



Flood Vulnerability of Karnataka, River Basin Approach

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ABSTRACT:

Flood impacts have gained immense importance and attention due to their adverse effects. More than half of global flood destruction and damages occur in the Asia region, which causes losses of life, damages infrastructure, and creates panic conditions among the communities. To provide a better understanding of flood hazard management, flood vulnerability assessment is the primary objective. In this case, vulnerability is the central construct in flood analysis and assessment. Many researchers have defined different approaches and methods to understand vulnerability assessment and how geographic information systems assess flood vulnerability and their associated risk. Geographic information systems track and predict the disaster trend and mitigate the risk and damages. This study systematically reviews the methodologies used to measure floods and their vulnerabilities by integrating geographic information systems.

Improving vulnerability measurement is a necessary initial stage towards studying its main causes and the formulation of more accurate descriptions that can better decrease loss of life, and possessions.

Keywords: Flood Vulnerability, hazard management, geographic information system, vulnerability assessment.

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I. Introduction:

The main aim of this paper is to evaluate the current knowledge of flood vulnerability in Karnataka state. Flooding is a natural event that causes widespread destruction, adversely affects daily life and raises vulnerability, including physical, social, economic, and environmental exposure. Flood has been identified as an upward condition of water levels in coastal areas, reservoirs, streams, and canals (Abah and Clement, 2013). About 350 million people in the world are affected by floods. It is also predicted that the flood destruction will be double by the end of 2050. It is one of society's most catastrophic environmental hazards and has drawn many researchers' interest to see it in the light of the growing effects of ecological alteration. The ever-increasing population and the combination of properties in built-up areas also increased flooding potential. In the future, the impact of flooding will increase as the population increases (Walker and Burningham, 2011).

1.2 Floods in Karnataka

In past two decades Karnataka has been frequently confronted and faced extreme weather events with various disasters such as drought, flood, hailstorm, etc., causing enormous loss and damage to life, property. Karnataka has experienced 8 years of flood situation including recent 4th consecutive years of floods of 2018, 2019, 2020 and 2021 in last decade. The rare severity floods carrying huge river flows were of rare severity.

The frequency range of flood in Karnataka is 2-8 years during 2005-2021. Floods are common in the districts of Coastal and Malnad region in the range 6-8 years followed by some taluks of north Karnataka in districts of Bidar, Yadgir, Kalaburagi and Raichur districts. North interior Karnataka districts more vulnerable flood compared to south interior districts, the flood frequency of Karnataka during 2005-2021 is shown in the **Map- 1**.

The rivers in Karnataka are not perennial in nature and they usually flow to their full capacity only when the catchment areas get good amount of rainfall during the SW Monsoon season. In the events of Excess rainfall during the season, an extreme volume of water is carried by rivers, creeks, and many other geographical features into areas where the water cannot be drained adequately therefore the flood occurs. The cause of flood mainly

due formation low pressure with associated with upper air cyclonic circulation results very heavy to extremely heavy rainfall and also seasonal monsoon heavy rainfall in part of western Ghats and also associated with huge discharges released from the upper reservoirs of Maharashtra has compounded effects and damages and causing flood situation in Karnataka.

During 2005 State received moderate to heavy rainfall in the months of June and July. The spell of heavy rainfall in the State commenced from 23rd July, 2005 and lasted for about three weeks. These heavy rains filled up almost all reservoirs and caused unprecedented floods in the major rivers of the State.

All reservoirs in the State (KRS, Harangi, Kabini, Tungabhadra, Hemavathi, Almatti, Narayanpur, Hidkal, Bhadra) are overflowing and the excess water is being released into the rivers leading to flood in the villages downstream. A total of 1290 villages have been affected of which 184 villages are submerged, about 29.05 lakh population are affected and cause of 123 human death and loss of 11,596 cattles/livestock. Its estimated About 74,027 houses are damages and about 1.63 lakh ha. agriculture area affected by flood.

During 2006 the successive flood situation continued in the districts of Bagalakote, Belagavi, Vijayapura, Kalaburagi and Raichur and about 127 villages are flood affected in districts of Kalaburagi, Vijayapura, and Belagavi districts. About 21,017 people from 5,094 families have been evacuated. Road communication was cut off in approximately 21 villages.

Due to deep depression during 21st June 2007 create havoc flood situation in districts of Dakshina Kannada, Shimoga, Chickmagalur, Kodagu, Udupi, Hassan, Uttara Kannada, Raichur, Kodagu, Bagalkote, Mangalore, Mysore, & Koppal. 39 deaths were reported from districts of Belgaum, Madikeri, Bellary, Shimoga, Gulbarga, Karwar and Koppal. 831 houses were fully damaged.

During 2009, the state received heavy rainfall of 377 mm in 24hrs which is highest in 100 years and 70% of the annual rainfall and departure ranges from 177 to 924% in five days in 15 districts of 84 taluks of north interior Karnataka which covers 63% of the state total area affected by heavy rainfall and severe flood and estimated loss of 19 thousand crores. Due to influence of well-marked low-pressure area over east central Arabian Sea and adjoining coastal areas of Karnataka during 2014 from 3rd week of August to till the end of August recorded high rainfall with 251% departure from normal which is highest in the last 43 years. During 2016 well marked low pressure area along with an associated upper air cyclonic circulation caused flood situation arises in north interior districts which comprises of black cotton soils which could not withstand the heavy downpour causes overland flows of rivers caused extreme damage for harvested crops to the farming community.

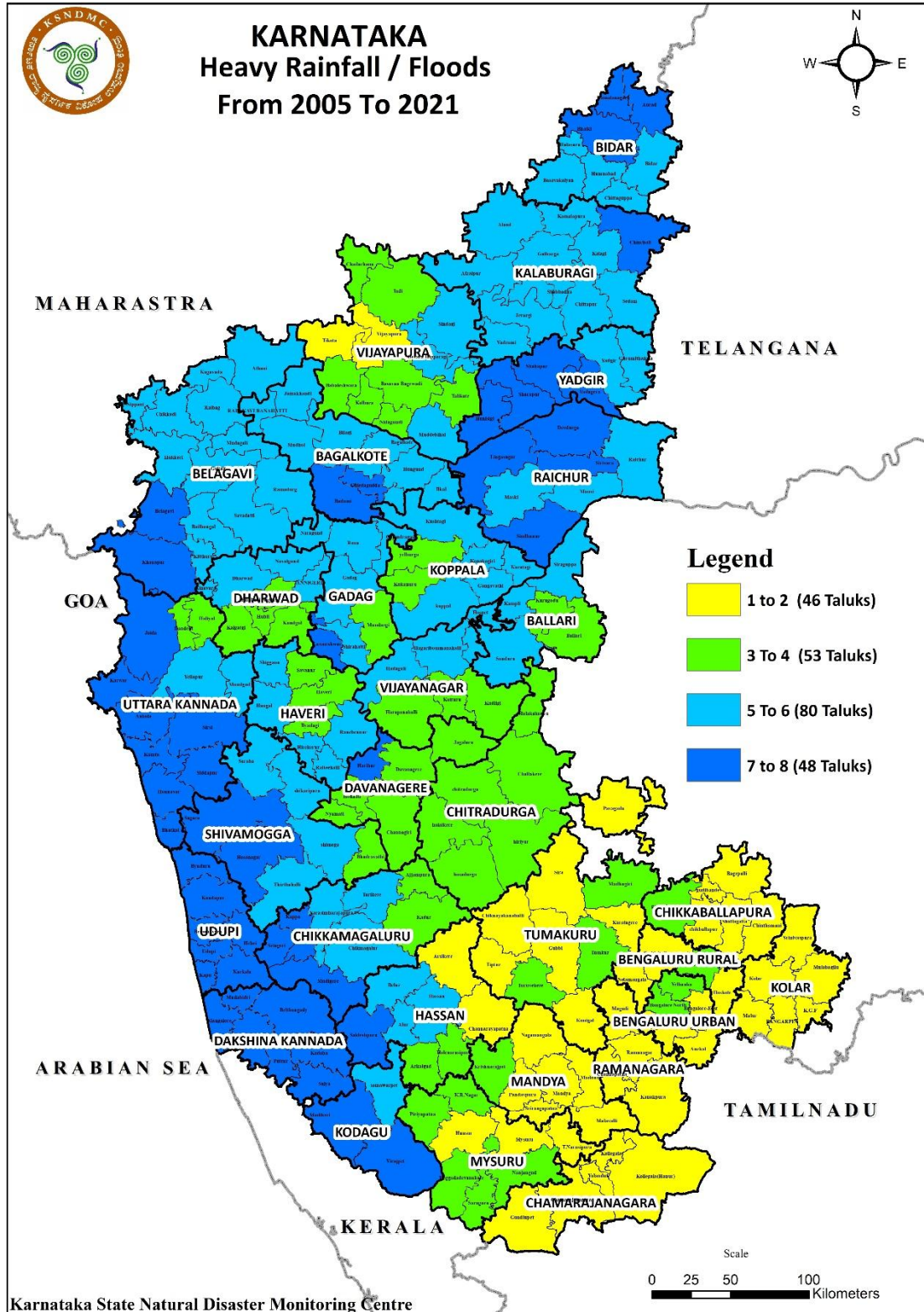
During 2018 the flood and rainfall induced Landslides occurred in Malnad (Kodagu, Chikmagaluru, Hassan, Shivamogga) and Coastal Districts (Dakshina Kannada, Udupi & Uttara Kannada) of Karnataka due to above the normal rainfall. After 2018 flood followed by 2019 flood incident due to heavy downpour of 224 mm (3rd to 10th August) and some of the district received more than 700% departure from normal especially in North interior, Malnad and coastal region the situation further intensified by record discharge of water release caused extreme flooding and landslides in 103 taluks of 22 districts. Under the influence of cyclonic circulation, the state faced 3rd consecutive flood situation in part of north interior district, Malnad and coastal districts during 2nd fortnight of august, September and October 2020 as many 23 districts have been affected due to heavy rain, floods, and landslides.

