાં લેવાતી જમીન ઓછી થતી જાય છે. સરકારે અહીં ડેમ બનાવવાની જરૂર છે જેથી નદીનો પ્રવાહ નિયંત્રણમાં લાવી શકાય અને તેનું પાણી ખેતીવાડીમાં વાપરી શકાય.”

“I stay at the banks of Sabarmati River and do farming. I have seen three generations here. This part of Sabarmati is very deep and marshy, water remains in the river round the year. As the agricultural fields are just adjacent to the river they get filled up in monsoon. Because of the good fertility of the soil we grow vegetables along with many other crops. There is no scarcity of water but in rainy season due to soil erosion we are losing a part of our fertile land every year. Government needs to build dam here so that the flow of the river can be regulated and the water can be used for agriculture.”



River bank prone to high erosion



Thick native vegetation at the bank



Agricultural field on the river bank



- Altitude - 15mt (50.0ft.)
- Average annual rainfall - 600mm

	400	450	500	550	600	650	700	750
Temp	In Summer				In Winter			
Min.	25 - 27°C				11 - 13°C			
Max.	43 - 45°C				20 - 22°C			

Sahij; Dholka



View taken from the over bridge looking downstream towards Khambhat

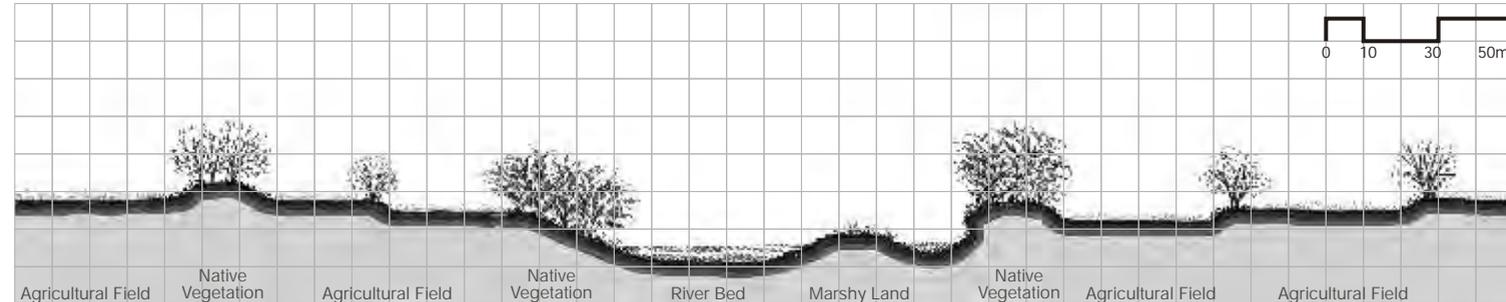


View taken from the one river bank looking towards the other one



View taken from the over bridge looking upstream towards Ahmedabad

River Cross Section



The river banks here are very steep and less eroded. Thick vegetation cover at the river banks protect the bank from getting heavily eroded.

This part of the river is deep and hence, it has ample amount of water for irrigation.

Agricultural fields are present on both the river banks. These fields faces surface erosion and get heavily eroded during the monsoon.

Because of the continuous draining of water from the adjacent agriculture fields, the part from where water joins the river course, has got heavily eroded over a period of time. The vegetation cover of that area is gradually reducing and this might affect the river banks.

As the soil here is sandy, farming is not practiced on the river bed. The soil structure of the surrounding area is also loose and is prone to erosion.

The soil type here is well drained, calcareous, fine and is severely prone to erosion.



River bank



Eroded part of the river bank



Eroded agricultural field



Ramnikbhai

“ હુ જ્યારે સાહિજ આવ્યો ત્યારે અહીં માંડ પંદર ઘરો હતા અને મોટા ભાગે બધાનો વ્યવસાય ખેતીવાડી હતો. અહીંની જમીન એ વખતે બહુજ ફળદ્રુપ હતી અને ઘણાં જાતનાં પાકો અહીં થતા હતા. ખેતીના જોર પર ગામનો ખુબ વિકાસ થયો છે. આજે પણ નદીની બન્ને બાજુ ખેતી થાય છે પણ હવે જમીનની ફળદ્રુપતામાં નોંધપાત્ર ઘટાડો આવ્યો છે. સાબરમતી માં પાણીનું પ્રમાણ બહુ ઓછુ થઈ ગયું છે જે ખેતીવાડી ઉપર માઠી અસર કરે છે. વર્ષના છ મહિના તો નદીમાં પાણી નજીવું હોય છે અને ઉનાળામાં સાબરમતી નદી પુરી રીતે સુકાઈ જાય છે. આવા સંજોગોમાં હવે પહેલાની જેમ જીવન ચાલન માટે પુરી રીતે સાબરમતી નદી પર આશ્રીત રહી શકાતું નથી અને પૈસા કમાવવા માટે સાથે - સાથે બીજી મજૂરી પણ કરવી પડે છે.”

