

**RAINFALL, AGRICULTURAL SITUATION, SATELLITE BASED CROP
ASSESSMENT, MOISTURE INDEX, ARIDITY INDEX ANOMALY,
RESERVOIR LEVELS, MINOR IRRIGATION, GROUNDWATER LEVELS,
SEISMIC ACTIVITY, ASSESSMENT OF FLOODS & DROUGHT
IN KARNATAKA – 2021**

1. ANNUAL RAINFALL

1.1. Introduction :

The State receives an Annual normal rainfall of **1153 mm** out of which the **Pre-Monsoon season** contributes about **10%**, the **South-West Monsoon** season contributes about **74%** and the **North-East Monsoon** season contributes to about **16%**. The spatial and temporal distribution of rainfall varies significantly across the State, i.e., from West to East. **Udupi District** which lies in the extreme western part of the State receives maximum annual rainfall of **4,535 mm** and **Chitradurga District** which lies in the eastern part of the State receives minimum annual rainfall of **540 mm**.

During 2021, the State as a whole recorded **1301 mm** of rainfall as against the Normal Annual rainfall of **1153 mm** with a departure from Normal being (+) **13%**. Thus the Annual rainfall over the State during 2021 is considered as **Normal**.

During the **Pre-Monsoon season 2021**, the State has recorded **207 mm** of rainfall as against the Normal rainfall of **120 mm** showing **(74)%** departure from Normal. Therefore, the Pre-Monsoon rainfall is considered as **Normal** in the State. Among the **31** Districts, **30** Districts recorded **Normal to Large Excess** rainfall and **1** District recorded **Deficit** rainfall.

During the **South-West Monsoon season 2021**, the State has recorded **787 mm** of rainfall as against the Normal rainfall of **852 mm** showing **(-) 8%** departure from Normal. Thus, the South-West Monsoon rainfall is considered as **Normal** in the State. Among the **31** Districts, **28** Districts recorded **Normal to Excess** rainfall and **3** Districts recorded **Deficit** rainfall.

During the **North-East Monsoon season 2021**, the State has recorded **342 mm** of rainfall as against the Normal rainfall of **182 mm** showing **(+) 88%** departure from Normal. Thus, the North-East Monsoon rainfall is considered as **Normal** in the State. Among the **31** Districts, **28** Districts recorded **Normal to Large Excess** rainfall and **3** Districts recorded **Deficit** rainfall.

The report provides the details on rainfall distribution pattern, agriculture status, Status of Reservoir levels, Groundwater levels & fluctuations, Seismic activity in the State and the response of the Government to the Flood & Drought condition in the State.

1.2 Annual Rainfall in the State during 2021

During 2021, the State received a total rainfall of **1,337 mm** (Avg. Wt %) out of which the **Pre-Monsoon season** contributed **15% (207 mm)**, the **South-West Monsoon** season contributed **59% (787 mm)** and the **North-East Monsoon** season contributed **26% (342 mm)** to the Annual rainfall of the State.

Rainfall distribution during different seasons of 2021 in different met divisions of the State is as below:

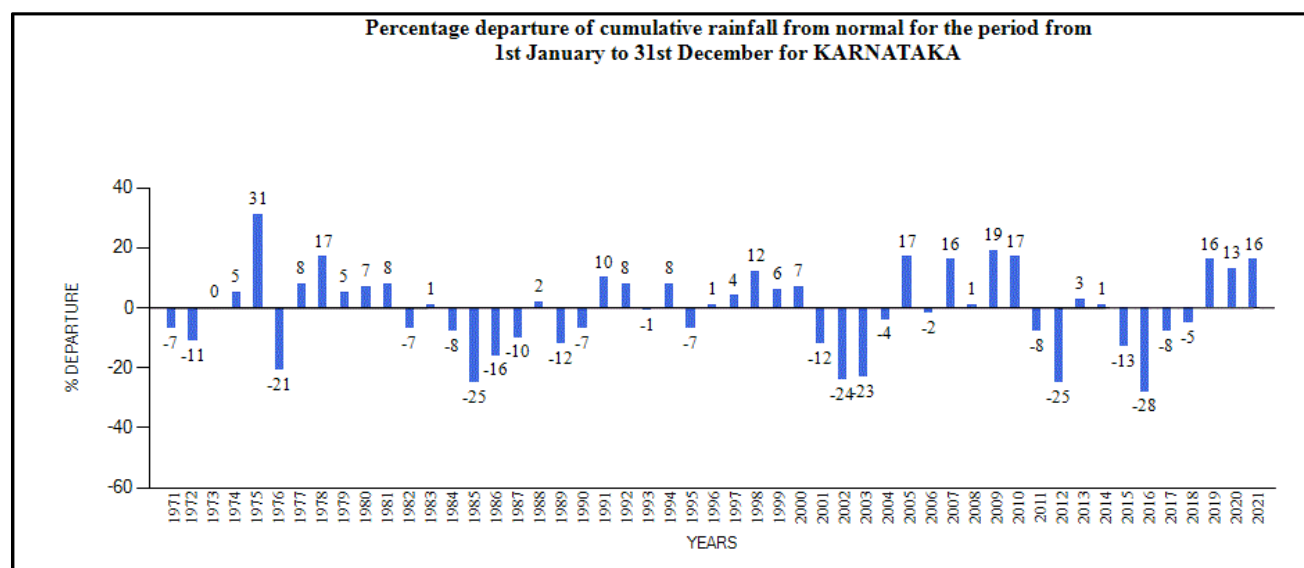
Region/ State	Pre-Monsoon			South-West			North -East			Annual		
	Normal (mm)	Actual (mm)	Dep (%)	Normal (mm)	Actual (mm)	Dep (%)	Normal (mm)	Actual (mm)	Dep (%)	Normal (mm)	Actual (mm)	Dep (%)
1.SIK	143.3	180.7	26	368.8	384.6	4	202	485	140	714	1050	47
2.NIK	83.2	121.5	46	478.6	496.2	4	140	163	17	702	780	11
3.MALNAD	167.5	338.2	102	1556.3	1283.6	-18	226	478	112	1950	2100	8
4.COASTAL	158.2	514.7	225	3100.7	2692.0	-13	259	577	122	3518	3784	8
STATE	120	207	74	852	787	-8	182	342	88	1153	1337	16