Improving vulnerability measurement is a necessary initial stage towards studying its main causes and the formulation of more accurate descriptions that can better decrease loss of life, and possessions

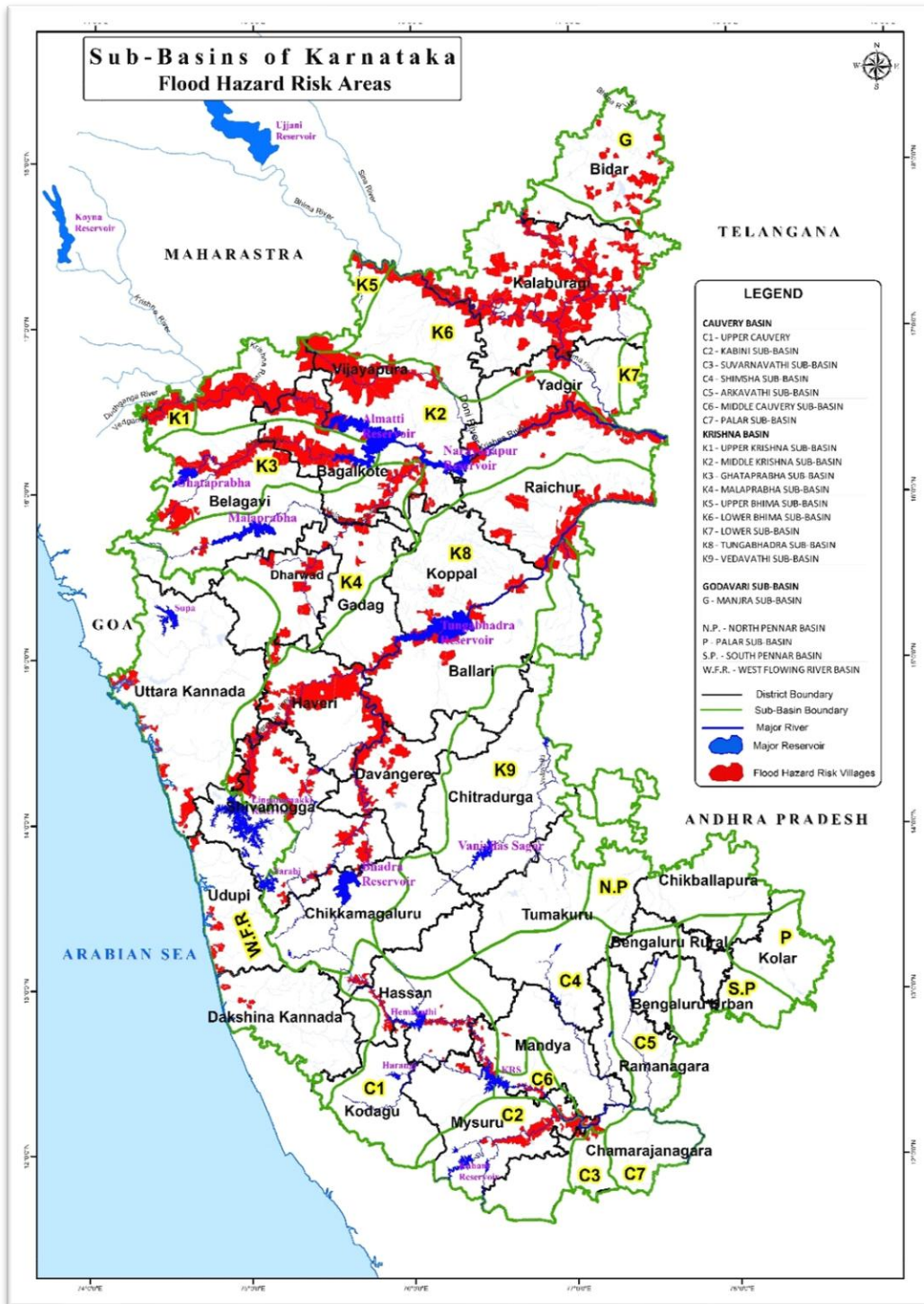
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Map –1 Flood Frequency of Karnataka



Map – 2 Flood risk areas of Karnataka

1.3 Flood hazard zonation Basin Approach

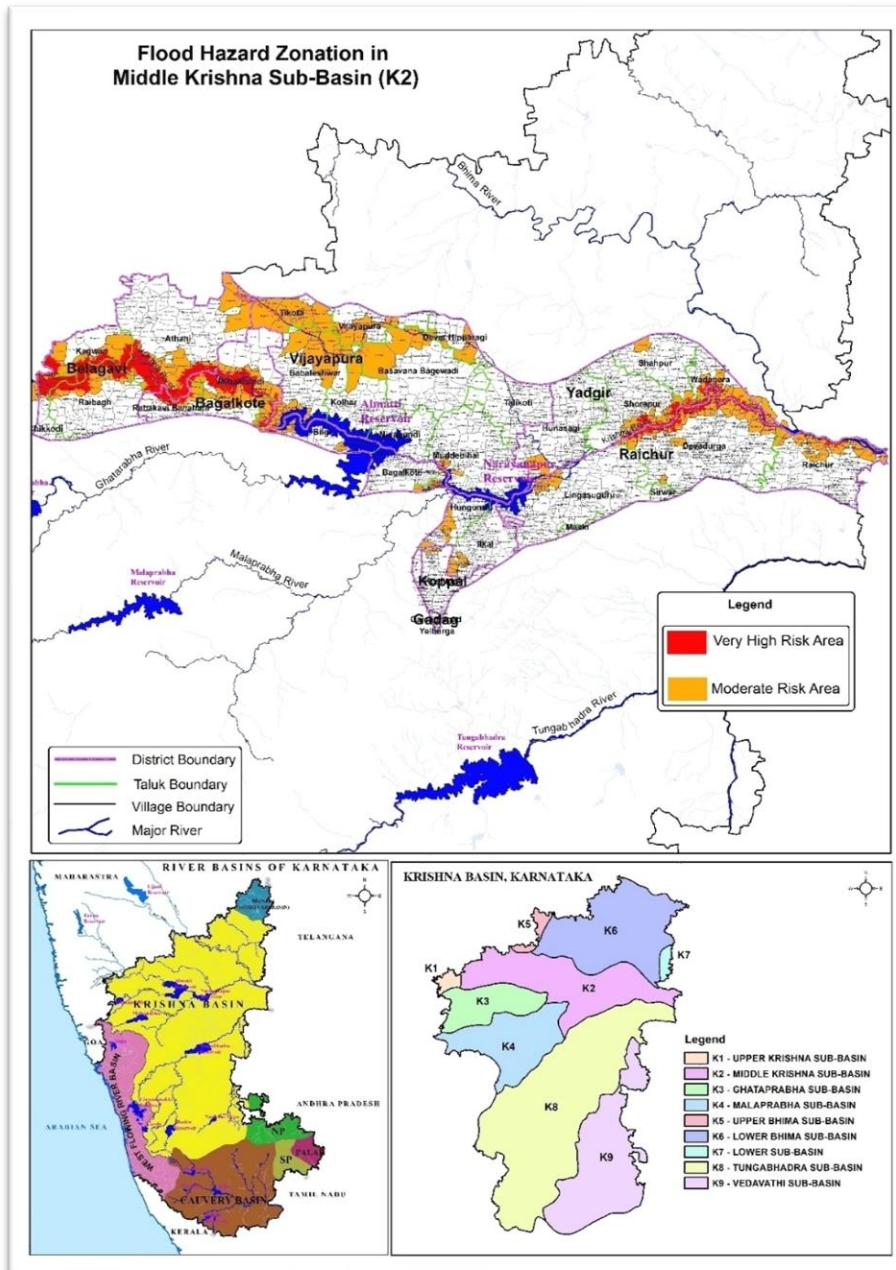
1.3.1 The Middle Krishna Sub-basin-K2:

The K2 Middle Krishna Sub Basin is a part of Krishna basin which comprises of 07 watersheds extending over an area of about 1438.60 Sq kms. The Middle Krishna Sub Basin is covered by Deccan Trap lava flows and laid in the districts of Belagavi, Vijayapura, Bagalakote, Koppala, Raichur and Yadgir districts of Karnataka. Groundwater and geohydrology is controlled by topography, geomorphology, and lithology. The basin is under rain shadow zone and having water scarcity. The annual rainfall in the basin varies between 488 mm to 544mm. Due to release of large amount of water from Koyna reservoir of Maharashtra and associated with heavy to very heavy rainfall cause flood situation in this basin. The Middle Krishna basin most vulnerable riverine

flooding and its identified 274 villages are prone very high risk (90 villages) to moderate risk area (184 villages) prone to flood.

Middle Krishna Sub-basin-K2: Flood Prone Districts

Sl.No.	District Name	No. of Taluks	No. of Hoblis	No. of Gram Panchayats	No. of Villages		Total Villages
					Very High Risk	Moderate Risk	
1	Koppal	1	1	1	—	1	1
2	Raichur	3	8	23	49	11	60
3	Belagavi	4	7	48	51	14	65
4	Bagalkote	5	7	32	34	25	59
5	Vijayapura	7	9	32	19	33	52
6	Yadgir	4	7	14	31	5	36
Total		24	39	150	184	89	273