“When I came to Sahij, there were hardly fifteen houses and most of the people used to practice farming. At that time the land was very fertile and we use to grow many types of crop on it. Village has progressed very much over the years because of the farming practice. Today people are still doing agriculture on both the sides of the river but the fertility of the soil and water level of the river has decreased substantially which has severely affected the crop yield. Water level remains very low for six months and in summer the river dries up completely. Now we cannot depend only on the river for livelihood hence, to earn money we are forced to do other labor.”



- Altitude - 17mt (56.60ft.)
- Average annual rainfall - 562mm

	400	450	500	550	600	650	700	750
Temp	In Summer			In Winter				
Min.	23 - 25°C			10 - 11°C				
Max.	43 - 45°C			20 - 22°C				

Vadgam; Khambhat



View taken from the river bank looking towards Arabian Sea

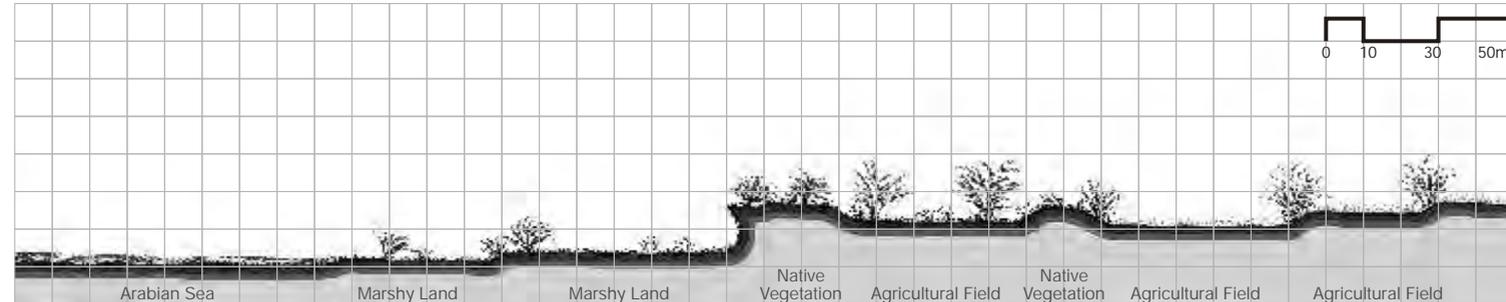


View taken from the middle of the sea looking towards the heavily eroded river bank of vadgam



View taken from the terrace of the temple located at the bank, looking towards the sea and the agriculture fields

River Cross Section



The stretch along the river here is very fertile & very useful for farming.

Because of the loose soil structure & heavy rainfall, river banks are getting heavily eroded during monsoon. The river bank here has already eroded by about five hundred meters. Due to heavy erosion, the size of the river bed has increased and it has eaten into the adjacent fields making them smaller.

The soil structure of the river bank here is so loose that if we stand on it and give a slight push the whole portion will fall down immediately.

There is a stretch of a water logged land at the bank of the river. As the Sabarmati empties into the Arabian Sea it deposits large amount of silt here.

This soil is also taken away to be used as a fertilizer in the fields farther away.

The soil here is imperfectly drained, calcareous, coarse-loamy type with moderately prone to erosion.