The comparison of Zone-wise rainfall pattern during 2021 with the rainfall of the last 4 years is as follows:

Region/State	Normal (mm)	2017		2018		2019		2020		2021	
		Actual (mm)	Dep (%)	Actual (mm)	Dep (%)	Actual (mm)	Dep (%)	Actual (mm)	Dep (%)	Actual (mm)	Dep (%)
SIK	714	888	24	687	-4	828	16	869	22	1050	47
2.NIK	702	641	-9	469	-33	746	6	882	26	780	11
3.MALNAD	1950	1541	-21	2303	18	2302	18	1827	-6	2100	8
4.COASTAL	3518	2924	-17	3603	2	4359	24	3936	12	3784	8
State	1153	1063	-8	1094	-5	1337	16	1307	13	1337	16

The percentage departure of rainfall from Normal during 2021 is (+) **16%** which is **better** when compared to the rainfall of the last 4 years.

The percentage departure of Annual rainfall from Normal for the State as a whole since 1971 is given in the following Figure 1.1:



The above figure shows that the percentage departure of Annual rainfall for the State since 1971. The Rainfall recorded during 2021 is (+) **16%** which is **more** than the corresponding period of the last year.

District wise rainfall pattern during the Year 2021 is given in the following Table.

Sl. No.	District	Normal (mm)	Actual (mm)	Departure (%)
1	Kolar	735	1316	79
2	Chikkaballapura	736	1269	73
3	Tumakuru	669	1109	66
4	Chitradurga	540	872	61
5	Bengaluru Rural	798	1256	57
6	Davanagere	659	987	50
7	Mandya	699	1011	45
8	Bengaluru Urban	846	1128	33
9	Ramanagara	840	1087	29
10	Haveri	800	1013	27
11	Dharwad	787	965	23
12	Kalaburagi	770	943	22
13	Vijayanagar	643	772	20
14	Hassan	1142	1363	19
15	Belagavi	826	983	19
16	Chamarajanagara	787	906	15
17	Ballari	599	684	14
18	Mysuru	837	955	14
19	Uttara Kannada	2936	3346	14
20	Chikkamagaluru	1833	2070	13
21	Gadag	624	678	9
22	Bidar	838	907	8
23	Udupi	4535	4797	6
24	Shivamogga	2325	2444	5
25	Koppala	614	640	4
26	Vijayapura	591	587	-1
27	Dakshina Kannada	4006	3963	-1
28	Kodagu	2729	2656	-3
29	Raichur	654	624	-5
30	Bagalkote	582	550	-6
31	Yadgir	719	669	-7
	STATE	1153	1337	16

Large Excess (>=60%)	4 Districts
Excess (+20 to +59%)	9 Districts
Normal (-19 to +19%)	18 Districts
Deficient (-20 to -59%)	Nil
Large Deficient (-60 to -99%)	Nil
No rain (<=-100%)	Nil

During the preceding year (2020) the Annual rainfall was **Excess** in **18** Districts and **Normal** in **12** Districts.

Taluk wise Annual Rainfall pattern of 2021 is given in the following table (**Total 227 Taluks in the State**):

Large Excess ($\geq 60\%$)	20 Taluks
Excess (+20 to +59%)	95 Taluks
Normal (-19 to +19%)	110 Taluks
Deficient (-20 to -59%)	2 Taluks
Large Deficient (-60 to -99%)	Nil
No rain ($\leq -100\%$)	Nil