Map-3 Middle Krishna Sub-basin -K2

Table List of Flood Prone Villages in Middle Krishna Sub basin -K2

Middle Krishna Sub-Basin (K2)																			
List of Flood Hazard Risk Villages																			
Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class									
1	2	3	4	5	6	7	8	9	10	11									
2	Koppal	1	Kushtagi	1	Hanamsagar	1	Antarathana	1	Kadoor	Moderate Risk Area									
						2	Karidigudda	3	Nilvanji	Very High Risk Area									
						3	Karegudda	4	Anjal	Very High Risk Area									
								5	Gopalpur	Very High Risk Area									
								6	Anchesugur	Very High Risk Area									
						4	Gugal	7	Herur	Very High Risk Area									
								8	Yatgal	Very High Risk Area									
						2	Devadurga	2	Devadurga	2	Devadurga	5	Dondambli	9	Wagadambli	Very High Risk Area			
														10	Huvinhadgi	Very High Risk Area			
														11	Joladhadgi	Very High Risk Area			
														12	Dondambli	Very High Risk Area			
														13	Benkal	Very High Risk Area			
														14	Karkihalli	Very High Risk Area			
														15	Konchapli	Very High Risk Area			
														16	Mydargol	Very High Risk Area			
	17	Hunur	Very High Risk Area																
	18	Kopper	Very High Risk Area																
	3	Gabbur	3	Gabbur	3	Gabbur	7	Hemnal	21	Baswantpur	Very High Risk Area								
									22	Apprahal	Very High Risk Area								
									23	Madarkal	Very High Risk Area								
									24	Hireraikumpi	Very High Risk Area								
									25	Chickraikumpi	Very High Risk Area								
									26	Itagi	Very High Risk Area								
									27	Gugal	Very High Risk Area								
	4	Jalihalli	4	Jalihalli	4	Jalihalli	10	Palkanmaradi	28	Devergud	Moderate Risk Area								
									11	Chinchodi	29	Veergot	Moderate Risk Area						
											30	Bunkaldoddi	Very High Risk Area						
											31	Chinchodi	Very High Risk Area						
											32	Lingadhalli	Very High Risk Area						
									12	Amarapur	33	Suladgud	Moderate Risk Area						
									13	Jalahalli	34	Chapalki	Very High Risk Area						
									14	Karidigudda	35	Bagur	Very High Risk Area						
											36	Mudgot	Very High Risk Area						
											37	Herundi	Very High Risk Area						
	38	Buddinni	Very High Risk Area																
	39	Roudal Banda	Very High Risk Area																
	40	Jungi-Rampur	Very High Risk Area																
	5	Lingasuguru	5	Lingasuguru	5	Lingasuguru	15	Rodalbanda U.K.P.	41	Upperi (Small)	Very High Risk Area								
									42	Sunkal	Very High Risk Area								
									43	Halbhavi	Very High Risk Area								
									44	Jaldurga	Very High Risk Area								
	6	Gurgunta	6	Gurgunta	6	Gurgunta	17	Guntgol	45	Jaldurga	Very High Risk Area								
									46	Budidipad	Moderate Risk Area								
	4	Raichur	2	Devadurga	2	Devadurga	7	Chandrabanda	47	Athkur	Very High Risk Area								
									19	Atkooor	48	Dongarampur	Moderate Risk Area						
											49	Korvakala	Moderate Risk Area						
											50	Korvakhurd	Moderate Risk Area						
											51	Agrahar	Moderate Risk Area						
											52	Wadloor	Moderate Risk Area						
											53	Ganjhalli	Very High Risk Area						
									20	Yadlapur	54	Yedlapur	Very High Risk Area						
											55	Korvihali	Very High Risk Area						
											56	Korthkunda	Very High Risk Area						
									21	Sagamkunta	57	Deosugur	Very High Risk Area						
											58	Shaktinagar (CT)	Moderate Risk Area						
									22	Devasugur	22	Devasugur	22	Devasugur	59	Kadlur	58	Kadlur	Very High Risk Area
																	59	Gurjapur	Very High Risk Area
																	60	Arshanagi	Very High Risk Area
	61	Karekal	Very High Risk Area																
	23	Kadlur	23	Kadlur	23	Kadlur	62	Chikkasugur	62	Chikkasugur	Moderate Risk Area								
									63	Chikkasugur	Moderate Risk Area								
	9	Kalmali	9	Kalmali	9	Kalmali	24	Chikkasugur	64	Chikkasugur	Moderate Risk Area								
65									Chikkasugur	Moderate Risk Area									

Middle Krishna Sub-Basin (K2)											
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Dist. SI.No.	District Name	Taluk SI.No.	Taluk Name	Hobli SI.No.	Hobli Name	GP SI.No.	Gram Panchayat Name	SI.No.	Village Name	Flood Hazard Class	
1	2	3	4	5	6	7	8	9	10	11	
						25	Mahishawadagi	63	Mahishwadgi	Very High Risk Area	
						26		Nandeshwar	64	Janawad	Very High Risk Area
						27		Shegunashi	65	Nandeshwar	Very High Risk Area
						28		Satti	66	Shegunshi	Very High Risk Area
									67	Satti	Very High Risk Area
									68	Dodwad	Very High Risk Area
									69	Naganur P.K.	Very High Risk Area
						29		Naganur -Pk	70	Avarkhod	Very High Risk Area
						30		Shankarhatti	71	Khavatkoppa	Very High Risk Area
						31		Savadi	72	Savadi	Very High Risk Area
									73	Chikkud	Moderate Risk Area
									74	Saptasagar	Very High Risk Area
						32		Saptasagar	75	Teerth	Very High Risk Area
						33		Darur	76	Darur	Very High Risk Area
						34		Radderahatti	77	Radderahatti	Moderate Risk Area
						35		Nadi-Ingalgaoon	78	Nadi-Ingalgaoon	Very High Risk Area
						36		Halyal	79	Halyal	Moderate Risk Area
						37		Hulagabali	80	Hulagabali	Very High Risk Area
									81	Shinal	Very High Risk Area
									82	Tangadi	Very High Risk Area
									83	Junjarwad	Very High Risk Area
									84	Shirahatti	Very High Risk Area
									85	Nandagaon	Moderate Risk Area
									86	Telsang	Moderate Risk Area
									87	Bannur	Moderate Risk Area
									88	Kakamari	Moderate Risk Area
									89	Kottalgi	Moderate Risk Area
									90	Ankali	Very High Risk Area
									91	Manjari	Very High Risk Area
									92	Yadur	Very High Risk Area
									93	Hosa Yedur	Very High Risk Area
		94	Yadurwadi	Very High Risk Area							
		95	Manjarwadi	Very High Risk Area							
		96	Ingali	Very High Risk Area							
		97	Chandur	Very High Risk Area							
		98	Chandur - Tek	Very High Risk Area							
		99	Kallol	Very High Risk Area							
		100	Nasalapur	Very High Risk Area							
		101	Diggewadi (Old)	Very High Risk Area							
		102	Soundatti	Very High Risk Area							
		103	Jalalpur	Very High Risk Area							
		104	Chinchali	Moderate Risk Area							
		105	Bhiradi	Very High Risk Area							
		106	Khemalapur	Very High Risk Area							
		107	Paramanandwadi	Very High Risk Area							
		108	Siddapur	Very High Risk Area							
		109	Kudachi (Rural)	Very High Risk Area							
		110	Kudchi (TP)	Moderate Risk Area							
		111	Shiragur	Very High Risk Area							
		112	Gundwad	Very High Risk Area							
		113	Molwad	Very High Risk Area							
		114	Kusnal	Very High Risk Area							
		115	Shahapur	Very High Risk Area							
		116	Shiraguppi	Moderate Risk Area							
		117	Krishana Kittur	Very High Risk Area							
		118	Ugar Budruk	Very High Risk Area							
		119	Ugar Khurd	Very High Risk Area							
		120	Jugul	Very High Risk Area							
		121	Mangavati	Very High Risk Area							
		122	Banajawad	Very High Risk Area							
		123	Shedbal	Moderate Risk Area							
		124	Ainapur	Very High Risk Area							
		125	Katral	Very High Risk Area							
		126	Kagawad	Moderate Risk Area							
		127	Mole	Moderate Risk Area							
3	Belagavi	8	Kagwad	16	Kagwad						

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Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class								
1	2	3	4	5	6	7	8	9	10	11								
4	Bagalkote	13	Rabakavi Banahatti	23	Terdal	104	Hipparagi	128	Gulbal	Moderate Risk Area								
								129	Budihal(S.G.)	Moderate Risk Area								
								130	Budihal(S.G.)	Moderate Risk Area								
								73	Badagi	131	Badgi	Moderate Risk Area						
								74	Teggi	132	Ballur	Moderate Risk Area						
								75	Galagali	133	Galagali	Very High Risk Area						
								76	Inam-Hanchinal	134	Hanchinal(Inam)	Moderate Risk Area						
										135	Gudadinni	Moderate Risk Area						
										136	Girgaon	Very High Risk Area						
										137	Rabkavi	Very High Risk Area						
										138	Chowdapur	Very High Risk Area						
										139	Chickhanchinal	Very High Risk Area						
										140	Kolur	Very High Risk Area						
										141	Mundaganur	Very High Risk Area						
										17	Bilgi	77	Kolur	141	Mundaganur	Very High Risk Area		
										18	Anagvadi	78	Girisagar	142	Girisagar	Moderate Risk Area		
								9	Bilgi	19	Hungund	19	Hungund	79	Nagur	143	Nagur	Moderate Risk Area
														80	Hungund (Rural)	144	Hungund (Rural)	Moderate Risk Area
														81	Hungund (TP)	145	Hungund (Rural)	Moderate Risk Area
														82	Kudalasangam	146	Hungund (TP)	Moderate Risk Area
														83	Bisaladinni	147	Sangam	Very High Risk Area
														148	Valakaladinni	Very High Risk Area		
														149	Bisaladinni	Very High Risk Area		
														84	Jamkhandi (Rural)	150	Jamkhandi (Rural)	Moderate Risk Area
														85	Jamkhandi (CMC)	151	Jamkhandi (CMC)	Moderate Risk Area
														10	Hungund	19	Hungund	19
								153	Jakanur	Moderate Risk Area								
								86	Kunchanur	154	Kunchanur	Very High Risk Area						
								155	Kumbarhal	Moderate Risk Area								
								156	Jamkhandi (Rural)	Very High Risk Area								
								87	Kumbar-Hall	157	Sanal	Moderate Risk Area						
								88	Alagur	158	Alagur	Very High Risk Area						
								159	Kankanawadi	Very High Risk Area								
								89	Kankanavadi	160	Kadacol	Very High Risk Area						
								11	Jamakhandi	21	Savalagi	21	Savalagi					
														162	Maigur	Very High Risk Area		
														90	Maigur	Very High Risk Area		
														91	Muttur	163	Muttur	Very High Risk Area
														164	Bidari	Very High Risk Area		
														92	Bidari	165	Janawad	Very High Risk Area
														166	Kavatagi	Very High Risk Area		
														93	Chikkpadasalagi	167	Chikkpadasalgi	Very High Risk Area
														168	Naganur	Moderate Risk Area		
														94	Hirepadasalagi	169	Hirepadasalgi	Very High Risk Area
								12	Ilkal	22	Ilkal	22	Ilkal	170	Jambagi.(B.K.)	Very High Risk Area		
														171	Takkalaki	Very High Risk Area		
														95	Jambagi-B.K	172	Takkod	Very High Risk Area
														173	Shurpali	Very High Risk Area		
														174	Jambagi.(K.D.)	Moderate Risk Area		
														96	Shurpali	175	Tubachi	Very High Risk Area
														176	Ishwarnagar	Moderate Risk Area		
														177	Hireupnal	Moderate Risk Area		
														97	Balakundi	178	Balakundi	Moderate Risk Area
														98	Hire Kodagali	179	Hanamanal	Moderate Risk Area
								13	Rabakavi Banahatti	23	Terdal	23	Terdal	99	Balakundi	180	Ilkal (CMC)	Moderate Risk Area
														181	Madanamatti	Very High Risk Area		
														100	Asangi	182	Asangi	Very High Risk Area
														101	Halingali	183	Halingali	Very High Risk Area
														102	Kulahalli	184	Kulhalli	Very High Risk Area
														103	Tamadaddi	185	Tamadaddi	Very High Risk Area
														104	Hipparagi	186	Hipparagi	Very High Risk Area

