Approximate dating of the Mahābhārata war with reference to drying up of the Sarasvatī River

Tatwadarshi P. Nagarhalli

Abstract
The Mahābhārata war is one of the greatest and one of the most important historical event in the history of India, happened many centuries ago. Over the years many scholars have researched and debated on the epic. One of the contentious issue has been the date of the Mahābhārata war. Many scholars have devised different methods in evolving the date of the Mahābhārata war. This uses the drying up of the Sarasvatī River as a reference to come at an approximate date of the Mahābhārata war.

Key-words: Mahābhārata war, Sarasvatī River, Approximate date of the Mahābhārata war, Sarasvatī River drying.

Introduction:
The Mahābhārata is one of the greatest and the longest epics ever written. This epic is made of one hundred thousand verses, making it an epic eight times longer than the Greek epics Iliad and Odyssey put together. It is an historic event written in the form of poetry by Maharṣi Veda Vyāsa. And, the Mahābhārata war is one of the greatest and one of the most important historical event in the history of India, happened many centuries ago. Many scholars have debated on many issues relating to the Mahābhārata. These issues pertains to the historicity, the date of the Mahābhārata war and the authorship of the Mahābhārata. This paper devices a new way of finding the approximate date of the Mahābhārata war.

1.1 The Mahābhārata War was a Historical Event
Some scholars like D. C. Sircar and S. S. N. Murthy even doubt the historicity of the war itself. Sircar[1] declared to the U.N.I. that the Mahābhārata was a myth on following grounds
The strength of the armies as given in the Epic lacks credibility.
There is no reference to this war in the Vedic literature and the Purāṇas, nor does Kurukṣetra figure in them as a battle-field.
There is no unanimous tradition about the date of the war among the historians and astronomers and the dates usually assigned to it clash with the accepted time bracket of the Indus valley civilization and the coming of the Aryans in India about the middle of the second millennium BCE.
It is inconceivable that the eastern and the southern states had taken part in this war as stated in the Epic, as these states were unknown to Pāṇini (5th century BCE.)
And in the end he concludes that due to these given reasons the Mahābhārata should be considered as a legend or myth and not as an historical event.
These arguments have been aptly met with and answered by P. L. Bhargava in his article ‘A Fresh Appraisal of the Historicity of the Indian Epics.’[2]
1. Several near ancestors and descendants of the heroes of the Bhārata war are mentioned in the Vedic literature which also mentions at least two of the participants of the Bhārata war viz. Kṛṣṇa Devakīputra and Śikhaṇḍin Yājñasena.
2. The genealogies of the Purāṇas mention the names of the chief heroes of the Bhārata war.
3. The grammarian Panini mentions the name of two of the Pāṇḍavas viz. Yudhiṣṭhira and Arjuna, besides the name of Vāsudev Purta i.e. Kṛṣṇa.
4. Kauṭülya attributes the destruction of Duryodhana to his usurpation of another’s kingdom.
5. Patañjali mentions the name of Bhīma, Nakula and Sahadeva.
6. Six of the dramas of Bhāsa are based on the story of the Mahābhārata.
7. The Nasik cave inscription of Vāsiṣṭhiputra Pulomāvi dated 149 CE alludes to the valour of Arjuna and Bhīma.
8. The Chinese pilgrim Hiuen Tsang refers in the seventh century CE to an ancient tradition according to which a war had taken place in the region of Thanesar in remote times which was so terrible that the entire area was covered with bones which were still visible to him.

As far as the coming of Aryans is concerned, till now there hasn’t been any archaeological evidence to support the claim of Aryan invasion theory. Eminent archaeologist B. B. Lal has not only proved wrong the invasion theory but also provided archaeological evidences to prove that the Indus-Sarasvatī valley civilization was indigenous and the civilization wasn’t destroyed by the so called Aryan invasion as declared by some scholars. S. S. N. Murthy in his article ‘The Questionable Historicity of the Mahābhārata’ declares that the epic is a myth and the Mahābhārata is a dramatized version of the battle of the 10 kings mentioned in the Rg Veda. Where Sudās, aided by a clan named Trisus, was pitted against a confederation of 10 kings. And he further states that archaeological excavation at some of the important sites have yielded nothing. But, on the contrary some of the important sites mentioned in the Epic have been found in the excavation (Fig. 1) as declared by archaeologist B. B. Lal in an International seminar on the Mahābhārata in New Delhi, April 2012, organized by Draupadi trust.