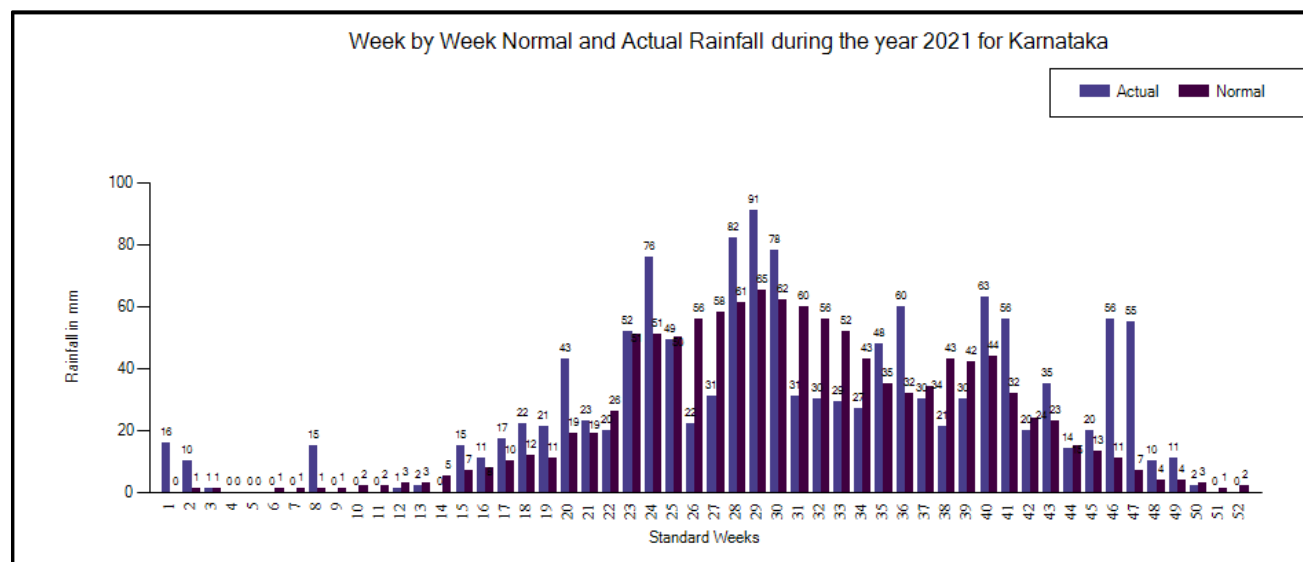
During the preceding year (2020) the Annual rainfall was **Large Excess** in **5** Taluks, **Excess** in **106** Taluks, **Normal** in **115** Taluks and **Deficit** in **1** Taluk.

Hobli wise Rainfall pattern during 2021 is given in the following table (**Total 850 Hoblis in the State**):

Large Excess ($\geq 60\%$)	132 Hoblis
Excess (+20 to +59%)	320 Hoblis
Normal (-19 to +19%)	373 Hoblis
Deficient (-20 to -59%)	24 Hoblis
Large Deficient (-60 to -99%)	1 Hobli
No rain ($\leq -100\%$)	Nil

During the preceding year (2020) the annual rainfall **Large Excess** in **29** Hoblis, **Excess** in **439** Hoblis, **Normal** in **352** Hoblis and **Deficit** in **30** Hoblis.

Weekly Rainfall pattern for the State during 2021 is given in the following Figure 1.2.



1.3 Rainfall in 4 meteorological sub-Divisions of the State during 2021.

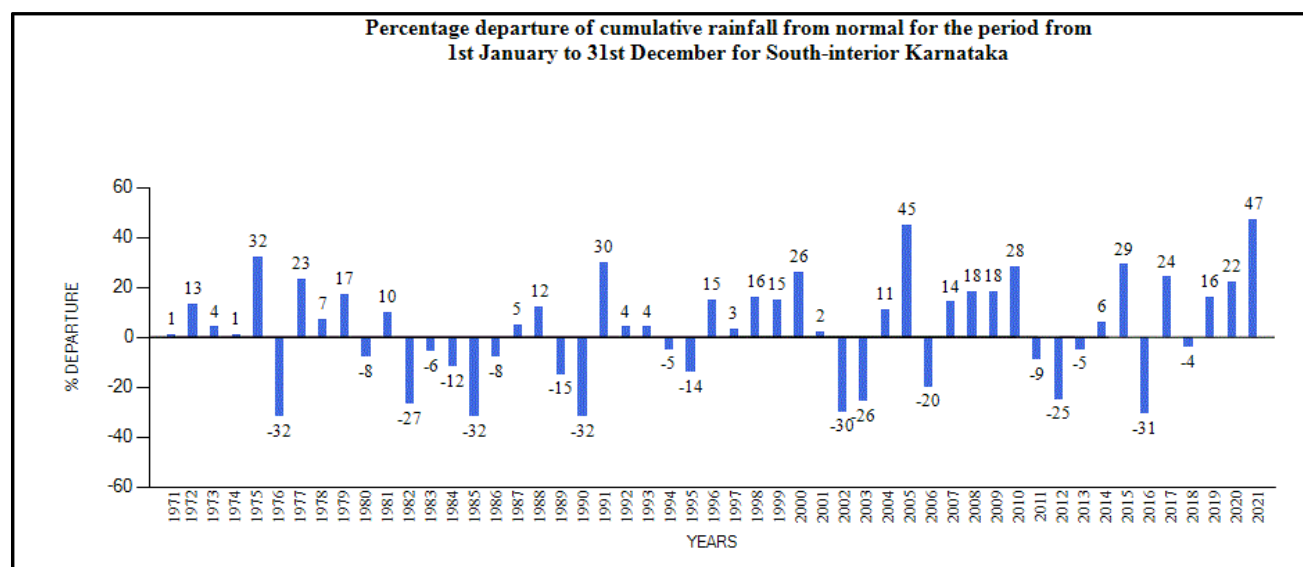
1.3.1 South-Interior Karnataka (SIK):

During 2021, the Annual rainfall was **Large Excess** in **Chitradurga, Chikkaballapura, Kolar, and Tumakuru** Districts, **Excess** in **Bengaluru Rural, Bengaluru Urban, Davanagere, Mandya and Ramanagara** Districts and **Normal** in **Chamarajanagara and Mysuru** Districts. During the preceding year (2020), the Annual rainfall was **Excess** in **7** Districts and **Normal** in **4** Districts.