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1	2	3	4	5	6	7	8	9	10	11
5	Vijayapura	14	Basavana Bagewadi	24	Managuli	105	Managuli	187	Managuli	Very High Risk Area
						106	Ukkali	188	Ukkali	Moderate Risk Area
						107	Markabbinalli	189	Bisanal	Moderate Risk Area
								190	Bommanahalli	Moderate Risk Area
						108	Donur	191	Donur	Moderate Risk Area
								192	Mullal	Moderate Risk Area
								193	Neginal	Moderate Risk Area
						109	Jumanal	194	Yambatnal	Moderate Risk Area
						110	Jumanal	195	Jumnal	Moderate Risk Area
						111	Hitnalli	196	Hittinahalli	Very High Risk Area
						112	Sarwad	197	Khatijapur	Moderate Risk Area
						112	Bijapur (Rural)	198	Bijapur (Rural)	Very High Risk Area
								199	Bijapur (Rural)	Moderate Risk Area
						113	Hegadihal	200	Ukumanal	Moderate Risk Area
		15	Vijayapura	25	Vijayapura	114	Kumatagi	201	Kumatagi	Moderate Risk Area
						115	Kolur	202	Devoor	Moderate Risk Area
		16	Muddebihal	26	Muddebihal	116	Yarazari	203	Handargall	Moderate Risk Area
						117	Khakandaki	204	Kandaganur	Moderate Risk Area
		17	Babaleshwar	27	Babaleshwar	118	Karjol	205	Kakhandaki	Very High Risk Area
						119	Babaleswar	206	Tonsyal	Very High Risk Area
						119	Babaleswar	207	Babaleshwar	Very High Risk Area
								208	Adavisangapur	Very High Risk Area
						120	Honaganahalli	209	Honaganahalli	Very High Risk Area
						121	Sarwad	210	Dadamatti	Very High Risk Area
								211	Sarawad	Very High Risk Area
						122	Nidoni	212	Nidoni	Very High Risk Area
						122	Nidoni	213	Kanamuchanal	Moderate Risk Area
								214	Dhanyal	Very High Risk Area
						124	Hosur	215	Jambagi(H)	Very High Risk Area
								216	Chikka-Galagali	Very High Risk Area
						124	Hosur	217	Hosur	Very High Risk Area
								218	Kanabur	Very High Risk Area
		125	Jainapur	219	Jainapur	Moderate Risk Area				
		126	Gunadal	220	Babalad	Moderate Risk Area				
				221	Shirabur	Very High Risk Area				
		126	Gunadal	222	Sutagundi	Moderate Risk Area				
				223	Lingadalli	Moderate Risk Area				
		17	Babaleshwar	28	Mamdapur	127	D.Gennur	224	Devara-Gennur	Moderate Risk Area
128	Toravi					225	Atalatti	Very High Risk Area		
18	Tikota	29	Tikota	129	Kotyal	226	Toravi (Part)	Moderate Risk Area		
				130	Tajpur.H	227	Kotyal	Moderate Risk Area		
18	Tikota	29	Tikota	131	Honawad	228	Harnal	Moderate Risk Area		
				132	Tikota	229	Ratnapura	Moderate Risk Area		
19	Kolhar	30	Kolhar	133	Mulawad	230	Malakandevarahatti	Moderate Risk Area		
				134	Jalawad	231	Honawad	Moderate Risk Area		
19	Kolhar	30	Kolhar	135	Yalawar	232	Rampur	Moderate Risk Area		
				136	Satihah	233	Tikota	Moderate Risk Area		
20	Devar Hipparagi	31	Devar Hipparagi	137	Jalawad	234	Mulawad	Very High Risk Area		
				138	Yalwar	235	Jalwad	Moderate Risk Area		
20	Devar Hipparagi	31	Devar Hipparagi	139	Yalwar	236	Yalwar	Moderate Risk Area		
				140	Satihah	237	Nagaraldon	Moderate Risk Area		
20	Devar Hipparagi	32	Huvinihiprgi	141	Satihah	238	Satihah	Moderate Risk Area		

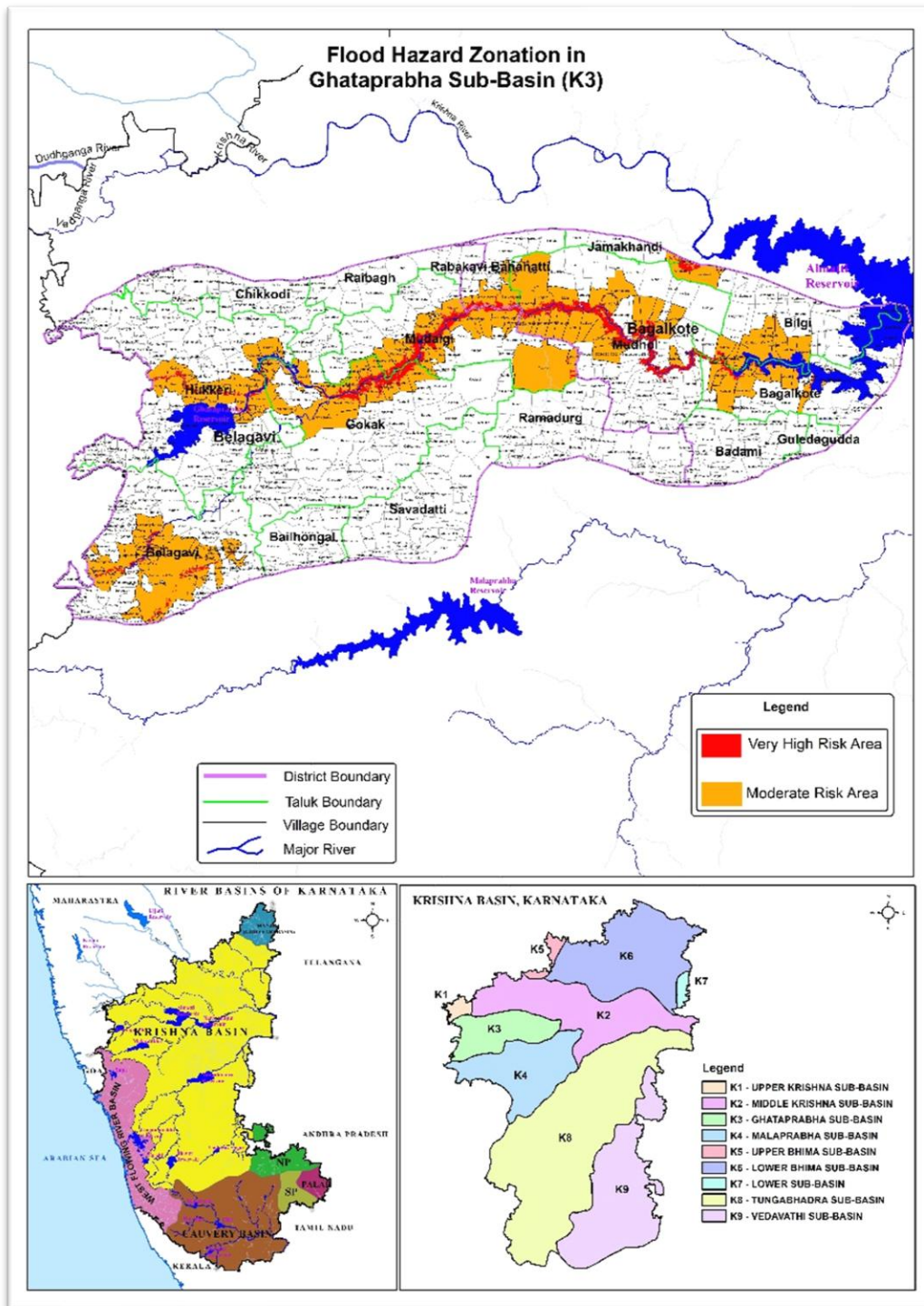
Middle Krishna Sub-Basin (K2)												
List of Flood Hazard Risk Villages												
Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class		
1	2	3	4	5	6	7	8	9	10	11		
6	Yadgir	21	Shahpur	33	Gogi	137	Gogi (K)	239	Gogikona	Moderate Risk Area		
								240	Markal	Very High Risk Area		
								241	Tonnur	Very High Risk Area		
								242	Chandral	Very High Risk Area		
								243	Goudoor	Very High Risk Area		
								244	Kollur	Very High Risk Area		
				22	Shorapur	34	Hayyalbuzurg	138	Kollur (M)	245	Mushtalli	Very High Risk Area
										246	Kagarhal	Very High Risk Area
										247	Shalgi	Very High Risk Area
										248	Aralhalli	Very High Risk Area
										249	Kampapur	Very High Risk Area
										250	Devapur	Very High Risk Area
		139	Devapur			251	Bevinhal	Very High Risk Area				
						252	Hemwadgi	Very High Risk Area				
						253	Sugur	Very High Risk Area				
						254	Adwadgi	Very High Risk Area				
						255	Choudeshwarhal	Very High Risk Area				
						256	Karnal	Moderate Risk Area				
		35	Shorapur	36	Kakkeri	142	Tinthni	257	Hemnoor	Very High Risk Area		
								258	Tinthni	Very High Risk Area		
		23	Wadagera	37	Wadagera	145	Konkal	259	Kodal	Very High Risk Area		
								260	Kadrapur	Very High Risk Area		
								261	Habshihal	Moderate Risk Area		
								262	Itga Simt Wadgera	Very High Risk Area		
								263	Tumkur	Very High Risk Area		
								264	Channur Jagir	Very High Risk Area		
				144	Tumakura	265	Konkal	Very High Risk Area				
266	Gondenoor					Very High Risk Area						
267	Ekchinti					Very High Risk Area						
268	Hayyal (B)					Very High Risk Area						
269	Aneksugur					Very High Risk Area						
270	Alkur					Very High Risk Area						
38	Hayyala Buzurg	146	Hayyal (B)	147	Konkal	271	Jangangaddi	Very High Risk Area				
						272	Kotigud	Moderate Risk Area				
						273	Rayangola	Very High Risk Area				
						274	Jogandabhavi	Moderate Risk Area				
						275	Narayanpur	Very High Risk Area				
						276	Aikur	Very High Risk Area				
24	Hunasagi	39	Kodekal	150	Jogundbhavi	277	Jogandabhavi	Moderate Risk Area				
						278	Jogandabhavi	Moderate Risk Area				

