VOL- VI ISSUE-IX SEPTEMBER 2019 PEER REVIEW e-JOURNAL IMPACT FACTOR 5.707 ISSN 2349-638x

Geomorphology Of The Bhīma River Basin, Its Flood Problem And Their Possible Remedial Measures

Dr. Shinde Sunita
HOD & Asso.
Prof,Smt.Sushiladevi Deshmukh Mahila Mahavidyalay Latur.S.R.T.M.University Nanded.
Mr. Fajage Dnyaneshwar.
Research Student,
Department of Geography Mahatma Basweshwar Mahavidylay Latur, S.R.T.M.University Nanded.

Abstract

The Bhīma River is a major river in Western India and India. It flows southeast for 861 kilometres (535 mi) through Maharashtra, Karnataka, and Telangana states, before entering the Krishna River. After the first sixty-five kilometres in a narrow valley through rugged terrain. The banks open up and form a fertile agricultural area which is densely populated. The river is prone to turning into gold during the summer season. In 2005 there was severe flooding in Solapur, Bijapur and Gulbarga districts. The river is also referred to as Chandrabhaga River, especially at Pandharpur, as it resembles the shape of the Moon. BhīmaRiver also flows from Daund taluka.

It has been realised that flood control measure will not be effective unless and until the basic data on cause of flood are collected and processed to find out proper and suitable remedial measures.

The paper brings out the geomorphological features of the Bhīma river basin and puts forth the major causes of flood there. The paper also suggests remedial measures to control flood in the Bhīma basin keeping in view that the economic development of the area is accelerated.

***Key Word**:Bhīma basin, Sub River, flood problem and their possible remedial measures*

Introduction

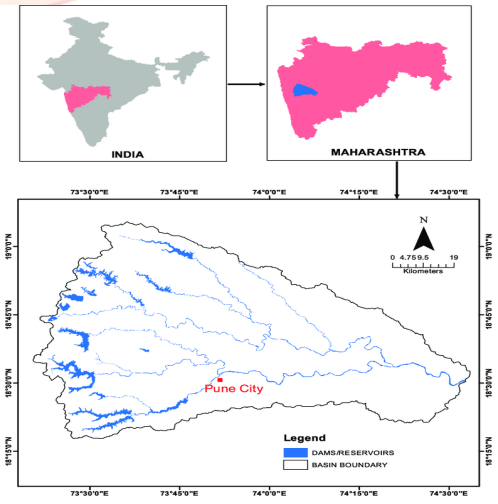
Devastation by foods, such as loss of human life, mass mortality of cattle, destructions of houses and landed properties, damages of road and bridges, loss of crop and revenue,widespread epidemic, have beena common feature –ahorror in the minds of the people living in the thickly populated Bhīma valley these vagaries are no less fearful than a war, and these happenings have so long been attributed to unavoidable natural calamities. But there is no logic behind such notions especially in these days of our improved Science and Technology. It is high time to take necessary and adequate steps to control the recurrence of floods in the Bhīma valley,or do whatever possible to lessen the effects of the flood mitigate the sufferings of the people and improve their economic conditions.

Tocontrol the floods of the Bhīma with its numerous turbulent tributaries is not an easy task. For this we are to launch a war against Nature with men, material and technical know-how. But before we proceed to undertake such a venture, we should study the geomorphology of the Bhīma basin find out the actual causes of floods, determine the natural and type of damages therefrom, collaborate thecooperation of the people, the government, the various organization and departments engaged in the study of physical and natural science and technology, chalk out the remedial measures and thenplan to give them a concrete shape in a systematic order.

Objectives:

1) To assess theBhīma basin.
2) To find out flood problem and their possible remedial measures.

Study Area:



Data Collected

The preliminary field visit was made to identify flood prone sites in study area. The collected secondary data from the Indian Meteorological Department, Pune and Irrigation Department, Government of Maharashtra. The base maps are prepared through Arc GIS 10.5. Several trips were made for detail observation of the river channel from the Bhīma basin

Photographs of the inaccessible flood areas has been taken for the understanding the flood features.

The marking of flood affected villages on map of study area have been done.

The survey work for Pandharpur and Sarkoli sites is completed through using theodolite and for Hingangaon and Niranarshingpur total station instrument.