The archaeological discovery of Painted Greyware Culture as the lowest common feature at all the different important sites associated with the Mahābhārata story coupled with literary and epigraphic evidences prove beyond doubt the historicity of the Mahābhārata war.

1. Date of the Mahābhārata War
Since the Mahābhārata is an historical event then the next question that would arise is when did the war actually take place? This, the dating of the Mahābhārata war, is one of the most contentious issue with regards to the Epic. In fact the dating of the Mahābhārata war is one of the very highly debated issue with many scholars have different views on the exact date of the event.

Different methods have been employed by scholars in order to fix the date of the war. The different methods include

i. Linguistics: Many scholars from or associated with Bhandarkar Oriental Research Institute have used linguistics as the base to arrive at a date for the Mahābhārata war.

ii. Textual: Some scholars have used the textual evidences present in the Vedic texts to arrive at date of the war.

iii. Genealogical: Some scholars have used the genealogical order of the kings given in the different Purāṇas in order to fix the date of the war. Here scholars go bottom up, from a historical figure with all accepted date, for example Chandra Gupta Maurya, and with the help of the names of the kings given in the Purāṇas they try to reach at a particular date.

iv. Astronomical: Many scholars have made use of the astronomical references in the Mahābhārata to arrive at a date. As early as 5th – 6th CE itself India’s first Astronomer Aryabhāta made use of astronomy to try and fix the date of the war, he has synchronised the date of the war and start of the Kali era.

v. Archaeology: Scholars familiar with or having expertise in archaeology have devised archaeology to come at a particular date.

How different the methods are, that many divergent the views of the scholars have been in dating the war. The dates vary from fifth - sixth century BCE to fifth – sixth millennium BCE. E. Vedavyas in his doctoral thesis, later published, ‘Astronomical Dating of the Mahabharata War’ surveys dates proposed by around 120 scholars. The dates surveyed by him range from the sixth century BCE given by Bentley and A. H. Dani to the sixth millennium BCE proposed by P. V. Vartak, V. R. Lele and Wheeler. Most of the times these scholars have used a combination of methods discussed above.

The result of the survey can be tabulated as shows follows Table 1

<table>
<thead>
<tr>
<th>Period</th>
<th>6000-3300 BCE</th>
<th>3300-3000 BCE</th>
<th>3000-1500 BCE</th>
<th>1500-1000 BCE</th>
<th>Later than 1000 BCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Scholars</td>
<td>6</td>
<td>59</td>
<td>7</td>
<td>41</td>
<td>7</td>
</tr>
</tbody>
</table>

These ranges of dates, proposed by different scholars, can be verified with the drying up of the Sarasvatī River and we can reach near to an approximate date of the Mahābhārata war.
2. The Sarasvatī River

Scholars who doubt the antiquity of the Hindu civilization even doubt the very existence of the Sarasvatī River. But recent scientific study in area has proved that the Sarasvatī River, described in the Vedas, was in fact a real mighty river flowing from the Himalayas to the sea.

Ṛg Veda[8] showers praise on the Sarasvatī in forty-five of its hymns; her name appears seventy-two times and three hymns are wholly dedicated to her. Multitudes of superlatives have been used in the Ṛg Veda to describe her. Her waters have been said to have great floods, she is great among the great, the most impetuous of rivers. She is Limitless, unbroken, swift-moving and surpasses in majesty and might all other waters, and comes onward with tempestuous roar. Over and above she is the mother of all the rivers. And in a rare geographical description in the Nādiśtuṭi Sūkta, the Ṛg Veda gives the location of Sarasvatī River as well, placing it between Yamunā and Sutlej (Fig. 2).

Even though the Ṛg Veda showers praises on the Sarasvatī River, due to her act of disappearance three main question dog the minds of the scholars

i. Was there really a physical river called the Sarasvatī or it was just a myth, a creation of a poetic mind?

ii. If such a river existed then where did it flow, where was its source and what was its destination?

iii. If it disappeared, then how and when did this happen?