1.3.2 Ghataprabha Sub-basin-K3:

The Ghataprabha River originates in the Western Ghats at an altitude of 884 meters and flows eastward for a distance of 283 kilometers before its confluence with the Krishna River at Almatti. The catchment area of Ghataprabha lies between latitude 15° 45' and 16° 25' N and longitude 74° 00' and 75° 55' E. The Ghataprabha River flows eastwards for a distance of 283 km before joining Krishna at Kudalasangama, about 35 km north-east of Kaladgi at an elevation of 500 m. The river flows for about 60 km in the Ratnagiri and Kolhapur Districts of Maharashtra before entering the Belgaum District of Karnataka. In Karnataka, it flows through Belgavi and Bagalakote districts and joins the Krishna about 16 km from Almatti. The catchment area of Ghataprabha including its tributaries is 8,829km². The Ghataprabha sub basin is also high variable in rainfall ranging from 6500mm in upper catchment and 500 mm in lower catchment. There are 12 watershed and major project in sub basin. The basin experienced flash floods in last decades and also heavy release of water from the upper basin of Krishna basin cause flood situation all along the adjacent regions and villages of Belagavi and Bagalakote district. In Belagavi district the taluks of Belagavi, Gokak, Hukkeri, Mudalagi, and in Bagalakote district taluks of Bagalakote, Bilagi, Jamakandi, Mudhol, Rabakavibanahattitaluks are prone to flood conditions and also the storage of huge flood water and backwater of Alamatti reservoirs inundates a large portion of villages and create flood situation. The flood hazard zonation of high risk area to moderate risk area are depicted in **Map-4**. There are 45 villages are prone high risk and 117 villages are prone moderate risk, flood prone villages..

Ghataprabha Sub-basin-K3:Flood Prone Districts

Sl.No.	District Name	No. of Taluks	No. of Hoblis	No. of Gram Panchayats	No. of Villages		Total Villages
					Very High Risk	Moderate Risk	
1	Belagavi	4	11	56	20	72	92
2	Bagalkote	5	7	36	25	45	70
Total		9	18	92	45	117	162



Map-4GhataprabhaSub-basin -K3

Table- List of Flood Prone Villages in Ghatpraba Sub basin -K3

Ghataprabha Sub-Basin (K3)												
List of Flood Hazard Risk Villages												
Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class		
1	2	3	4	5	6	7	8	9	10	11		
1	Belagavi	1	Belagavi	1	Belagavi	1	Peeranwadi	1	Peeranwadi (CT)	Moderate Risk Area		
						2	Belgaum (M Corp. + OG)	2	Belgaum (M Corp. + OG)	Moderate Risk Area		
				2	Hirebagevadi	3	Mutaga	3	Mutga (CT)	Moderate Risk Area		
						4	Nilaji	4	Nilaji	Moderate Risk Area		
						5	Balekundari Kh	5	Balekundri (K.H)	Moderate Risk Area		
						6	Sulebhavi	6	Sulebhavi (CT)	Moderate Risk Area		
						7		7	Khanagaon (B.K)	Moderate Risk Area		
						8	Chandur	8	Chandur	Moderate Risk Area		
				3	Kakti	7	Mucchandi	9	Muchandi	Moderate Risk Area		
						8	Kalakhamba	10	Kalakhamb	Moderate Risk Area		
						9	Ashte	11	Aste	Moderate Risk Area		
						10	Kangrali Kh	12	Chandgad	Moderate Risk Area		
						11	Kangrali Bk	13	Alatage	Moderate Risk Area		
						12	Kadoli	14	Goundawad (Part)	Moderate Risk Area		
						13	Kakti	15	Jafarwadi	Moderate Risk Area		
						14	Honaga	16	Kadoli	Moderate Risk Area		
						15	Sulaga (U)	17	Devagiri	Moderate Risk Area		
						16	Turmuri	18	Kakati (CT)	Moderate Risk Area		
				4	Uchagaon	17	Kangrali Kh	19	Honaga	Moderate Risk Area		
						18	Uchagaon	20	Kallehol	Moderate Risk Area		
		19	Ambewadi			21	Sulge (Uchagaon)	Moderate Risk Area				
		20	Kangrali Bk			22	Bachi	Moderate Risk Area				
						23	Turamari	Moderate Risk Area				
						24	Kangrali (KH) (CT)	Moderate Risk Area				
						25	Uchagaon	Moderate Risk Area				
						26	Mannur	Moderate Risk Area				
						27	Ambewadi	Moderate Risk Area				
						28	Kangrali (BK) (CT)	Moderate Risk Area				
		2	Gokak	5	Gokak	21	Kolavi	29	Gokak (Rural)	29	Gokak (Rural)	Moderate Risk Area
						30	Gokak (CMC)	30	Gokak (CMC)	Very High Risk Area		
				6	Kowjalgi	22	Melavanki	31	Adibatti	31	Adibatti	Very High Risk Area
						23	Udagatti	32	Melavanki	32	Melavanki	Very High Risk Area
						24	Talakatnal	33	Chigadolli	33	Chigadolli	Very High Risk Area
						25	Lolasur	34	Kalarkoppa	34	Kalarkoppa	Very High Risk Area
						26	Nallanatti	35	Hadiginal	35	Hadiginal	Very High Risk Area
						27	Dhupadal	36	Udagatti	36	Udagatti	Very High Risk Area
				7	Arbhavi	28	Nandagaon	37	Talakatnal	37	Talakatnal	Very High Risk Area
						29	Balobal	38	Molmanatti	38	Molmanatti	Moderate Risk Area
						39	Shingalapur	39	Shingalapur	Moderate Risk Area		
						40	Lolasur	40	Lolasur	Moderate Risk Area		
						41	Basaligundi	41	Basaligundi	Moderate Risk Area		
						42	Shivapur	42	Shivapur	Moderate Risk Area		
						43	Nallanatti	43	Nallanatti	Moderate Risk Area		
		3	Hukkeri	8	Hukkeri	30	Hospet	44	Dhupadal	44	Dhupadal	Moderate Risk Area
						31	Mavanur	45	Mutnal	45	Mutnal	Moderate Risk Area
						32	Godageri	46	Nandagaon	46	Nandagaon	Moderate Risk Area
						33	Hosur	47	Khanapur	47	Khanapur	Moderate Risk Area
						34	Badakundri	48	Balobal	48	Balobal	Very High Risk Area
						35	Bastawad	49	Beerangaddi	49	Beerangaddi	Moderate Risk Area
						36	Beniwad	50	Shindihatti	50	Shindihatti	Moderate Risk Area
						37	Sultanapur	51	Hospet	51	Hospet	Moderate Risk Area
						38	Kotabagi	52	Ankalgudikettra	52	Ankalgudikettra	Moderate Risk Area
						39	Shiradaana	53	Nadigudikettra	53	Nadigudikettra	Moderate Risk Area
		9	Sankevar	9	Sankevar	40	Gudas	54	Yarnal	54	Yarnal	Moderate Risk Area
						41	Hanchinal	55	Ingali	55	Ingali	Moderate Risk Area
						42	Kurani	56	Hosur	56	Hosur	Moderate Risk Area
						43	Kochari	57	Yargatti	57	Yargatti	Moderate Risk Area
						44	Hebbal	58	Badkundri	58	Badkundri	Moderate Risk Area
								59	Goudawad	59	Goudawad	Moderate Risk Area