Severely eroded river bank



Bank as seen from Arabian sea



Water logged land



Shrenikbhai

“જંભાત ની ખાડી માથી સાબરમતી નદી અરબી સમુદ્રમાં ભળી જાય છે. મને અહિયાં સોળ વરસ થયા છે અને આ સોળ વર્ષમાં મને કોઈપણ જાતનો મોટો ફેર નદીમાં જોવા મળ્યો નથી. અહીં જમા થતો નદીનો કાંપ ખુબજ ફળદ્રુપ હોવાથી અહીં ખેતી તો થાયજ છે અને સાથે અહીંની માટી દુરના ખેતરો માં લઈ જઈને એનો ખાતર તરીકે પણ ઉપયોગ કરાય છે, અહીં કાંપનો ગેરકાયદેસર ધંધો પણ થાય છે. જંભાતની જળવાયુ ઘણા પ્રકારના પાકોને મદદરૂપ થાય છે. સરકાર દ્વારા અમલમાં લેવાયલી પાણી સંચાલિત યોજનામાં ગામના લોકોએ ઉમડકાબેર ભાગ લીધો હોવાથી વરસાદનું પાણી મોટા પ્રમાણમાં ભેગુ કરાય છે અને એનો ઉપયોગ ખેતીમાં અને બાકી ઘણો વસ્તુઓ માં લેવાય છે. કોઈ પણ ઋતુમાં અહીં એવી કોઈ ગંભીર પ્રકારની પરિસ્થિતી સર્જતી નથી. સાબરમતી નદીને લીધે આ ગામનો ઘણો વિકાસ થયો છે.”

“Sabarmati River empties into Arabian Sea through Gulf of Khambhat. In my last sixteen years of staying here I have not observed any kind of major change in the river. As the soil here is very fertile, most of the people do farming practice here. The soil is also taken away to be used as manure in fields further away. Illegal transportation of river silt also happens here. Climate of Khambhat is ideal for many types of crop production. People have readily participated in the government initiated project of rain water harvesting. Water which is accumulated is mostly used in agriculture and also for other purposes. Any kind of serious problem never arises in any season. Village has developed a lot because of Sabarmati River.”



- Altitude - 8mt (26.60t.)
- Average annual rainfall - 700mm

	400	450	500	550	600	650	700	750
Temp	In Summer					In Winter		
Min.	20 - 22°C					10 - 12°C		
Max.	36 - 38°C					25 - 30°C		

Soil types

01. Kheroj; Ambaji
02. Gadhada; Khedbrahma
03. Valasana; Idar
04. Derol; Himmatnagar
05. Sadra; Gandhinagar
06. Palaj; Gandhinagar
07. Paldikankrej; Ahmedabad
08. Saroda; Bavla
09. Sahij; Dholka
10. Vadgam; Khambhat

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

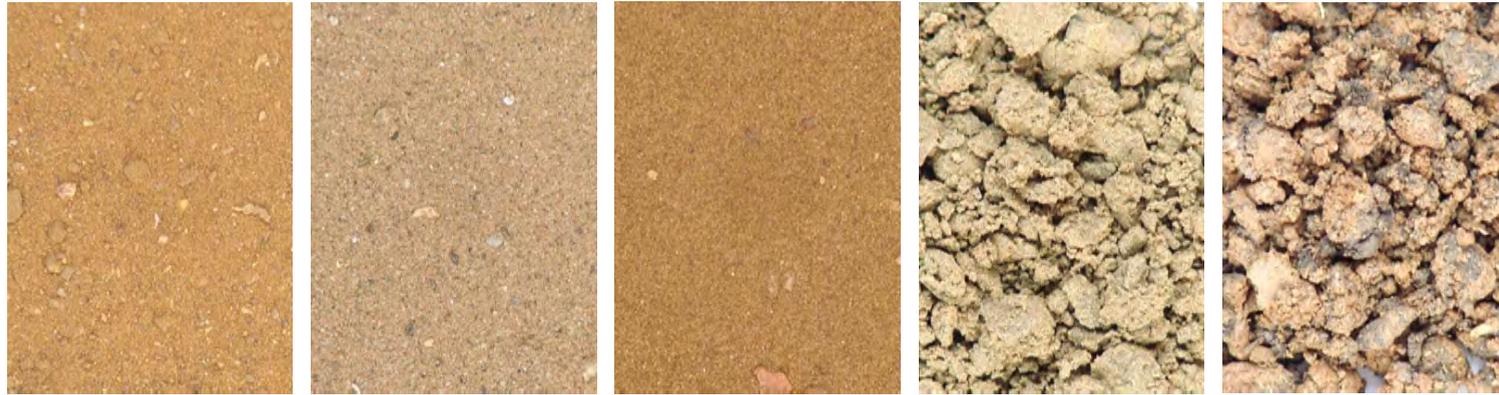
Type - 012

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.