3.1 The Sarasvatī was a Real River

Research was taken up as early as 1872 by C. F. Oldham and R. D. Oldham to locate the Vedic Sarasvatī. They undertook a detailed survey of the area where the river Sarasvatī and its tributaries were supposed to be flowing in the earlier times. And as result of this survey they located the course of the Sarasvatī and its tributaries. They came to the conclusion that the Sarasvatī was once fed by two great rivers namely Yamunā and Sutlej. And it disappeared due to the westward movement of the Yamunā and eastward movement of the Sutlej.[9]

Further, C. F. Oldham says 'Although the river below the confluence (with the Ghaggar) is marked in our maps as Ghaggar, it was formerly the Sarasvatī; that name is still known amongst the people.'

In 1980 four scientists, Yash Pal, Baldev Shai, R. K. Sood and D. P. Agrawal, published a paper called 'Remote Sensing of the Lost Sarasvatī River', based on an analysis of many photographs of LANDSAT satellites. In the paper they concluded, accompanied by a map (Fig. 3), that The ancient bed of the Ghaggar has a constant width of about 6 to 8 km from Shatran in Punjab to Marot in Pakistan. The bed stands out very clearly... The vast expanse of the Ghaggar bed can be explained only by assuming that major tributaries were flowing into it in the past... Our studies thus show that the Sutlej was the main tributary of the Ghaggar and that subsequently the tectonic movements may have forced the Sutlej westward and the Ghaggar dried up... The other major river system contributing waters to the Ghaggar may have been some prior channel of the Yamunā. (These two) main feeders were weaned away by the Indus and the Ganga, respectively.[10]
S. R. N. Murthy in his article ‘The Vedic river Sarasvatī a Myth or Fact - A geological Approach’[11], after extensive study concluded that ‘The problem is examined here from a geological point of view and it is concluded that the river Sarasvatī now extinct was a live river in the geological past hence not mythical.’

Before and after the nuclear testing conducted by India in May 1998, the Bhabha Atomic Research Centre conducted a number of tests to access the impact of nuclear explosion on the ground water under S. M. Rao and K. M. Kulkarni of the isotope division. In their paper published under the title ‘Isotope Hydrology Studies on Water Resources in Western Rajasthan’ they conclude that a study on the buried channel of the legendary Sarasvatī River in Jaisalmer district indicates that the ground water in the area is enriched in stable isotope content... compared to that of Himalayan rivers... The ground water samples exhibit negligible tritium content indicating absence of modern recharge... Shallow waters are old with 14C content of 54.9 pMC to 58.8 pMC (uncorrected ages: 4950 to 4400 BP).[12]

After the corroboration of literary, archaeological, geological and hydrological evidences we can safely say that the Sarasvatī River was indeed a physical river of the past, which has dried up now, and not mythical as some suggest. And, the present day Sutlej and Yamunā, now tributaries of Indus and Ganga respectively, were a former tributaries of the great Sarasvatī River.

The Sarasvatī originated in the Himalayas and travelled around 1600 kms to discharge in the Gulf of Kachchh.[13] K. S. Valdiya in his article ‘River Piracy Sarasvatī that Disappeared’ explains in detail the course from the Himalayas to the Gulf of Kachchh (Fig. 4)

The legendary Sarasvatī was indeed a great river which rose in the Bandarpunch massif of the great Himalaya in western Garhwal, flowed south-westward through a channel past Adi Badri, Bhavanipur and Balchhapur in the foothills and met the Shatadru or Sutlej (which veered towards the south-east). The Shatadru came from the region of Mount Kailash in south-western Tibet. The ancient Sarasvatī was thus formed by the confluence of what are today the Yamunā and Sutlej rivers flowing in entirely different directions. The two joined at Shatrana, 25km south of Patiala, and flowed through a 6 to 8 km wide channel known today as the Ghaggar. Obviously, a large volume of water flowed down the Ghaggar channel. Even today the combined discharge of the Yamunā and Sutlej is of the order of 2900 million cubic metres per year.