Ghataprabha Sub-Basin (K3)													
List of Flood Hazard Risk Villages													
Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class			
1	2	3	4	5	6	7	8	9	10	11			
		4	Mudalgi	10	Arbhavi	45	Hunashyal.P.G	74	Hunshyal (P.G.)	Very High Risk Area			
						46	Waderahatti	75	Waderatti	Moderate Risk Area			
						47	Masaguppi	76	Fulagaddi	Very High Risk Area			
						48	Patagundi	77	Masaguppi	Very High Risk Area			
						49	Patagundi	78	Patagundi	Moderate Risk Area			
						79	Kamalahinni	79	Kamalahinni	Very High Risk Area			
						80	Rangapur	80	Rangapur	Moderate Risk Area			
				11	Kowjalgi	81	Munyal	81	Munyal	Very High Risk Area			
						50	Yadwad	82	Yadwad	Moderate Risk Area			
						51	Tigadi	83	Tigadi	Very High Risk Area			
						52	Kamanakatti	84	Kopadatti	Moderate Risk Area			
						53	Sunadholi	85	Sunadholi	Very High Risk Area			
						54	Hunashyal.P.Y.	86	Bairanatti	Moderate Risk Area			
						87	Hunshyal (P.Y.)	87	Hunshyal (P.Y.)	Very High Risk Area			
			88			Bisanakoppa	88	Bisanakoppa	Moderate Risk Area				
			89			Hale Yaragudri	89	Hale Yaragudri	Moderate Risk Area				
			90	Avaradi	90	Avaradi	Very High Risk Area						
			91	Dhavaleshwar	91	Dhavaleshwar	Very High Risk Area						
			92	Aralimatti	92	Aralimatti	Very High Risk Area						
					5	Bagalkote	12	Kaladgi	57	Gaddanakeri	93	Gaddanakeri	Moderate Risk Area
									58	Kaladagi	94	Kaladagi	Very High Risk Area
									59	Chikkashellikeri	95	Govindkopp	Moderate Risk Area
									96	Murana	96	Murana	Moderate Risk Area
									97	Kesanur *	97	Kesanur *	Moderate Risk Area
									98	Yadahalli	98	Yadahalli	Moderate Risk Area
									99	Chebbi	99	Chebbi	Moderate Risk Area
100	Ankalagi	100							Ankalagi	Moderate Risk Area			
101	Sharadal	101							Sharadal	Very High Risk Area			
102	Udagatti	102							Udagatti	Moderate Risk Area			
103	Devana	103							Devana	Moderate Risk Area			
104	Sokanadgi	104							Sokanadgi	Moderate Risk Area			
105	Chikk-Sansi	105							Chikk-Sansi	Moderate Risk Area			
106	Hire-Sansi	106							Hire-Sansi	Moderate Risk Area			
107	Yadahalli	107				Yadahalli	Very High Risk Area						
108	Amalzari	108				Amalzari	Moderate Risk Area						
109	Lingapur(S.K)	109				Lingapur(S.K)	Moderate Risk Area						
110	Kataraki	110				Kataraki	Very High Risk Area						
111	Shiraguppi	111				Shiraguppi	Moderate Risk Area						
112	Kundargi	112				Kundargi	Moderate Risk Area						
113	Venkatapura	113				Venkatapura	Moderate Risk Area						
114	Anagawadi	114				Anagawadi	Moderate Risk Area						
115	Budhihal(S.H)	115				Budhihal(S.H)	Moderate Risk Area						
116	Bavalatti	116				Bavalatti	Moderate Risk Area						
117	Kovalli	117				Kovalli	Moderate Risk Area						
118	Koppa(S.K)	118				Koppa(S.K)	Moderate Risk Area						
119	Algundi	119	Algundi	Moderate Risk Area									
120	Gani	120	Gani	Moderate Risk Area									
121	Rugi	121	Rugi	Very High Risk Area									
122	Uttur	122	Uttur	Moderate Risk Area									
123	Jaliber	123	Jaliber	Very High Risk Area									
124	Ranjanagi	124	Ranjanagi	Very High Risk Area									
125	Mallapur(P.J)	125	Mallapur(P.J)	Moderate Risk Area									
126	Mirji	126	Mirji	Moderate Risk Area									
127	Vantigodi	127	Vantigodi	Very High Risk Area									
128	Channa	128	Channa	Moderate Risk Area									
129	Mudhol (TMC)	129	Mudhol (TMC)	Moderate Risk Area									
130	Akkimara	130	Akkimara	Very High Risk Area									
131	Nagaral	131	Nagaral	Very High Risk Area									
132	Malali	132	Malali	Very High Risk Area									
133	Mudhol(Rural)	133	Mudhol(Rural)	Moderate Risk Area									
134	Belagali	134	Belagali	Moderate Risk Area									
135	Bhantnur	135	Bhantnur	Moderate Risk Area									
136	Hebbal	136	Hebbal	Very High Risk Area									
137	Chitabanukoti	137	Chitabanukoti	Moderate Risk Area									
138	Timmapur	138	Timmapur	Moderate Risk Area									
139	Pettur	139	Pettur	Moderate Risk Area									
140	Chikkur	140	Chikkur	Moderate Risk Area									
141	Badnur	141	Badnur	Moderate Risk Area									
142	Junnur	142	Junnur	Very High Risk Area									
143	Muddapur	143	Muddapur	Moderate Risk Area									
144	Kasba Jambgi(B.K)	144	Kasba Jambgi(B.K)	Very High Risk Area									
145	Budni Khurd	145	Budni Khurd	Very High Risk Area									
146	Antapur	146	Antapur	Moderate Risk Area									
147	Baragi	147	Baragi	Very High Risk Area									
148	Bidri	148	Bidri	Moderate Risk Area									
149	Machaknur	149	Machaknur	Moderate Risk Area									
150	Budni (B.K.)	150	Budni (B.K.)	Very High Risk Area									
151	Alagundi(B.K)	151	Alagundi(B.K)	Very High Risk Area									
152	1501006017002	152	1501006017002	Moderate Risk Area									
153	Chinchakhandi(K.D)	153	Chinchakhandi(K.D)	Very High Risk Area									
154	Jambgi(K.D)	154	Jambgi(K.D)	Very High Risk Area									
155	Gulgal Jambagi	155	Gulgal Jambagi	Very High Risk Area									
156	Ingalagi	156	Ingalagi	Very High Risk Area									
157	Yadahalli	157	Yadahalli	Moderate Risk Area									
158	Vajaramatti	158	Vajaramatti	Moderate Risk Area									
159	Marapur	159	Marapur	Very High Risk Area									
160	Nandagoan	160	Nandagoan	Very High Risk Area									
161	Dhavaleshwar	161	Dhavaleshwar	Very High Risk Area									
162	Mahalingpur (TMC)	162	Mahalingpur (TMC)	Moderate Risk Area									
		6	Bilgi	13	Bilgi	65	Yadahalli	108	Amalzari	Moderate Risk Area			
						66	Kataraki	109	Lingapur(S.K)	Moderate Risk Area			
						67	Kundaragi	110	Kataraki	Very High Risk Area			
						68	Anagawadi	111	Shiraguppi	Moderate Risk Area			
						69	Budihal-Sh	112	Kundargi	Moderate Risk Area			
						70	Chikkalagundi	113	Venkatapura	Moderate Risk Area			
						71	Linganur	114	Anagawadi	Moderate Risk Area			
						72	Gulagal-Jambagi	115	Budhihal(S.H)	Moderate Risk Area			
						73	Uttur	116	Bavalatti	Moderate Risk Area			
						74	Vantigodi	117	Kovalli	Moderate Risk Area			
		7	Jamakhandi	14	Anagvadi	70	Chikkalagundi	118	Koppa(S.K)	Moderate Risk Area			
						71	Linganur	119	Algundi	Moderate Risk Area			
						72	Gulagal-Jambagi	120	Gani	Moderate Risk Area			
						73	Uttur	121	Rugi	Very High Risk Area			
						74	Vantigodi	122	Uttur	Moderate Risk Area			
						75	Mudhol (TMC)	123	Jaliber	Very High Risk Area			
						76	Nagaral	124	Ranjanagi	Very High Risk Area			
						77	Malali	125	Mallapur(P.J)	Moderate Risk Area			
						78	Mudhol(Rural)	126	Mirji	Moderate Risk Area			
						79	Bhantnur	127	Vantigodi	Very High Risk Area			
		8	Mudhol	15	Jamakhandi	71	Linganur	120	Gani	Moderate Risk Area			
						72	Gulagal-Jambagi	121	Rugi	Very High Risk Area			
						73	Uttur	122	Uttur	Moderate Risk Area			
						74	Vantigodi	123	Jaliber	Very High Risk Area			
						75	Mudhol (TMC)	124	Ranjanagi	Very High Risk Area			
						76	Nagaral	125	Mallapur(P.J)	Moderate Risk Area			
						77	Malali	126	Mirji	Moderate Risk Area			
						78	Mudhol(Rural)	127	Vantigodi	Very High Risk Area			
						79	Bhantnur	128	Channa	Moderate Risk Area			
						80	Hebbal	129	Mudhol (TMC)	Moderate Risk Area			
		9	Rabakavi Banahatti	16	Mudhol	72	Gulagal-Jambagi	130	Akkimara	Very High Risk Area			
						73	Uttur	131	Nagaral	Very High Risk Area			
						74	Vantigodi	132	Malali	Very High Risk Area			
						75	Mudhol (TMC)	133	Mudhol(Rural)	Moderate Risk Area			
						76	Nagaral	134	Belagali	Moderate Risk Area			
						77	Malali	135	Bhantnur	Moderate Risk Area			
						78	Mudhol(Rural)	136	Hebbal	Very High Risk Area			
						79	Bhantnur	137	Chitabanukoti	Moderate Risk Area			
						80	Hebbal	138	Timmapur	Moderate Risk Area			
						81	Bhantnur	139	Pettur	Moderate Risk Area			
		9	Rabakavi Banahatti	17	Lokapur	73	Uttur	140	Chikkur	Moderate Risk Area			
						74	Vantigodi	141	Badnur	Moderate Risk Area			
						75	Mudhol (TMC)	142	Junnur	Very High Risk Area			
						76	Nagaral	143	Muddapur	Moderate Risk Area			
						77	Malali	144	Kasba Jambgi(B.K)	Very High Risk Area			
						78	Mudhol(Rural)	145	Budni Khurd	Very High Risk Area			
						79	Bhantnur	146	Antapur	Moderate Risk Area			
						80	Hebbal	147	Baragi	Very High Risk Area			
						81	Bhantnur	148	Bidri	Moderate Risk Area			
						82	Kasaba-Jambagi	149	Machaknur	Moderate Risk Area			
		9	Rabakavi Banahatti	18	Mudhol	73	Uttur	150	Budni (B.K.)	Very High Risk Area			
						74	Vantigodi	151	Alagundi(B.K)	Very High Risk Area			
						75	Mudhol (TMC)	152	1501006017002	Moderate Risk Area			
						76	Nagaral	153	Chinchakhandi(K.D)	Very High Risk Area			
						77	Malali	154	Jambgi(K.D)	Very High Risk Area			
						78	Mudhol(Rural)	155	Gulgal Jambagi	Very High Risk Area			
						79	Bhantnur	156	Ingalagi	Very High Risk Area			
						80	Hebbal	157	Yadahalli	Moderate Risk Area			
						81	Bhantnur	158	Vajaramatti	Moderate Risk Area			
						82	Kasaba-Jambagi	159	Marapur	Very High Risk Area			

1.3.3 Malaprabha Sub-basin -K4:

Malaprabha sub basin is a right bank tributary of Krishna River. The Malaprabha catchment lies between North latitudes 15° 00' and 16° 12' and east longitudes 74° 14' and 76° 05'. The Malaprabha River originates from the Chorla Ghats, a section of the Western Ghats, at an elevation of about 792m about 35m south-west of Belgaum District of Karnataka. The river flows east and north-west and joins Krishna at Kapila Sangam in the Bijapur District at an elevation of about 488 m. Malaprabha traverses a length of 306 km before meeting the Krishna River.