Among the **67** Taluks in **SIK**, the Annual rainfall was **Large Excess** in **15** Taluks, **Excess** in **39** Taluks and **Normal** in **13** Taluks. During the preceding year (2020), the Annual rainfall was **Excess** in **26** Taluks, **Normal** in **40** Taluks and **Deficit** in **1** Taluk.

Among the **336** Hoblis in **SIK**, the Annual rainfall was **Large Excess** in **108** Hoblis, **Excess** in **166** Hoblis and **Normal** in **62** Hoblis. During the preceding year (2020), the Annual rainfall was **Large Excess** in **12** Hoblis, **Excess** in **178** Hoblis, **Normal** in **143** Hoblis and **Deficit** in **3** Hoblis.

The departure (%) of the Annual rainfall from Normal in South-Interior Karnataka since 1971 is given in the following Figure 1.3:



The figure shows that, during 2021, the **South-Interior Karnataka** recorded a rainfall **47% more** than the Normal which is **more** than the preceding year.

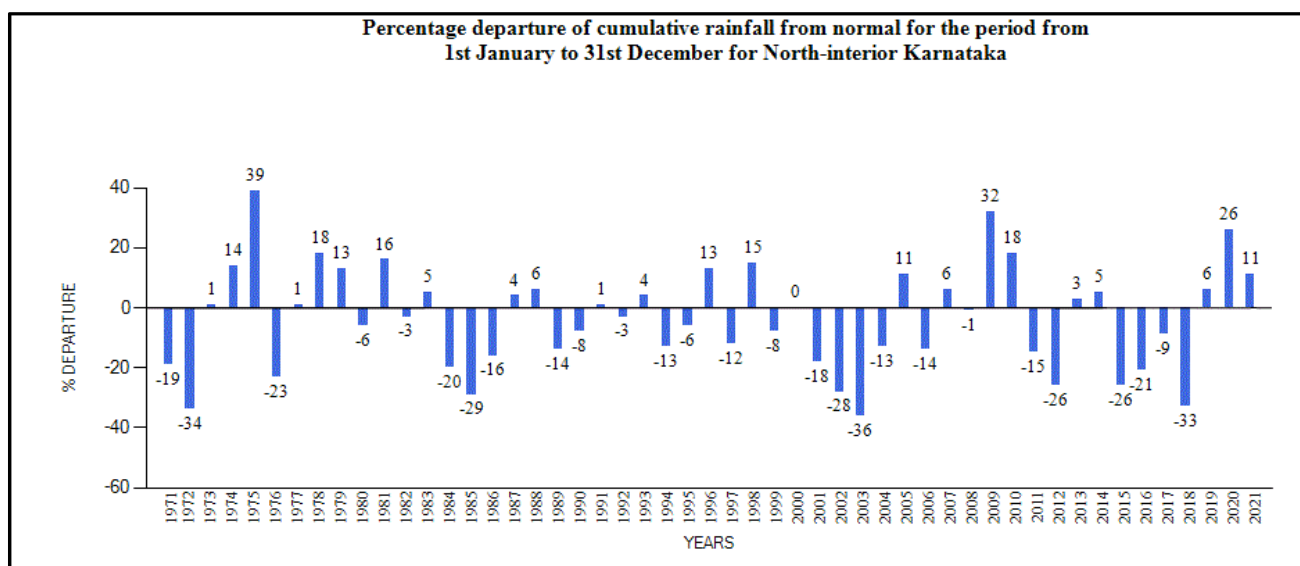
1.3.2 North-Interior Karnataka (NIK):

During 2021, the Annual rainfall was **Excess** in **Dharwad, Kalaburagi, Haveri and Vijayanagara** Districts, **Normal** in **Bagalkote, Ballari, Belagavi, Bidar, Gadag, Koppala, Raichur, Vijayapura and Yadgir** Districts and Districts. During the preceding year (2020), the Annual rainfall was **Normal** in **11** Districts and **Normal** in **2** Districts.

Among the **108** Taluks, the Annual rainfall was **Large Excess** in **1** Taluk, **Excess** in **36** Taluks , **Normal** in **69** Taluks and **Deficit** in **2** Taluks. During the preceding year (2020), the Annual rainfall was **Large Excess** in **4** Taluks, **Excess** in **64** Taluks and **Normal** in **40** Taluks.

Among the **316** Hoblis, the Annual rainfall was **Large Excess** in **5** Hoblis, **Excess** in **90** Hoblis, **Normal** in **205** Hoblis and **Deficit** in **16** Hoblis. During the preceding year (2020), the Annual rainfall was **Large Excess** in **14** Hoblis, **Excess** in **205** Hoblis, **Normal** in **93** Hoblis and **Deficit** in **4** Hoblis.

Percentage departure of the Annual rainfall from Normal in North-Interior Karnataka since 1971 is given in the following Figure 1.4:



The figure indicates that, during 2021, the **North-Interior Karnataka** recorded a rainfall **11% more** than the Normal which is **less** than the corresponding period from the last year.