Valasana; Idar



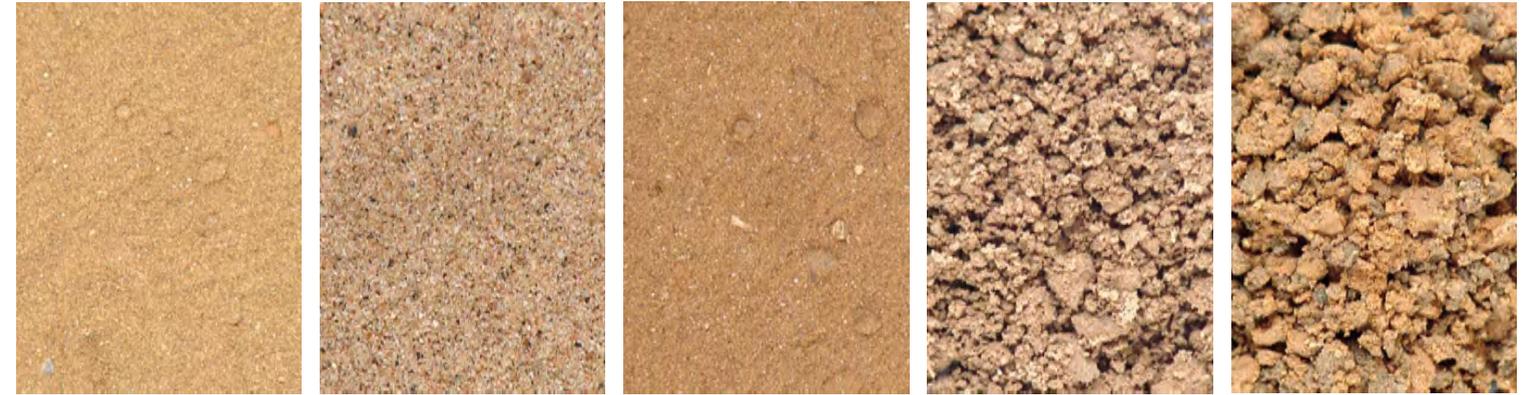
Fine sand Coarse sand Clayey Clayey loam Coarse loam

Soil Type Description

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 - 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.

Derol; Himmatnagar



Coarse loam Coarse sand Fine loam Coarse loam Clayey loam

Soil Type Description

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 - 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.

Sadra; Gandhinagar



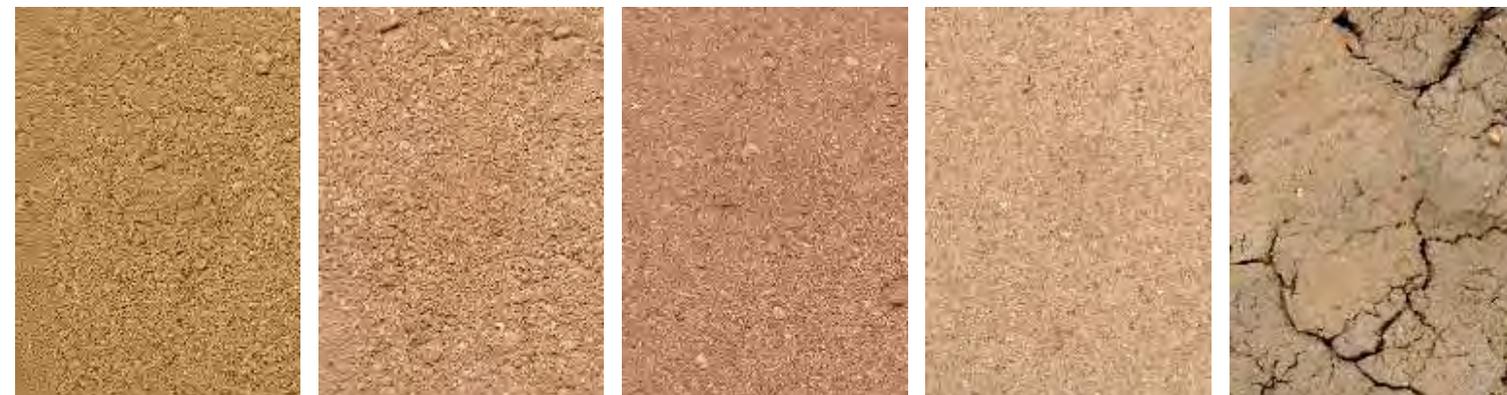
Fine sand Clayey loam Coarse sand Coarse loam Fine loam

Soil Type Description

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 - 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.