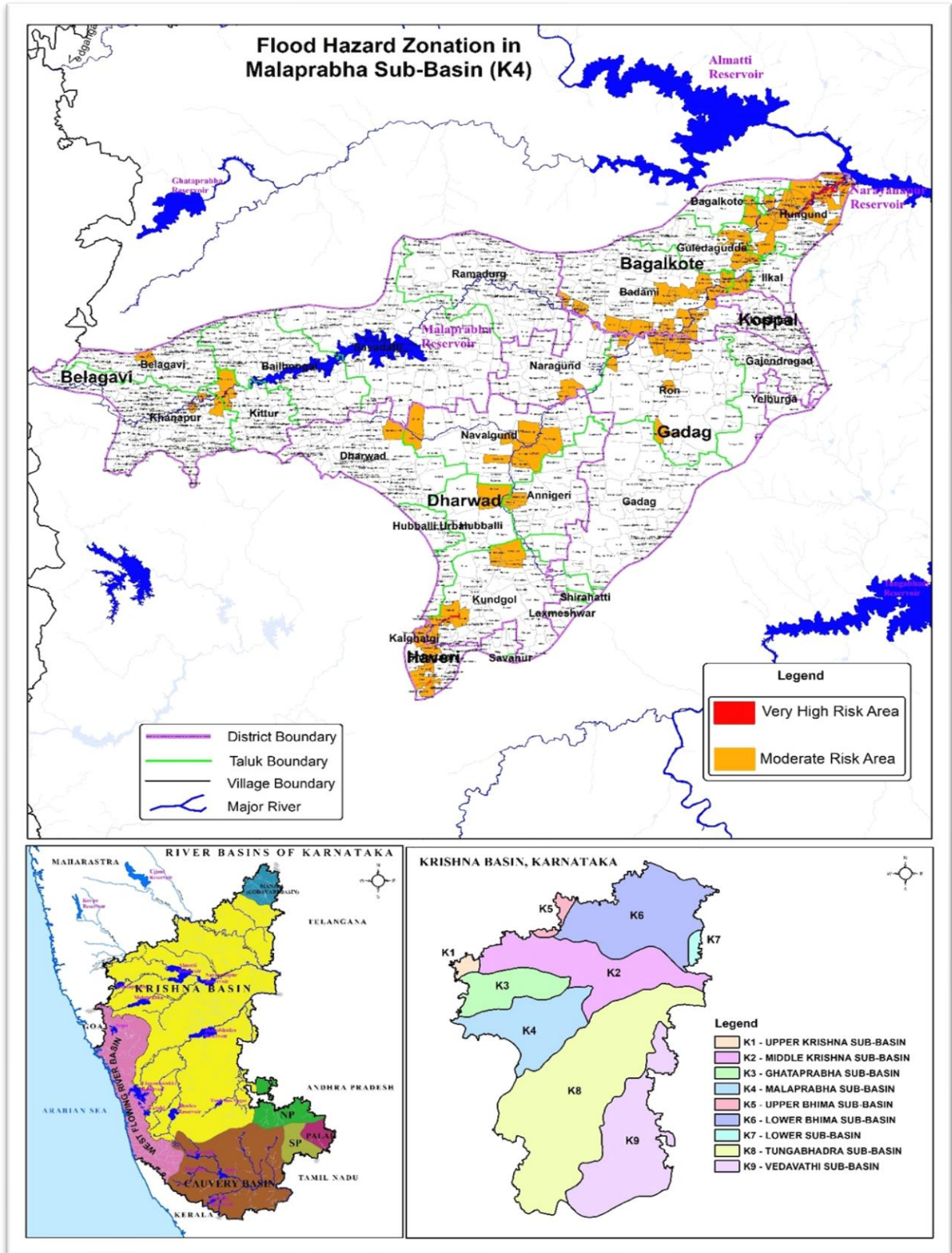
The Bennihala and the Hirehalla are the principal tributaries of the river Malaprabha. The total catchment area of the Malaprabha including its tributaries is 11,549 sq. km, which lies wholly in the State of Karnataka. It flows for a distance of 304 km and joins the Krishna river at an altitude of 488 meters near Kudal Sangama in Bagalkot district in Karnataka. It also flows through Dharwar District. Hubli city gets the drinking water from this reservoir. The Naviluteertha Dam is constructed near Munavalli in Belgaum District with a storage capacity of 1.07 km³. It irrigates more than 2,000 square kilometres of land. This reservoir is called Renukasagar.

The flood situation is commonly noticed in main tributaries of Bennihalla and Hirehalla during the southwest monsoon season due to heavy to very heavy rainfall associated with release of water from the upper basins of Krishna basin and also the storage of Alamatti reservoir and Narayanapura reservoir at full capacity create back water inundation of villages all along the basin of Malaprabha.

From the flood hazard zonation map its depicted that the Malaprabha sub basin lies districts Bagalakote, Dharwad, Gadag, Haveri and Belagavi districts. Bagalakote district is most vulnerable district compare to other districts. In Malaprabha sub basin its identified that 8 villages are high risk and about 114 villages are under moderate risk its shown in the **Map-5**.

Malaprabha Sub-basin -K4: Flood Prone Districts

Sl.No.	District Name	No. of Taluks	No. of Hoblis	No. of Gram Panchayats	No. of Villages		Total Villages
					Very High Risk	Moderate Risk	
1	Belagavi	3	3	7	—	9	9
2	Bagalkote	3	6	31	8	55	63
3	Gadag	2	5	12	—	16	16
4	Haveri	1	1	5	—	9	9
5	Dharwad	5	6	16	—	25	25
Total		14	21	71	8	114	122



Map-5 Malaprabha Sub basin -K4

Table – List of Flood Prone Villages in Malprabha Sub-basin -K4

Malaprabha Sub-Basin (K4)												
List of Flood Hazard Risk Villages												
Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class		
1	2	3	4	5	6	7	8	9	10	11		
1	Belagavi	1	Belagavi	1	Belagavi	1	Yallur	1	Yellur (CT)	Moderate Risk Area		
		2	Khanapur	2	Khanapur	1	Kodachawad	2	Kagganagi	Moderate Risk Area		
						3	Chikadinkop	3	Chikadinkop	Moderate Risk Area		
						2	Itagi	4	Itagi	Moderate Risk Area		
		3	Kittur	3	Kittur	3	Hirehattiholi	5	Hire-Hattiholi	5	Hire-Hattiholi	Moderate Risk Area
						4	Devarashighalli	6	Marganakoppa	6	Marganakoppa	Moderate Risk Area
						5	Dastikoppa	7	Veerapur	7	Veerapur	Moderate Risk Area
								8	Dastikoppa	8	Dastikoppa	Moderate Risk Area
						6	M.K.Hubli	9	M.K.Hubli	9	M.K.Hubli	Moderate Risk Area
2	Bagalkote					4	Badami	4	Badami	7	Kataraki	10
		11	Jakanur	Moderate Risk Area								
		12	Neeralagi	Moderate Risk Area								
		13	Katharaki	Moderate Risk Area								
		14	Thaminal	Moderate Risk Area								
		15	Chikkanasabi	Moderate Risk Area								
		8	Beloor	16	Dhanakashirur					16	Dhanakashirur	Moderate Risk Area
		9	Cholachagudd	17	Cholachagudda					17	Cholachagudda	Moderate Risk Area
		10	Mangalur	18	Hirenasabi					18	Hirenasabi	Moderate Risk Area
				19	Mangalur					19	Mangalur	Moderate Risk Area
				20	Gonal					20	Gonal	Moderate Risk Area
				21	Shirabadagi					21	Shirabadagi	Moderate Risk Area
				11	Badami (TMC)					22	Badami (TMC)	22
		12	Nandikeshwar	23	Nelwagi					23	Nelwagi	Moderate Risk Area
		13	Badami (Rural) *	24	Badami (Rural) *			24	Badami (Rural) *	Moderate Risk Area		
		14	Nandikeshwar	25	Nandikeshwar			25	Nandikeshwar	Moderate Risk Area		
		15	Pattadakall	26	Bachinagudd			26	Bachinagudd	Moderate Risk Area		
				27	Pattadakall			27	Pattadakall	Moderate Risk Area		
				16	Hebballi			28	Hebballi	28	Hebballi	Moderate Risk Area
29	Mumaraddikoppa					29	Mumaraddikoppa	Moderate Risk Area				
17	Kittali			30	Sulla	30	Sulla	Moderate Risk Area				
		31	Kittali	31	Kittali	Moderate Risk Area						
		18	Alur-Sk	32	Beeranur	32	Beeranur	Moderate Risk Area				
33	Talakawad			33	Talakawad	Moderate Risk Area						
34	Alur .S.K.			34	Alur .S.K.	Moderate Risk Area						
19	Kakanur	35	Karalakoppa	35	Karalakoppa	Moderate Risk Area						