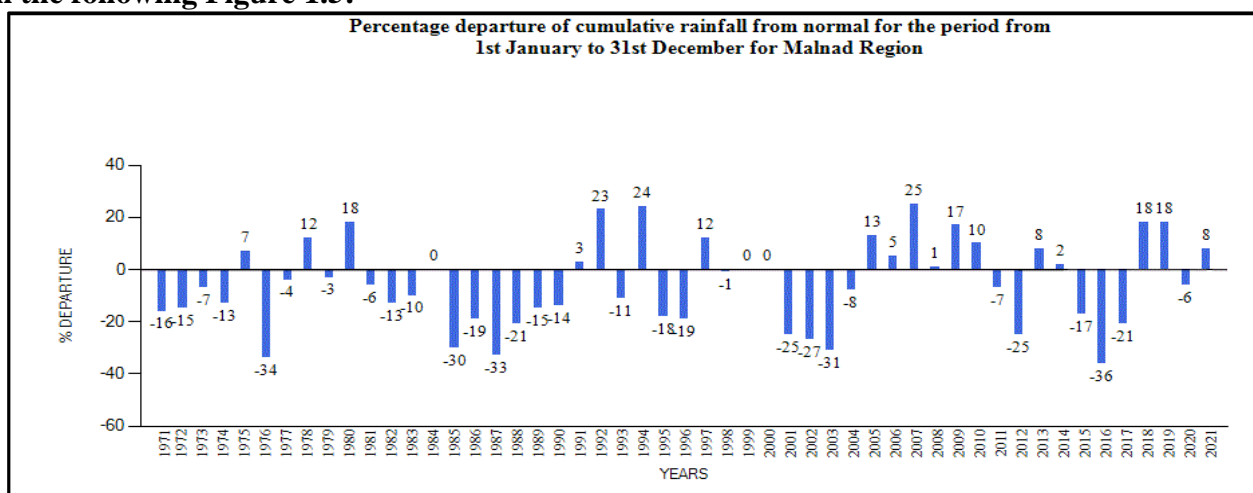
1.3.3 Malnad Region:

During 2021, the Annual rainfall was **Normal** in **Chikkamagaluru, Hassan, Kodagu** and **Shivamogga** Districts. During the preceding year (2020), the Annual rainfall was **Normal** in **4** Districts.

Among the **26** Taluks, the Annual rainfall was **Large Excess** in **4** Taluks, **Excess** in **12** Taluks and **Normal** in **10** Taluks. During the preceding year (2020), the Annual rainfall was **Large Excess** in **1** Taluk, **Excess** in **4** Taluks, **Normal** in **21** Taluks.

Among the **131** Hoblis, the Annual rainfall was **Large Excess** in **18** Hoblis, **Excess** in **52** Hoblis, **Normal** in **54** Hoblis, **Deficit** in **6** Hoblis and **Large Deficit** in **1** Hobli. During the preceding year (2020), the Annual rainfall was **Large Excess** in **1** Hobli, **Excess** in **28** Hoblis, **Normal** in **79** Hoblis and **Deficit** in **23** Hoblis.

Percentage departure of the Annual rainfall from Normal in Malnad Region since 1971 is given in the following Figure 1.5:



The Figure shows that, during 2021, the Malnad Region recorded a rainfall **8% more** than the Normal, which is **more** than the corresponding period from the **last** year.

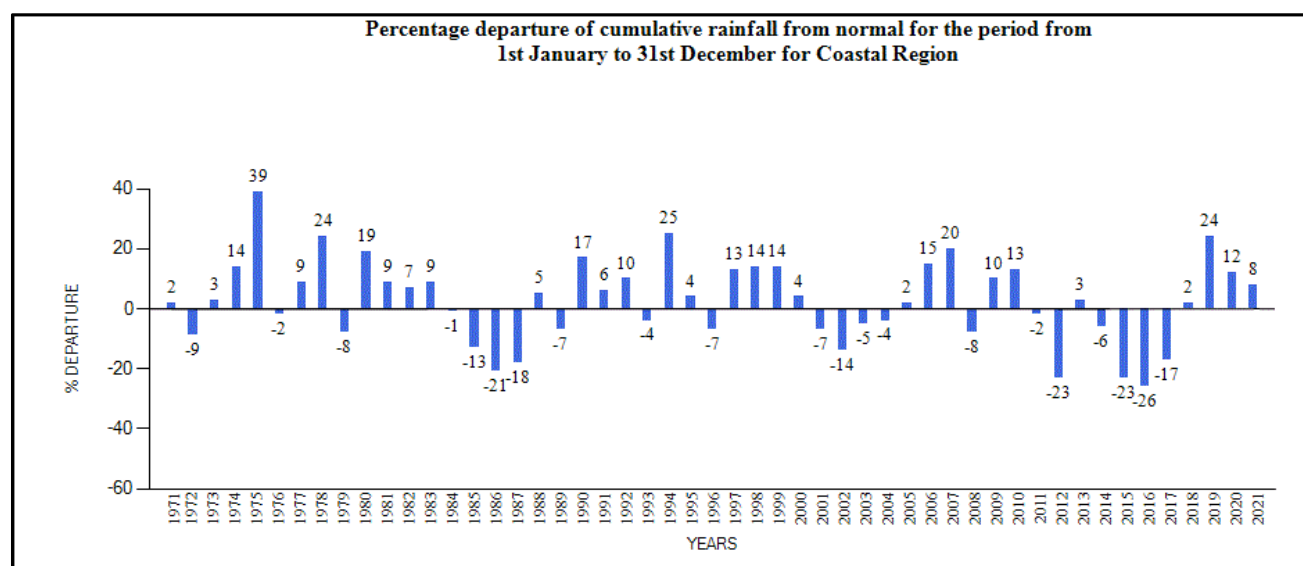
1.3.4 Coastal Region:

During 2021, the Annual rainfall was **Normal** in **Dakshina Kannada Udupi** and **Uttara Kannada** Districts. During the preceding year (2020), the Annual rainfall was **Excess** in **1** District and **Normal** in **2** Districts.