Palaj; Gandhinagar



Fine loam Sandy loam Fine sand Coarse sand Clayey loam

Soil Type Description

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 - 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.

Paldikankrej; Ahmedabad



Silty Fine loam Clayey Clayey loam Coarse sand

Soil Type Description

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 - 100
 Deep well drained, fine loamy soils on very gently sloping alluvial plain with slight erosion and slight salinity; associated with deep moderately well drained, calcareous, fine soils on gently sloping lands with moderate erosion.

Saroda; Bavla



Silty Fine sand Coarse loam Clayey loam Coarse loam

Soil Type Description

Type - 115
 Moderately deep, moderately 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 - 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.

Sahij; Dholka



Coarse sand

Coarse loam

Fine loam

Clayey loam

Coarse loam

Soil Type Description

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 - 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.

Vadgam; Khambhat



Silty loam

Silty

Fine sand

Clayey loam

Coarse loam

Soil Type Description

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 with slight erosion and moderate salinity.

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.

Landscape Vignettes

01. Kheroj; Ambaji
02. Gadhada; Khedbrahma
03. Valasana; Idar
04. Derol; Himmatnagar
05. Sadra; Gandhinagar
06. Palaj; Gandhinagar
07. Paldikankrej; Ahmedabad
08. Saroda; Bavla
09. Sahij; Dholka
10. Vadgam; Khambhat



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



Himantopus Linnaeus
Black winged Stilt



Bubulcus ibis Linnaeus
Cattle Egret



Alba Egretta garzetta Linnaeus
Large Egret



Pseudibis Papillosa Temminck
Black Ibis



Pseudibis Papillosa Temminck
Black Ibis



Pavo cristatus
Linnaeus
Common Peafowl



Bubulcus ibis
Linnaeus
Cattle Egret



Alba Egretta garzetta
Linnaeus
Large Egret



Alba Egretta garzetta
Linnaeus
Large Egret



Corvus splendens
Vieillot
House Crow



Vanellus indicus
Boddaert
Red wattled Lapwing



Nectarinia asiatica
Latham
Purple Sunbird



Halcyon smyrnensis
Whitebreasted Kingfisher



Acridotheres ginginianus
Latham
Bank Myna



Acridotheres ginginianus
Latham
Bank Myna



Pavo cristatus
Linnaeus
Common Peafowl



Himantopus
Linnaeus
Black-winged Stilt



Vanellus indicus
Boddaert
Red-wattled Lapwing



Alba Egretta garzetta
Linnaeus
Large Egret



Columba livia
Gmelin
Blue Rock Pigeon



Bubulcus ibis
Linnaeus

Cattle Egret



Egretta garzetta
Linnaeus

Little Egret



Himantopus
Linnaeus

Black winged Stilt



Little Egret

Black winged Stilt



Himantopus
Linnaeus

Black winged Stilt



Bubulcus ibis
Linnaeus

Cattle Egret



Bubulcus ibis
Linnaeus

Cattle Egret



Sarus
Cranes

Spoonbill

White Ibis



Grus antigone
Linnaeus

Sarus
Cranes



Phoenicopterus roseus
Pallas

Flamingo



Bubulcus ibis
Linnaeus

Cattle Egret



Bubulcus ibis
Linnaeus

Cattle Egret



Himantopus
Linnaeus

Black winged
Stilt



Himantopus
Linnaeus

Black winged
Stilt



Little Egret

Black winged
Stilt



Bubulcus ibis
Linnaeus

Cattle Egret



Cattle Egret

Large Egret



Alba Egretta
garzetta
Linnaeus

Large Egret



Pseudibis
Papillosa
Temminck

Black Ibis



Vanellus
indicus
Boddaert

Red wattled
Lapwing



Alba Egretta garzetta
Linnaeus

Large Egret



Anastomus oscitans
Boddaert

Open billed stork



Pseudibis Papillosa
Temminck

Black Ibis



Alba Egretta garzetta
Linnaeus

Large Egret



Alba Egretta garzetta
Linnaeus

Large Egret

Appendix

- 01. Rainfall data
- 02. Soil key chart
- 03. Crop chart
- 04. Native Flora

Rainfall Data

- Sabarmati River flows through six districts of Gujarat state before emptying into the Gulf of Khambhat
- Standard week number is the total number of week of the year in continuation, counting first week of the year from first of January
- Rainfall data of four districts is as follows
- Reference is taken from the Agroclimatic Atlas of India