Malaprabha Sub-Basin (K4)												
List of Flood Hazard Risk Villages												
Dist. Sl.No.	District Name	Taluk Sl.No.	Taluk Name	Hobli Sl.No.	Hobli Name	GP Sl.No.	Gram Panchayat Name	Sl.No.	Village Name	Flood Hazard Class		
1	2	3	4	5	6	7	8	9	10	11		
		5	Hungund	6	Hungund	20	Chittaragi	36	Chittaragi	Very High Risk Area		
						21	Hiremalagavi	37	Chickmagi	Moderate Risk Area		
						38	Khairwadgi	Moderate Risk Area				
						39	Chickmalagavi	Very High Risk Area				
						40	Belgal	Very High Risk Area				
						41	Medinapur	Very High Risk Area				
						42	Huvanur	Very High Risk Area				
						23	Hiremalagavi	43	Hiremalagavi	Moderate Risk Area		
						24	Dhannur	44	Iddalgi	Moderate Risk Area		
						25	Ganjihal	45	Nandanoor	Very High Risk Area		
						46	Ganjihal	Very High Risk Area				
						26	Kudalasangam	47	Sangam	Very High Risk Area		
						27	Bisaladinni	48	Chowdakamaladinni	Moderate Risk Area		
						7	Amingarh	8	Karadi	28	Ihole	49
				50	Aiahole					Moderate Risk Area		
				29	Huvinahalli			51	Ramathal	Moderate Risk Area		
				30	Hiremagi			52	Hiremagi	Moderate Risk Area		
								53	Bevinal	Moderate Risk Area		
				54	Budihal (Inam)			Moderate Risk Area				
				31	Kamatgi (CT)			55	Kamatgi (CT)	Moderate Risk Area		
				32	Muganur			56	Kadiwal Kallapur	Moderate Risk Area		
								57	Suralikal	Moderate Risk Area		
								58	Basawanal	Moderate Risk Area		
								59	Basarikatti	Moderate Risk Area		
								60	Budihal (S.K.)	Moderate Risk Area		
				6	Guledagudda			9	Guledagudda	33	Dhannur	61
						34	Mangalagudda			62	Katapur	Moderate Risk Area
		63	Mangalagudda							Moderate Risk Area		
		64	Chimmalagi							Moderate Risk Area		
		35	Layadagundi			65	Kataginahalli			Moderate Risk Area		
						66	Layadagundi			Moderate Risk Area		
						67	Kotnalli			Moderate Risk Area		
						68	Asangi			Moderate Risk Area		
		36	Nagaral-S.P			69	Subbalahunashi			Moderate Risk Area		
		37	Haladur			70	Allur. S.P.			Moderate Risk Area		
				71	Haradolli	Moderate Risk Area						
				72	Haladur	Moderate Risk Area						

Sub Basin wise Flood prone Districts

Sub Basin	Sl. No.	District Name	No. of Taluks	No. of Hoblis	No. of Gram Panchayats	No. of Villages		Total Villages
						Very High Risk	Moderate Risk	
Upper Krishna - K1	1	Belagavi	2	3	26	16	19	35
Middle Krishna - K2	1	Koppal	1	1	1	—	1	1
	2	Raichur	3	8	23	49	11	60

Sub Basin	Sl. No.	District Name	No. of Taluqs	No. of Hoblis	No. of Grams	No. of Villages		Total Villages
	3	Belagavi	4	7	48	51	14	65
	4	Bagalkote	5	7	32	34	25	59
	5	Vijayapura	7	9	32	19	33	52
	6	Yadgir	4	7	14	31	5	36
	Total		24	39	150	184	89	273
Ghataprabhs - K3	1	Belagavi	4	11	56	20	72	92
	2	Bagalkote	5	7	36	25	45	70
	Total		9	18	92	45	117	162
Mallaprabha - K4	1	Belagavi	3	3	7	—	9	9
	2	Bagalkote	3	6	31	8	55	63
	3	Gadag	2	5	12	—	16	16
	4	Haveri	1	1	5	—	9	9
	5	Dharwad	5	6	16	—	25	25
	Total		14	21	71	8	114	122
Upper Bhima - K5	1	Belagavi	2	2	7	2	13	15
Lower Bhima - K6	1	Kalaburagi	11	31	134	89	149	238
	2	Bidar	2	3	4	—	7	7
	3	Vijayapura	4	5	16	16	13	29
	4	Yadgir	3	6	10	7	11	18
	Total		20	45	164	112	180	292
Tunjabadra - K8	1	Davangere	7	6	46	57	30	87
	2	Ballari	6	13	33	29	24	53
	3	Koppal	3	6	19	6	21	27
	4	Raichur	4	13	35	38	39	77
	5	Gadag	2	2	6	10	—	10
	6	Haveri	5	10	87	62	105	167
	7	Shivamogga	6	24	74	65	75	140
	8	Chikkamagaluru	2	2	3	1	2	3
	9	Uttara Kannada	3	4	11	10	20	30
	Total		38	80	314	278	316	594
Vedavati - K9	1	Ballari	1	2	6	1	11	12
Cauvery Basin	1	Chamarajanagara	2	3	7	4	7	11
	2	Mysuru	5	12	34	30	35	65
	3	Mandya	1	1	2	1	2	3
	4	Hassan	2	5	13	16	12	28
	5	Chikkamagaluru	1	2	4	—	11	11

Sub Basin	Sl. No.	District Name	No. of Tehsils	No. of Blocks	No. of Grams	No. of Villages		Total Villages
	6	Kodagu	1	1	3	3	3	6
	Total		12	24	63	54	70	124
West Flowing River	1	Shivamogga	1	2	2	1	1	2
	2	Dakshina Kannada	2	4	11	7	7	14
	3	Udupi	4	5	17	19	3	22
	4	Uttara Kannada	5	14	38	33	25	58
	Total		12	25	68	60	36	96

References:

- [1]. Izinyon O, Ehiorobo J (2011) Measurements and documentation for flood and erosion monitoring and control in the Niger Delta states of Nigeria, American-Eurasian Journal of Sustainable Agriculture 2: 117-124.
- [2]. Jeb DN, Aggarwal SP (2008) Flood Inundation Hazard Modeling of the River Kaduna Using Remote Sensing and Geographic Information Systems, Journal of Applied Science Research 4: 1822-1833.
- [3]. Demessie OA (2007) Assessment of flood risk, in Dire Dawa Town, Eastern Ethiopia, using GIS. [M. Sc Thesis]. School of Graduate Studies, Addis Ababa University Ethiopia.
- [4]. Bikram Manandhar, Mohan Krishna Balla, Ripendra Awal, Biswombher Man Pradhan (2010) Flood Plain Analysis and Risk Assessment of Lothar Khola, Unpublished M.Sc. Thesis. Tribhuvan University, Institute of Forestry, Pokhara Nepal.
- [5]. Hyogo Framework for Future (2005) Hyogo Framework for Action (2015) Building the Resilience of Nations and Communities to Disasters, Report of the World Conference on Disaster Reduction, Kobe, Hyogo Japan 25. <https://www.undrr.org/publication/hyogo-framework-action-2005-2015-building-resilience-nations-and-communities-disasters>
- [6]. Vanghani V (2005) Flood Impact Analysis using GIS: A case study of Lake Roxen and Lake Glan-Sweden [http://www. diva-portal.org/smash/get/diva2:20556/FULLTEXT01.pdf](http://www.diva-portal.org/smash/get/diva2:20556/FULLTEXT01.pdf).
- [7]. Ishaya S, Ifatimehin O O, Abaje IB (2009) Mapping Flood Vulnerability Areas in developing urban centres of Nigeria, Journal of Sustainable Development in Africa 11: 180-190.
- [8]. Mmom PC, Akpi A (2014) Spatial analysis of flood vulnerability levels in Sagbama Local Government Area using Geographic Information Systems (GIS). Int. Journal of Research in Environmental Studies 1: 1-8.
- [9]. Wizer CH, Week D A (2014) Impact of 2012 Nigeria on Emergent Cities of Nigeria: The Case of Yenagoa, Nigeria. Journal of Civil and Environmental Research 6: 31-34.
- [10]. Berezi OK, Eludoyin OS, Akpokodje EG, Obafemi AA (2015) Flood Vulnerability Prediction in Kolokuma/Opokuma LGA, Bayelsa State, Nigeria using Geographic Information System (GIS). The Nigerian Journal of Cartography and GIS 10: 86-102.
- [11]. Berezi OK, Obafemi AA, Nwankwoala HO (2019a) Flood Vulnerability Assessment of Communities in the Flood Prone Areas of Bayelsa State, Nigeria. International Journal of Geology & Earth Sciences 5: 19-36.
- [12]. Berezi OK, Obafemi AA, Nwankwoala HO (2019b) Public Perception of Communities towards Flood Vulnerability and Resilience in Bayelsa State, Nigeria. International Journal of Ecology & Environmental Sciences 1: 08-20.
- [13]. National Population Commission [NPC] (2006) 2006 Housing and population census result: Bayelsa State. National population Office Yenagoa. file:///C:/Users/SLV/Downloads/Vol1%2003%20Table%20DSx%20LGAPop%20by%20SDistrict-PDF%20(1).pdf
- [14]. Nigeria Bureau of Statistics [NBC] (2010) Annual Abstract of Statistics, 2010. 611P [https://ghdx.healthdata.org/record/ nigeria-annual-abstract-statistics-2010](https://ghdx.healthdata.org/record/nigeria-annual-abstract-statistics-2010).
- [15]. Osuiwu BO, Ologunorisa TE (1999) "Weather and Climate", In C.U. Oyegun, & A. Adeyemo (Ed): Port Harcourt Region, Paragraphics Port Harcourt.
- [16]. Alagoa EJ (2013) The Land and People of Bayelsa State: Central Niger Delta. Onyoma Research Publications, Port Harcourt 9-57.
- [17]. Akpokodje EG (1987) The Engineering-Geological characteristics and classification of the major superficial soils of the Niger Delta. Eng. Geol 23:193-211.
- [18]. Etu-Efeotor JO, Akpokodje EG (1990) Aquifers systems of the Niger Delta. Journal of Mining & Geol 26: 279-284.
- [19]. Allen JRL (1965) Coastal geomorphology of eastern Nigeria beach ridges barrier islands and vegetated tidal flats. Geol. Mijabonw 44:1-21.
- [20]. ILACO-NEDECO (1996) Report on the Soil investigation in the Niger Delta Special Area, Port Harcourt, Niger Board, (GAS.) <https://scirp.org/reference/referencespapers.aspx?referenceid=1433200>.