Among the **26** Taluks, the Annual rainfall was **Excess** in **8** Taluks and **Normal** in **18** Taluks. During the preceding year (2020), the Annual rainfall was **Excess** in **12** Taluks, **Normal** in **14** Taluks

Among the **67** Hoblis, the Annual rainfall was **Large Excess** in **1** Hobli, **Excess** in **12** Hoblis, **Normal** in **52** Hoblis and **Deficit** in **2** Hoblis. During the preceding year (2020), the Annual rainfall was **Large Excess** in **2** Hoblis, **Excess** in **28** Hoblis and **Normal** in **37** Hoblis.

Percentage departure of the Annual rainfall from Normal in Coastal Region since 1970 is given in the following Figure 1.6:



The figure shows that, during 2021, the **Coastal Region** recorded a rainfall **8% more** than the Normal and which is **less** than the corresponding period of the last year.

Number of Taluks falling under different Rainfall Categories during 2021 and 2020.

Division	Total No Taluks	Large Excess		Excess		Normal		Deficit		Large Deficient		No Rain	
		2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
1.SIK	67	15	0	39	26	13	40	0	1	0	0	0	0
2.NIK	108	1	4	36	64	69	40	2	0	0	0	0	0
3.MALNAD	26	4	1	12	4	10	21	0	0	0	0	0	0
4.COASTAL	26	0	0	8	12	18	14	0	0	0	0	0	0
State	227	20	5	95	106	110	115	2	1	0	0	0	0

Table: 1.1: Hobli/Taluk/District/Region rainfall Pattern in Karnataka State during 2021

Note: Weighted average rainfall is computed using Thiessen Polygon method and Departure calculated from Normal. The long period Normal rainfall data is available for Taluk headquarters stations. The Normal rainfall for other stations is estimated through interpolations.

LE : Large Excess (=>60%) E: Excess (20 to +59%) N: Normal (-19 to +19%) D: Deficient (-20 to -59%) D: Large Deficient (-60 to -99%) NR : No Rainfall (-100 %)).

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
BENGALURU URBAN	846	1128	33	E
Anekal	902	1036	15	N
Anekal_1	902	848	-6	N
Attibele_1	824	892	8	N
Jigani_1	845	1149	36	E
Sarjapura_1	748	1154	54	E
Anekal_2	881	956	9	N
Jigani_2	865	1121	30	E
Attibele_2	857	1131	32	E
Sarjapura_1	855	1088	27	E
Sarjapura_3	814	1053	29	E
Bengaluru North	1004	1158	15	N
Bengaluru North_1	1004	1207	20	E
Dasanapura_1	896	1159	29	E
Yashavantapura_1	819	1152	41	E
Bengaluru North_2	854	939	10	N
Yashavantapura_2	866	1286	49	E
Dasanapura_2	872	1023	17	N
Dasanapura_3	900	1031	15	N
Bengaluru South	820	1156	41	E
Beguru_3	820	1068	30	E
Kengeri_1	905	1205	33	E
Tavarekere_1	734	1150	57	E
Uttarahalli_4	905	1353	50	E
Uttarahalli_1	886	1018	15	N
Uttarahalli_2	872	1120	28	E
Uttarahalli_3	863	1307	51	E
Uttarahalli_5	941	1120	19	N
Beguru_1	912	1166	28	E
Beguru_2	875	1016	16	N
Kengeri_2	878	1219	39	E
Kengeri_3	860	1192	39	E
Kengeri_4	852	1509	77	LE
Tavarekere_2	961	906	-6	N
Tavarekere_3	871	1199	38	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Bengaluru East	815	1101	35	E
Mahadevpura_1	815	1059	30	E
Bidarahalli_2	828	1083	31	E
Varturu_1	818	1108	35	E
K R Pura_2	855	1094	28	E
K R Pura_3	827	1126	36	E
Varturu_2	881	1018	16	N
Bidarahalli_1	821	1036	26	E
Mahadevpura_2	882	1003	14	N
Marathahalli	891	1313	47	E
Bidharahalli_3	799	1196	50	E
Yelahanka	752	1212	61	LE
Yelahanka_1	752	1277	70	LE
Yelahanka_2	785	1079	37	E
Yelahanka_3	801	1166	46	E
Jala_1	760	1055	39	E
Jala_2	763	1214	59	E
Jala_3	781	1218	56	E
Hesarughatta_1	746	1186	59	E
Hesarughatta_2	781	1286	65	LE
BENGALURU RURAL	798	1256	57	E
Devanahalli	808	1226	52	E
Devanahalli	808	1261	56	E
Channarayapatna	796	1191	50	E
Kundana	786	1249	59	E
Vijayapura	787	1201	53	E
DODDABALLAPURA	799	1305	63	LE
Dodballapur	799	1272	59	E
Dodda Belavangala	792	1277	61	LE
Madure	812	1243	53	E
Sasalu	709	1326	87	LE
Tubagere	787	1392	77	LE
HOSAKOTE	857	1240	45	E
Hosakote	857	1023	19	N
Anugondhalli	731	1188	62	LE
Jadigenhalli	796	1368	72	LE
Nandagudi	777	1381	78	LE
Sulibele	803	1141	42	E
Nelamangala	954	1224	28	E
Nelamangala	954	1188	25	E
Sompura	794	1214	53	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Tyamagondal	877	1236	41	<i>E</i>
Nelamangala_2	891	1204	35	<i>E</i>
Sompura_2	827	1446	75	<i>LE</i>
Tyamagondal_2	870	1275	47	<i>E</i>
RAMANAGARA	840	1087	29	<i>E</i>
Channapatna	861	1052	22	<i>E</i>
Channapatna	861	1078	25	<i>E</i>
Maluru	843	1097	30	<i>E</i>
Virupakshipura	843	993	18	<i>N</i>
Kanakapura	797	1059	33	<i>E</i>
Kanakapura	797	1191	49	<i>E</i>
Dodda Maralavadi	828	1187	43	<i>E</i>
Harohalli	845	1168	38	<i>E</i>
Kodihalli	802	938	17	<i>N</i>
Satnuru	798	1055	32	<i>E</i>
Uyyamballi	792	901	14	<i>N</i>
Magadi	1000	1151	15	<i>N</i>
Magadi	1000	1185	19	<i>N</i>
Kuduru	841	1180	40	<i>E</i>
Madabal	968	1121	16	<i>N</i>
Solur	881	1207	37	<i>E</i>
Tippasanara	822	1017	24	<i>E</i>
Ramanagara	921	1106	20	<i>E</i>
Ramanagara_1	921	1072	16	<i>N</i>
Bidadi	865	1236	43	<i>E</i>
Kailancha	867	1053	21	<i>E</i>
Kutgallu	887	1065	20	<i>E</i>
Ramanagara_2	889	973	9	<i>N</i>
Kailancha_2	872	1010	16	<i>N</i>
KOLAR	735	1316	79	<i>LE</i>
Bangarapet	764	1194	56	<i>E</i>
Bangarapet	764	1225	60	<i>LE</i>
Budikote	687	1102	60	<i>LE</i>
Kamsandra	778	1265	63	<i>LE</i>
Robertsonpet	818	1233	51	<i>E</i>
Kolar	784	1396	78	<i>LE</i>
Kolar	784	1365	74	<i>LE</i>
Holuru	745	1312	76	<i>LE</i>
Huttur	768	1311	71	<i>LE</i>
Narasapura	753	1296	72	<i>LE</i>
Sugaturu	763	1462	92	<i>LE</i>