Ahmedabad and Gandhinagar

The normal rainfall of Ahmedabad is 617.4 mm and number of rainy days are 28. Within the district the annual rainfall vary between 500 to 750 mm. The time series of annual rainfall data of the district does not indicate any increasing or decreasing trend in 90 years period. The highest rainfall (1444.5 mm) in the district was recorded in 1927, while the lowest (201 mm) was recorded in 1918. Ahmedabad district experienced drought every 20 years, while district experienced excessive rainfall every 17 years.

About 95% of annual rainfall is received in four months period (June to September) of which July contributes maximum (38.3% of annual rainfall) followed by August (26.8%). June and September contribute about 13% and 16% respectively. January though may altogether contribute only 2% to annual rainfall, while October and November contribute more than 3% of annual rainfall.

During June, the weekly rainfall ranges between 12 to 36 mm, however the sufficient rainfall for sowing is received only in the last week i.e. standard week 26 (June 25 - 1 July). The weekly rainfall increases during June and July and reaches to its maximum value (72 mm) in standard week 30 (July 23-29) thereafter, weekly normal rainfall is less than 10mm.

Kheda

The normal annual rainfall of Kheda district is 808.5 mm in 35 rainy days. The spatial variation of rainfall in the district is observed between 700 to 900mm. The highest rainfall (1946 mm) was observed in 1927, while the lowest was (128mm) in 1973. During last 88 years, the district experienced droughts every 22 years, while excessive rainfall in every 23 years. More than 95 % of annual rainfall is received during June to September months. In Kheda district the maximum monthly rainfall is received in July (319mm) followed by August (225 mm), September (131.5 mm) and June (98.3 mm). October and November contribute 2.8% to annual rainfall.

The weekly rainfall during standard week 25 (June 18-24) is insufficient for sowing purpose. Adequate amount is received only in standard week 26 (June 25-July 1). The highest weekly rainfall (89 mm) is received in standard week 30 (July 23-29). The monsoon rain ceases in the third week of September.

Mehsana

In Mehsana district, the rainfall records are available only after 1927. The normal rainfall of the district is 603.4 mm which is received in 28 rainy days. The lowest rainfall (258 mm) was recorded in 1929, while the highest (1253 mm) was recorded in 1927. The spatial rainfall variation in the district is between 450-700 mm. Out of 60 years of rainfall data, about 23% of years experienced drought and equal percentage of years experienced excessive rainfall.

About 96 % of annual of the district is received during June- September months. July receives the maximum monthly rainfall (235.7 mm) followed by August (181.7 mm). June and September contribute about 10 % and 16 % respectively to the annual rainfall. October and November

altogether contribute about 2.2% to annual rainfall.

The sowing rains are received in standard week 26 (June 25 to July 1). The weekly rainfall increases with the advancement of monsoon and reaches to the maximum (62.4 mm) in standard week 30 (July 23-29), then decreases continuously during rest of the monsoon. After second week of September the weekly rainfall is less than 25mm which further decreases continuously during rest of the months.

Sabarkantha

The normal rainfall of Sabarkantha district is 807.4mm in 35 rainy days. The annual rainfall varies between 675 mm to 950 mm in the different parts of the district. Modasa and Idar records highest rainfall. The past rainfall records do not indicate any trend in annual rainfall in the district. The highest rainfall (1543 mm) was received in 1937 while the lowest (273 mm) was received in 1911. Out of 86 years, drought occurred in 25 years, while excessive rainfall (25% above normal) occurred in 26 years.

About 96% of annual rainfall of Sabarkantha district is received due to South-West monsoon rains. July receives (309 mm) rainfall followed by August (251.6 mm) rainfall and September contributes 15.8 % respectively. Only 12.3mm of rainfall is received during October. The highest weekly rainfall (82 mm) is received in standard week 30 (July 23-29). The monsoon rain ceases after standard week 38 (September 17-23).