Hypothesis

Identification and marking of flood lines in high flood-Bhīma basin will help to reduce the effects of flood hazard in adjoining villages or settlement

Discussion & Result

The Bhīma River flows southeast for a long journey of 861 kilometers (535 mi), with many smaller rivers as tributaries. It originates near Bhimashankar Temple in the Bhimashankar hills in khed Taluka on the western side of the Western Ghats, known as Sahyadri, in Pune District, Maharashtra state. It flows through Bhimashankar Wildlife Sanctuary where it enters Khed taluka and is soon joined by its tributary, the Aria River from the right (west) which flows into the Chas Kaman Reservoir.Upstream on the Aria is the Rajgurunagar-Kalmodi Dam impounding the Kalmodi Reservoir. The Chas Kaman Reservoir is impounded by the Chas Kaman Dam, the most upstream dam on the Bhīma River proper. The village of Chas is on the left bank some 16 km below the dam. Some 5 km along the river below the bridge on the Bhīma at Chas, the Kumandala River enters from the right. From there it is 8 km along the river to the railroad bridge at the town of Rajgurunagar (Khed)on the left bank. In 18 km further along the river, the Bhīma River enters from the right just above the village of Pimpalgaon on the left bank. From there to Siddhegavhan along the river is 10 km. Siddhegavhan is the last village in Khed Taluka on the left.

After leaving Khed Taluka, the Bhīma forms the boundary between Havali Taluka on the right (south) and Shirur Taluka on the left (north). From the Bhīma's intersection to the Indrayani River, which also enters from the right, is 14 km along the river. At the confluence is the town of Tulapur on the right bank in Havali Taluka. The Bhīma River, the Indrayani River and the Mula-Mutha River are the major tributaries of the Bhīma that drain western Pune. After the Indrayani, in about 4 km downstream the Dhomal River enters from the right, at the village of Wadhu Budruk. Shortly thereafter (3.5 km) the Bhima passes under the SH 60 bridge at the town of Koregaon Bhima From Koregaon going east, downstream 16 km, is the confluence with the Vel River from the left (north) and the village of.Vittalwadi,The Vel River also arises in Ambegaon Taluka, east of the Bhima, and flows through Khed Taluka and into Shirur Taluka before flowing into the Bhima. With Vittalwadi on the left, the right side of the river leaves Haveli Taluka and enters Daund Taluka.

From Vittalwadi the Bhima meanders northwest and 14 km after the Vel River enters from the left, the Kamania River (Kamina) enters from the left at the village of .ParodiAfter the Kamania River enters,the river meanders back southeast for 23 km to the confluence with the Mula-Mutha River from the right at the village of Ranjangaon Sandas. The Mula-Mutha River flows from the city of Pune where it is a combination of the Mula River and the.Mutha River.

31 km after the Mula-Mutha River, the Ghod River enters from the left (north) across the Bhima from the village of Nanvij (Nanwij). TheGhod River is the last of the Western Ghat tributaries of the Bhima. Shirur Taluka stops at the Ghod River, and Shrigonda Talukaof Ahmednagar District continues on the left (northeast) side of the river. Downstream just 6 km from the Ghod River, is the city of Daund on the right (southwest) bank.

Chandani ,Kamini ,Moshi, Bori, Sina, Man, Bhogavati River and Niraare the major tributaries of the river in Solapur District. Of these, the NiraRiver meets with the Bhima between Nira Narsingpurin

Pune District and Malshiras Taluka in Solapur district

Bhīma merges into the Krishna along the border between Karnatakaand Telangana about 24 km north of Raichur. At the point where the two rivers meet, the Bhīma is actually longer than the Krishna in length.

Bhima Basin

The total area of the Bhīma basin is 70,614 km². The population living along the banks of Bhima is approximately 12.33 million people (1990) with 30.90 million people expected by 2030. Seventy-five percent of the basin lies in the state of Maharashtra.