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Vakkaleri	738	1495	103	LE
Rajakallahalli Vemagal	758	1492	97	LE
Malur	798	1164	46	E
Malur	798	1243	56	E
Lakkur	529	1229	132	LE
Masathi	633	1095	73	LE
Tyakal	649	1057	63	LE
MULABAGILU	804	1343	67	LE
Mulbagal	804	1234	54	E
Avani	775	1455	88	LE
Bairakur	734	1322	80	LE
Duggasandra	753	1375	83	LE
Tayilur	708	1289	82	LE
Srinivasapura	758	1458	92	LE
Srinivasapura	758	1455	92	LE
Nelavanki	664	1966	196	LE
Ronuru	711	1257	77	LE
Royalpadu	639	1435	124	LE
Yelldur	710	1244	75	LE
K.G.F	890	1169	31	E
Betamangala	797	1126	41	E
Kyasamballi	785	1218	55	E
Robertsonpet	890	1146	29	E
CHIKKABALLAPURA	736	1269	73	LE
Bagepalli	695	1121	61	LE
Bagepalli	695	1132	63	LE
Chelur	706	1228	74	LE
Guluru	696	991	42	E
Mittermari	715	1184	66	LE
Pathapalya	701	1117	59	E
CHIKKABALLAPURA	828	1311	58	E
Chikballapura	828	1315	59	E
Mandikal	723	1299	80	LE
Nandi	808	1335	65	LE
Chintamani	787	1311	67	LE
Chintamani	787	1408	79	LE
Ambajidurga	768	1238	61	LE
Chilakalanerpu	722	1181	63	LE
Kaiwara	736	1356	84	LE
Munganahalli	730	1345	84	LE
Murugamale	749	1409	88	LE

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Gauribidanur	704	1331	89	LE
Gauribidanur	704	1193	69	LE
D.Palya	713	1533	115	LE
Hosur	709	1175	66	LE
Manchenahalli	786	1342	71	LE
Nagaragere	695	1374	98	LE
Tondebavi	758	1481	95	LE
Gudibanda	694	1181	70	LE
Gudibanda	694	1244	79	LE
Somenahalli	728	1129	55	E
Sidlaghatta	763	1313	72	LE
Sidlaghatta	763	1404	84	LE
Bashattahalli	765	1324	73	LE
Jangamakote	776	1290	66	LE
Sadali	735	1223	66	LE
TUMAKURU	669	1109	66	LE
CHIKKANAYAKANAHALLI	761	1112	46	E
Chiknayakanahalli	761	1237	63	LE
Handanakere	595	1018	71	LE
Huliyaru	504	1083	115	LE
Kandikere	610	1218	100	LE
Shettikeri	700	1091	56	E
Gubbi	809	1228	52	E
Gubbi	809	1262	56	E
Chandrashekerapura	692	1213	75	LE
Chelur	729	1161	59	E
Hagalavadi	655	1267	93	LE
Kadaba	787	1122	43	E
Nittur	789	1315	67	LE
Koratagere	777	1238	59	E
Koratagere	777	1071	38	E
Chennarayadurga	787	1440	83	LE
Holanahalli	768	1127	47	E
Kolala	720	1234	71	LE
Kunigal	825	1196	45	E
Kunigal	825	1304	58	E
Amrutur	675	1261	87	LE
Huliyurudurga	741	1164	57	E
Huttariduraga	799	1268	59	E
Kottagere	752	1073	43	E
Yedeyur	669	1143	71	LE