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.

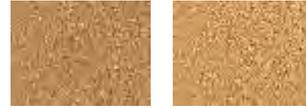
Type - 004

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.



List of crops

Vegetables	(L) <i>Solanum melongena</i>	(R) Ringna, Baigan	(E) Eggplant, Aubergine
	(L) <i>Solanum lycopersicum</i>	(R) Tamatar, Tameta	(E) Tomato
	(L) <i>Solanum tuberosum</i>	(R) Alu, Bateta	(E) Potato
	(L) <i>Trigonella foenum-graecum</i>	(R) Methi	(E) Fenugreek, Greekhay
	(L) <i>Spinacia oleracea</i>	(R) Palak	(E) Spinach
	(L) <i>Brassica oleracea</i> var. <i>Totrytis</i>	(R) Phoolgobi	(E) Cauliflower
	(L) <i>Brassica oleracea</i> var. <i>Capitata</i>	(R) Pattagobi, Gobi	(E) Cabbage, Colewart
	(L) <i>Lagenaria Siceraria</i>	(R) Doodhi, Karu, Indrajau	(E) Dyer's Oleander, Pala indiago
	(L) <i>Cucumis sativus</i>	(R) Kakdi	(E) Cucumber
	(L) <i>Allium cepa</i>	(R) Kanda, Dungdi, Pyaz	(E) Onion
	(L) <i>Raphanus sativus</i>	(R) Mudo, Muli	(E) Radish
	(L) <i>Zingiber officinale</i>	(R) Adoo, Adrak, Alay	(E) Ginger
Fruits	(L) <i>Citrullus lanatus</i>	(R) Tarbuj, Kaling, Kalingad	(E) Watermelon
	(L) <i>Syzigium cumini</i>	(R) Jamun, Jaman, Jamoa, Jambolan	(E) Jara/Malbar/Blackplum/Indian black berry
	(L) <i>Musa spp.</i>	(R) Keda, Kela, Ked	(E) Banana
	(L) <i>Manilkarna zapota</i>	(R) Chikoo	(E) Sapodilla, Chicle, Sapote, Naseburry
	(L) <i>Psidium guajava</i>	(R) Jam, Amrood	(E) Guava, Yellow Guava. Apple Guava
	(L) <i>Punica granatum</i>	(R) Dadam, Anar, Anardana	(E) Pomegranate, Chinese apple, Granada
	(L) <i>Mangifera indica</i>	(R) Aam, Amri, Ambi, Aamba, Ambo	(E) Mango

	(L) <i>Citrus sinensis</i>	(R) Santra, Narangi	(E) Orange
	(L) <i>Carica papaya</i>	(R) Pappaiyu, Papitu, Papita	(E) Papaya
	(L) <i>Ziziphus mauritiana</i>	(R) Ber, Bera, Beri, Bor, Bordi	(E) Desert apple, Indian jujube/Plum/Cherry
Grains	(L) <i>Tritium vulgare</i>	(R) Gahu, Gehu	(E) Wheat
	(L) <i>Sorghum vulgare</i>	(R) Jawar, Jawari	(E) Jowar
	(L) <i>Pennisetum glaberrimum</i>	(R) Bajro, Bajri	(E) Bajra
	(L) <i>Oryza sativa</i>	(R) Chaval, Bhat	(E) Rice, Paddy
	(L) <i>Zea mays</i>	(R) Makai, Bhutta	(E) Maize
Cash Crops	(L) <i>Phaseolus aureus</i>	(R) Mag, Mug	(E) Green-gram
	(L) <i>Phaseolus mungo</i>	(R) Adad, Udad, Urd	(E) Black-gram
	(L) <i>Cicer arietinum</i>	(R) Chana	(E) Bengal-gram
	(L) <i>Nicotiana tabacum</i>	(R) Tambakhu	(E) Tobacco
	(L) <i>Emblica officinalis</i>	(R) Amda, Amla, Aonla, Amalki, Aunra	(E) Emblic myrobalan, Indian gooseberry
	(L) <i>Arachis hypogaea</i>	(R) Falli, Fallidana, Mungfalli, Sing	(E) Groundnut