Temples

- Bhimashankar one of the twelve esteemed Jyotirlinga shrines.
- Siddhatek, SiddhivinayakTemple of
- Ashtavinayak Ganesh Vitthal Temple in Pandharpur.
- *Mallikarjun Temple ChinmalliKalaburagi*
- Sri Dattatreya Temple, GangapuraGulbarga district, Karnataka.
- Shri KshetraGhattargiBhagamma, Ghattargi, Gulbarga District, Karnataka.
- Sri KshetraHulakantheshwar Temple, Heroor (B), Gulbarga District, Karnataka.
- Sri KshetraRasangiBalabheemasenaTemple in Rasanagi, jevargi taluka, gulbargaDistrict,Karanataka.
- Sri KshetraKalakosSiddhabasaveshwareTemple in Kolakoor, Jevargi taluka Gulbarga district Karnataka.
- HonaguntaChandralaParameshwari Temple, Honagunta near Shahbad, Gulbarga district
- Sri Kshetra, SannatiChandralaparamweshwari temple
- KanaganahalliBuddhist site, Karnataka

Dams

There are twenty-two dams in the basin of Bhima River. The first dam is the Chas Kaman Dam in.KhedTaluka,Pune district. The largest dam by capacity is ,Ujjani Dam, near Tembhurni, Solapur District. Total Water storage capacity of Bhima basin is about 300 TMC in Maharashtra state. Nearly 30 barrages are constructed across the main Bhima river from the downstream of Ujjani dam in Maharashtra and Karnataka states to harness all the water available in the river in excess of Krushina Water Disputes Tribunal allocations. Bhīma to Sina interlink (JodKalava) with 21 km tunnel from Ujjana Reservoir is constructed to supply water for vast lands in catchment area of sina Tributary from main Bhīma river.

Bhīma River Dams – Capacity

S.R	Dams	Capacity in (TMC)	River
1	Ujjani	118	Bhima
2	Bhatghat	23.50	Yeiwandi
3	mulshi	18.47	Mula
4	Varasgaon	12.82	Mose
5	Dimbhe	12.49	Ghod
6	NiraDevghar	11.73	Nira
7	panshet	10.65	Ambi
8	Manikdoh	10.17	Kukadi
9	Veer	9.41	Nira
10	Pavana	8.51	Pawana
11	BhamaAskhed	7.67	Bhama
12	Chas Kaman	7.58	Bhima
13	Ghod (Chinchani)	5.47	Ghod
14	Pimpalgaon Joge	3.89	Aarala
15	Temghar	3.71	Mutha
16	Andhra	2.92	Indrayani
17	Yedgaon	2.80	Kukadi
18	Khadakwasala	1.98	Mutha
19	Kalamodi	1.51	Aarala
20	Vadaj	1.17	Meena
21	vadivale	1.07	Indrayani
22	Visapur	0.90	Hanagaion
23	Gunjavani	0.69	Gunjavani
24	Nazare	0.59	Karha
25	Kasarsai	0.57	Pawana (Basin)
26	Walwan	0.58	Indrayani
27	Chilewadi	0.55	Kukadi Basin
28	Pushpawati	0.52	Kukadi Basin
29	Thitewadi	0.49	Vel
30	SinaNimgaon	2.2	Approx (Sina)
31	SinaKolegaon	5.0	Approx (Sina)
32	Shirvata	5.0	Approx (Indrayani)

Hydro Power Plants In Bhīma River

Bhira Hydroelectric Project 300 MW (150 MW pumped Storage) by with water From MulshiDam,BhushiDam,BhiraDam,WalwanDam,Th okarwadi Dam and ShirvataDam.Khopoli Hydro 72

MW by Tata power.Bhivpuri hydro 78 MW by Tata Power,Ujjani Dam 12 MW pumped storage,Bhatghar Dam 16 MW,Pawana Dam 10 MW, Khadakwasla dam 8 MW,Veer Dam 9 MW ,Dimbhe Dam 5 MW,Manikdoh Dam 6 MW,Niradevghar Dam 6 MW.

Most of the hydro power (450 MW from Bhira, Khopoli and Bhivpuri) is generated by diverting water from the Bhīma river basin to west flowing kundalika, patalgangaand Ulhāsrivers respectively. The diverted water is nearly 42.5 TMC which is mostly going waste to Arabian Sea after generating hydro power. State government is planning to reduce the use of Bhīma river basin water for power generation and use river basin water fully for drinking and irrigation purposes inside the basin as the available water is inadequate. However, Bhira hydro station can be operated in pumped storage mode to generate peaking power without releasing water to Arabian Sea.