3.2 The Sarasvatī Got Desiccated

So what exactly happened to the legendary river? Why did its two main tributaries desert? There are three main causes of desiccation of river:[14] i. Sudden increase in the mass of water of the tributary, which may be due to melting of huge glaciers and ii. Tectonic changes, uplifting of the terrain. iii. Impediments in the stream of a river.

In the case of the Sarasvatī River all the above, in some case or the other, played a part. As K. S. Valdiya points out the Aravali orogenic belt is riddled with a multiplicity of long and deep faults, most of them paralleling the trend of the mountains, and some transverse to it and extending across the Sarasvatī domain. The tectonically resurgent Aravali and the land beyond stretching to the far west have witnessed strong seismotectonic upheavals many a time in the late Quaternary time. The faults have been and continue to be active, registering strike-slip (side way), dip-slip (up and down) and both lateral left-right and up-down movements time in and time again. As consequence, there was uplift and sinking or horizontal (lateral) displacement of ground. Under such tectono-physicgraphic...
upheavals, the rivers and streams were frequently forced to change their course, sometimes gradually, sometimes abruptly, as seen spectacularly in the land of Sarasvatī. The Sarasvatī and its tributary rivers shifted progressively westward as the Aravali rose up. Sometimes they moved eastward following the sinking of the land in the east due to faulting down movement.

Because of the rising up of the Aravali range and sinking of the land at the east and the west the major rivers shifted their course either eastward or the westward. Due to this the Sutlej moved eastward and joined the Indus at the expense of the Sarasvatī. In the case of Yamunā these tectonic uplift of the Aravali helped a branch of Chambal River in headward erosion. A branch of Chambal River started cutting its course northwards by headward erosion. It cut the channel deeper than that of the Sarasvatī and thus beheaded the Sarasvatī. And during rains, the floodwater of the Sarasvatī rushed into this new channel, later to be called Yamunā, culminating in the capture of a part of the Sarasvatī river by the Chambal River, a south-western tributary of Gangā. Even today it can be seen that due to the rising of the Aravali range all the major rivers have wither moved westward or eastward where the height is relatively lower compared to the Aravali range (Fig. 5).

To sum it up, we can say that there is only one major reason due to which the Sarasvatī dried up, the still active tectonic plates of the Aravali and Himalayan ranges, which in turn triggered the other two. These tectonic movements caused the rising up of the Aravali ranges which in turn caused the eastward or westward movements of the rivers, causing the Sutlej to deviate from its original course and join the Indus after taking a dramatic 90 degree turn at Ropar. These tectonic movements triggered the headword erosion of a branch of Chambal River, later to be called Yamunā, towards the Sarasvatī River eventually cutting the channel deep enough to steal the waters of Sarasvatī. These tectonic events were the reason why Yamunā was able to capture the glacial waters of the Sarasvatī.

3.3 The Date of Desiccation of the Sarasvatī

We have observed that tectonics movements over a period of time played a major role in the gradual drying up of the Sarasvatī River. The archaeological site of the Kalibangan bares the greatest testimony to these seismic activities. The early Harappan settlement in Kalibangan, which began in the third millennium BCE, was brought to an end by an earthquake. This is the earliest earthquake ever to have been identified in an excavation.

The earthquake wasn’t the only reason, the settlement at Kalibangan came to a sudden end due to the drying up of the Sarasvatī River. This sudden drying up of the Sarasvatī may be attributed to the, the Sarasvatī waters escaping through the Yamunā system. Furthermore radio-carbon dating show that the abandonment of the Kalibangan took place around 2000 BCE.

A study conducted by a joint team of researchers from British, U.S. and Pakistan directed by Peter Clift. They conducted field excavations on the Ghaggar-Hakra’s floodplain in Pakistan’s state of Punjab. By radiocarbon dating of freshwater gastropod shells and woody material recovered from the pits they arrived at dates. According to their initial finding, ‘Provisional age data now show that between 2000 and 3000 BCE, flow along a presently dried up course known as the Ghaggur-Hakkra River ceased.’

From this we can conclude that by 2000 BCE the Sarasvatī had completely cease to exist. And, surely the Mahābhārata war has to be placed long before 2000 BCE. Because, it clearly mentions that the river went into the sea in the western part of the country[16] in addition to the different tīrthas visited by
Balarāma during his pilgrimage on the course of the Sarasvatī River.