(L) - Latin names
(R) - Regional names
(E) - English names

Native Flora in and around regions of the Sabarmati River

Trees

Adina cordifolia
Acacia chundra
Bambusa arundinacea
Dalbergia latifolia
Tectona grandis
Albizia lebbeck
Anogeissus latifolia
Lagestroemia lanceolata
Terminalia bellerica
Tamarix ericoides
Vitex negundo
Salvadora oleoides
Acacia nilotica
Annona squamosa
Azadirachta indica
Emblica officinalis
Delonix regia
Kigelia pinnata
Millingtonia hortensis
Mimusops elengi
Peltophorum pterocarpum
Pongamia pinnata

Shrubs

Tamarindus indica
Ficus religiosa
Prosopis cineraria
Balanites aegyptia
Moringa oleifera
Pithecelobium dulce

Clerodendrum inerme
Euphorbia nerifolia
Jatropha curcas
Anisomeles indica
Barleria priontis
Caesalpinia crista
Capparis sepiaria
Kirganelia reticulate
Maytenus emarginata
Sesbania bispinosa
Cassia occidentalis
Cassia angustifolia
Cassia auriculata
Cassia tora
Saccharum spontaneum

Herbs

Plumbago capensis
Plumbago zeylanica
Ocimum canum
Ocimum basilicum
Ocimum gratissimum
Acalypha indica
Phyllanthus fraternus
Alhagi pseudalhagi
Tamarix ericoides

Argemone mixicana
Peristrophe bicalyculata
Cardamine trichocarpa
Polygala chinensis
Cleome viscosa
Portulaca oleracea
Portulaca pilosa
Portulaca quadrifida
Bergia suffruticosa
Bergia ammannioides
Sida acuta
Vernonia anthelmintica

Sida cordifolia
Sida rhombifolia
Sida alba
Oxalis acetosella
Oxalis corniculata
Fagonia cretica
Aeschynomone indica
Psoralea corylifolia
Neptunia oleracea
Ammannia baccifera
Vahlia digyna
Ludwigia adscendens
Mollugo cerviana
Ageratum conyzodes
Blumea oblique
Blumea fistulosa
Caesulia axillaris
Cyathocline purpurea
Eclipta prostrata
Sphaeranthus senegalensis
Tridax procumbens
Tragus biflorus

Vernonia cinerea
 Xanthium strumarium
 Borreria articulate
 Heydyotis corymbosa
 Bacopa monnieri
 Limnophila indica
 Utricularia gibba
 Utricularia inflexa
 Hydrolea zeylanica
 Coldenia procumbens
 Physalis minima
 Physalis peruviana
 Solanum nigrum
 Solanum jasminoides
 Canscora diffusa
 Hygrophila auriculata
 Strobilanthes heyneanus
 Phyla nodiflora
 Boerhavia diffusa
 Achyranthes aspera
 Alternanthera sessilis
 Amaranthus arvensis

Amaranthus lividus
 Amaranthus oleraceus
 Amaranthus spinosus
 Amaranthus viridis
 Digera muricata
 Polygonum glabrum
 Aristolochia bracteolata
 Chrozophora rottleri
 Ceratophyllum demersum
 Asphodelus tenuifolius
 Commelina benghalensis
 Wolffia arrhiza
 Wolffia microscopia
 Najas graminea
 Limnophyton obtusifolium
 Sagittaria sagittifolia
 Potamogeton crispus
 Juncus maritimus
 Juncus bufonius
 Cyperus aernarius
 Cyperus bulbosus
 Cyperus conglomeratus

Fimbristylis cymosa
 Remirea maritime
 Scirpus tuberosus
 Aeluropus lagopoides
 Bothriochola pertusa
 Andropogon pumilus
 Chloris barbata
 Cynodon dactylon
 Echivnocloa crus-galli
 Melanocenchris jacquemontii
 Pennisetum purpureum
 Setaria glauca
 Setaria verticellata
 Ipomoea aquatic Forsk
 Ipomoea carica
 Ipomoea aquatic Forsk
 Ipomoea carica
 Ipomoea pes - caprae
 Clitoria ternatea
 Cardiospermum halica-cabum

Aquatic
Plants

Vallisneria spiralis
 Trapa natans
 Nymphaea pubescens
 Hydrilla verticillata
 Typha angustata
 Lemna gibba

Climber

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