Tributaries River In Bhīma Basin

S. R	Name of River	Origin	Length In. (K.M)	Which River Gets It	Place Of Confluence
1	Mula	Mulcitiskare	50	Mula	pune
2	Pawana	Bondseel	48	Mula	Fugewadi
3	Mutha	Wadi(Wagarewadi)	70	Mula	Sangampulpune
4	Mosai	Dapsar	30	Mutha	khadikwas
5	Ambi	Ambeghar	26	Mutha	khadikwas
6	Ghod	bhimashankar	125	Bhima	Tandaleesangam
7	Meeni	Mankeshwar	80	Ghod	Shingwayapargaion
8	Kukadi	Kukdeswar Taluka Junnar	95	Ghod	aanapur
9	Are	Khune paragon	32	Kukadi	Yedgaiondharan
10	Bhima	Bhimashankar	300	Krushina	State Line
11	Andhara	Alegaon Thokarwadi	25	Indirani	Ambi
12	Hanga	Hanga Taluka Parner	85	Ghod	Shirgaionfatha
13	Neera	Hirdoshi	190	Bhima	Neeranirsingpur
14	Yelwandi	Varote	30	Neera	Sangavi
15	Gungwani	Gungvane	50	Neera	Shirval
16	Khara	Garade	95	Neera	Songaion Sangam
17	Bhima	Pardhache Wadi taluka Khed	56	Bhima	Shel pimpalgaion
18	indirani	Lonavala	85	Bhima	Turapurmarkal
19	Man	mahswad	100	Bhima	machnoor

Floods In The Bhima Basin

- Restricted and limited Channels of drainage of the Surface Water.
- Attainment of base-level of vertical erosion, especially when the bed of the Bhīma goes below the mean-sea-level.
- Elevation of the river beds and the flood plains because of Earth quakes and other tectonic phenomena.
- Deforestation resulting in quick removal of the exposed soil and ruling out the possibility of retention of soil by vegetation.

Man-Made Cause Like blocking the water channels by construction of road and Railways, with narrow bridges and culverts, keeping little and inadequate provision for the drainage of the surface water and unscientific construction of temporary earth-dykes.

Measures To Control Flood In The Bhīma Valley

Steps and measures Which may be taken to stabilize the flood Situation in the Bhīma valley and check the devastation from the recurring seasonal Flood may be grouped into the Following 4 categories.

1) Improvement of the drainage Channels

In order to help the river water to run off quickly, especially in the case of the tributaries, parallel dykes of suitable dimension may be constructed on either side of the rivers. The dykes should be aligned to straight lines, as far as possible,so that bands or the curvatures of the river courses are eliminated.that dykes should not be just on the rivers.sufficient space should always be maintained between the dykes and the river bank.the dykes also should be sufficiently broad with re-

inforcement of netted hard rock boulders at the inner central portion and the sides should be lined thickly with cemented hard rock boulders with oval or rounded sweeps, like those in an aerodrome, at interval for checking the speed of the flowing water. the height of the dykes should be at least double the height of the normal flood water to safeguard any possible Spill- over. the dykes should be provided with sluice gates.

Also in order to facilitate more direct flow of water,meandering courses of the tributary rivers should be eliminated by making straight channels, guarded by dykes.Digging the channels in the silted sections of the rivers will, also, help in improving the drainage channels. Besides,construction of canals may also help in improving the drainage of the surface water. The small rivers may be inter-connected by canals after studying the topography and gradient of the general country-side. Canals so constructed should also be guarded by dykes.

2) Holding up Fraction of the Surface run off in artificial reservoirs.

Constriction of reservoirs, along with hydro-electrical projects wherever possible, may help to a great extent to store rain water and check Flood. The water thus stored may be used for irrigating the agricultural Fields in area away and above the flood plains.

In the hill area measures should be taken to introduce intensive terrace cultivation which is helpful in checking Quick run off on the rain water and check soil erosion and minimize the siltation in the rivers of the plains area.

3) Protectionworks by constructing dykes and embankments.

For the protection of the valuable and fertile agricultural fields, against the clutches of Floods, dykes (as mentioned above) should be constructed along both side of the tributary river.

4) Other Socio-economic Measures

The socio-economic measures which may ease the grim Flood situation and economic crisis of people may be summarized as Fallows.

1) Making adequate storage facilities to store food grains.
2) Rehabilitant the flood affected people at places which are free from devastating Floods.
3) By introducing boat-houses.
4) By introducing cottage industries in an extensive scale.
5) By introducing co-operative marketing societies.
6) By providing agricultural loans to the actual cultivators.
7) By establishing a network of primary health centers.
8) By establishing a network of veterinary field dispensaries.
9) By raising auxiliary cadet corps.
10) Introduction of weather bulletins and flood sirens.