Coming back to the hydrological sample study in and around Jaisalmer district by Bhabha Atomic Research Centre scientists S. M. Rao and K. M. Kulkarni, their conclusion was that Legendary Sarasvatī River in Jaisalmer district indicates that the ground water in the area is enriched in stable isotope content… compared to that of Himalayan rivers… The ground water samples exhibit negligible tritium content indicating absence of modern recharge… Shallow waters are old with 14C content of 54.9 pMC to 58.8 pMC (uncorrected ages: 4950 to 4400 BP).

Once calibrated, these dates would approximately point at 3700 to 3200 BCE. After which there was very little or no recharge of water in this stretch of the former river. A very similar situation prevails in Cholistan as well.

A comprehensive hydrogeological, geophysical, and isotopic hydrological survey conducted from 1986 to 1991 by German scientists M. A. Geyh and D. Ploethner in the Hakra’s floodplains of Cholistan between Fort Abbas in the east and Fort Mojgarh in the south-west… A tritium-based isotope study established that the present recharge of the groundwater in Cholistan is negligible, pointing to a range of the actual water age from 12900 to 4700 years BP, that is, till about 2700 BCE.

If we try and put the journey of the Sarasvatī River in chronological order from the greatest of all rivers during the Vedic period to the present day dry bed it would be:

i. Water Age: The water age of the Sarasvatī lasted for thousands of years, probably from the Pleistocene Ice Age.

ii. Disintegration Age: The Sarasvatī River started disintegrating by about 3200 BCE. This gradual disintegrating lasted for around 1000 years.

iii. Desiccation: The Sarasvatī River completely ceased to exist by 2000 BCE. In the later period it was a rain fed river, not even a shadow of its glorious past.

3. The Sarasvatī and The Mahābhārata

The Sarasvatī of the Mahābhārata.[17] rose from the Shiwalik and drained out in the western sea, as it was during the Vedic period and confirmed in recent study. But the Sarasvatī of the Vedic period was the mightiest river flowing the full course of its length without any interruption. Whereas the Sarasvatī of the Mahābhārata had started disintegrating and majorly she was lost or became invisible in the desert at a place called Vinashana, probably near Marot or Baireena.[18] A study conducted by four scientist led by V. Soni in the Jaisalmer region found that some tube wells showed no sign of water table reduction even though they were more than forty years old, thus confirming that the underground flow was active as suggested by the Mahābhārata, which says that the Sarasvatī river has an invisible current through the bowels of the earth.

After considering all that the Mahābhārata has to say about the Sarasvatī River and recent studies in this regard we can make the following inferences:

i. The Sarasvatī was indeed a major river in the Mahābhārata war period; the epic is not faking the existence of the legendary river.

ii. The Sarasvatī River was still a mighty and most revered river in the Mahābhārata period, this is evident with the kind of importance this great river gets over the other rivers.

iii. During the Mahābhārata period the disintegration of the river had started and was in the initial phases of desiccation. It was in the initial phase of desiccation because during the time of the Mahābhārata war Balarāma traverses the complete length of the Sarasvatī River and apart from one or two places, where it was invisible or had invisible current through the bowels of the earth, the river was flowing from the Shiwalik to the sea.

4. Conclusion

In conclusion we can say that the Mahābhārata war was fought during the initial phase of the desiccation of the legendary river Sarasvatī. That is, around 3200 BCE but no later than 3000 BCE, it is assumed here that if the disintegration started around 3200 BCE then as time passes it would have worsened and since during the Mahābhārata war there wasn’t any major worsening in the condition of the river, hence the time period is kept at 200 years. Also, compared to other rivers of the time the Sarasvatī has been given more importance. This also suggests that, compared to other rivers the Sarasvatī still had a good flow with a good volume of water; that is, the desiccation of the river was still in its initial stages. Hence, the approximate date of the Mahābhārata war can be kept between 3200 to 3000 BCE if we consider the drying of the Sarasvatī River as a reference point. Further research and study in this regard would be helpful in narrowing down the range and come to a more accurate date of the Mahābhārata war.

References


8. Rig Veda Samhita


16. Mahabharata, Gorakhpur, Gitapress