Discussion

The flood controls measures which have been broadly outline above are not themselves adequate the floods in the Bhīma basin river, or minimize the effects and losses. In order to regulate the flow of the rivers,check their spilling of the excess water and improve the economic conditions of the people varied steps and measures will have to be taken, both short term and long term as and when problems arise. These will require the joints efforts by scientists, engineers, economists and co-operation of the people and the government. For proper planning also, a lot of information and technical data will have to be collected. Therefore, on the very out set the following tasks may be taken into hand.

1) Set up Bhīma research institute.
2) Detailed contouring and large scale mapping of the flood plains.
3) Preparation of aerial photographs during and after the floods.
4) Fixing close-spaced measuring gauzes in the rivers and flood plains.
5) Measurement of velocities and discharge rates of different rivers at different points.
6) Measurement of siltation rates in the rivers as well as in the flood plains.
7) Collection of more data on rainfall and temperature.
8) Survey of the snow-covered areas, especially by aerial survey.
9) Establishment of a network of meteorological stations.
10) Mapping the old and new courses of the rivers.
11) Detailed geographical mapping of the river basin.
12) Establishment of a number of seismological stations.

13) Establishment of a road and building research institute.
14) Preparation of techno-economic map, showing type of cultivation, subsidiary occupation and habitation of the people.

Result:

The Bhīma River is a major river in Western India and India. It flows southeast for 861 kilometres (535 mi) through Maharashtra, Karnataka, and Telangana states,

The total area of the Bhīma basin is 70,614 km². The population living along the banks of Bhima is approximately 12.33 million people (1990) with 30.90 million people expected by 2030. Seventy-five percent of the basin lies in the state of Maharashtra.

On the bank of the River Bhima twelve temples are found.

A Total of thirty-two Dharane are Found on the bank of The River Bhima the hightscapicaty in (TMC) ujjani dam and in BhimaRiver lowest Thitewadi dam 0.49(TMC) in yel River
Hydro Power Plants in Bhīma Rivertotal Tata power

High Rainfall By listening to the River Bhima, YouCan90 Rivers, heightsLength of man River 100 K.M in Bhīma River in Machnoor.

References

1. Khan, Mirza Mehdi (1909). "Rivers". Hyderabad state. Imperial Gazetteer of India, Provincial Series. Calcutta: Superintendent of Government Printing. pp. 97-98.
2. Bhīma River Britannica Concise article. Archived from The original on 2 January 2013. Retrieved 11 December 2006.
3. "South West monsoon 2005-Flood Situation Report 31 Jul 2005. Retrieved 11 December 2006.
4. Ahmednagar India, Sheet NE-02(topographic map, scale 1:250,000), Series U-502, United States Army Map Service, February 1962
5. "Delimitation of Pc and Ac -2004 Khed Taluka, Pune District Maharashtra Pune District. Archived from the original on 9 May 2013.
6. "Havali Taluka map"(PDF) (in Marathi). Pune District. Archived from the original (PDF) on 10 May 2013. Retrieved 10 May 2013.
7. "Bhīma River Pushkaralu 2018 Ghats in Telangana Trip Trees. Retrieved 11 October 2018.
8. ".Bhīma River Basin, India" Archived from the Original on 10 June 2007. Retrieved 11 December 2006.
9. "Bhimashankaram"temple net. Retrieved 11 December 2006.
10. Hydro Electric Project in Maharashtra" Retrieved 9 March 2018.
11. Tata Power loses water resource to Bhīma Basin" Retrieved 9 March 2018
12. Chatterji,G.C.Biswas A.B, Basu,S& Niyogi,B.N(1964) Geology and Groundwater resources of the Greater Calcutta in industrial area Bull Geol.Surv.ind,Series B No.21.pp.1-150.
13. Dutta Choudhury A.N. & Dass, J.(1968) Assam, her Flood & hydrology. Proc.precong.Symp, 21st int.Geogr.Congr.India, pt. II pp.58.66, published by the University of Gauhati.
14. Tandon,A.N (1955) Direction of Faulting in the Great Assam Earthquake of 15 the August1950 India .Jour. Meteor.Geol, Vol 6 Nos 1-4,p.61.