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Madhugiri	730	1032	41	E
Madhugiri	730	1065	46	E
Dodderi	594	1119	88	LE
Itakadibbanahalli	616	1077	75	LE
Kodigenahalli	632	891	41	E
Midigesi	553	1002	81	LE
Puravara	674	1011	50	E
Pavagada	611	894	46	E
Pavagada	611	962	57	E
Nagalamadike	588	840	43	E
Nidagal	518	955	84	LE
Yellappanayakana Hosakote	532	860	62	LE
Sira	638	1023	60	LE
Sira	638	945	48	E
Bukkaptna	579	1088	88	LE
Gowdagere	581	938	62	LE
Hulikunta	506	1005	99	LE
Kallambella	606	1178	94	LE
Tiptur	731	1196	64	LE
Tiptur	731	1236	69	LE
Honnavalli	705	1170	66	LE
Kibbanahalli	607	1241	104	LE
Nonavinakere	720	1165	62	LE
Tumakuru	830	1228	48	E
Tumakuru North	830	1189	43	E
Bellavi	788	1249	59	E
Guluru	869	1070	23	E
Hebbur	678	1198	77	LE
Uradigere	682	1169	71	LE
Kora	788	1528	94	LE
Tumakuru East	844	1129	34	E
Tumakuru West	839	1079	29	E
Tumakuru South	846	1041	23	E
Turuvekere	772	1104	43	E
Turuvekere	772	1079	40	E
Dabbegatta	605	1058	75	LE
Dandinasivara	707	1079	53	E
Mayasandra	657	1186	81	LE
CHITRADURGA	540	872	61	LE
Challakere	485	779	61	LE
Challakere	485	813	68	LE

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Nayakanahatti	428	691	62	LE
Parasurampura	410	814	98	LE
Thalku	392	782	100	LE
Chitradurga	666	896	35	E
Chitradurga	666	849	28	E
Bharmasagara	601	1007	67	LE
Hire Guntanur	576	855	48	E
Turuvanur	581	891	53	E
Hiriyur	578	884	53	E
Hiriyur	578	922	59	E
Aymangala	517	787	52	E
Dharmapura	481	881	83	LE
Javanagondanahalli	562	977	74	LE
Holalkere	722	849	18	N
Holalkere	722	861	19	N
Bharmanaikanadurga	648	668	3	N
Ramagiri	535	938	75	LE
Talya	650	899	38	E
Hosadurga	648	1100	70	LE
Hosadurga	648	950	47	E
Madadhakeri	573	1003	75	LE
Mathodu	580	1291	122	LE
Srirampura	564	1269	125	LE
Molakalmuru	545	651	19	E
Molakalmuru	545	662	21	E
Devasamudra	400	634	58	E
DAVANAGERE	659	987	50	E
Channagiri	840	1057	26	E
Channagiri	840	1159	38	E
Basavapatna_1	703	1182	68	LE
Basavapatna_2	682	823	21	E
Santebannur_1	710	993	40	E
Santebannur_2	741	1039	40	E
Ubrani	752	988	31	E
Davanagere	641	1028	60	LE
Davanagere	641	965	51	E
Anogodu	599	1107	85	LE
Mayakonda	639	1004	57	E
HARIHARA	630	993	58	E
Harihara	630	968	54	E
Malebennur	586	1013	73	LE

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Honnali	662	1026	55	E
Honnali	662	1012	53	E
Govinakovi_2	667	969	45	E
Sasavehalli_1	719	1119	56	E
Sasavehalli_2	640	978	53	E
Jagalur	528	742	41	E
Jagalur	528	717	36	E
Bilichodu	504	808	60	LE
Sokke	574	711	24	E
Nyamati	826	1239	50	E
Belagutti	826	1309	59	E
Govinakovi_1	710	1030	45	E
CHAMARAJANAGARA	787	906	15	N
CHAMARAJANAGARA	770	915	19	N
Chamarajanagara	770	859	12	N
Chandakavadi	793	1005	27	E
Haradhanalli	774	856	11	N
Harve	752	868	15	N
Santemarahalli	838	918	10	N
Gundlupet	792	828	5	N
Gundlupet	792	719	-9	N
Begur	648	763	18	N
Terakanambi	766	817	7	N
Hangala	784	889	13	N
Kollegal	843	886	5	N
Kollegala	843	877	4	N
Palya	802	891	11	N
Yelandur	867	981	13	N
Yelandur	867	971	12	N
Agara	771	985	28	E
Hanur	754	939	25	E
Hanur	754	820	9	N
Lokkanahalli	781	903	16	N
Ramapura	811	995	23	E
MYSURU	837	955	14	N
HEGGADADEVANAKOTE	837	983	18	N
Heggadadevanakote	837	960	15	N
Antarasante	1031	1046	1	N
Hampapura	764	877	15	N
Hunsur	799	938	17	N
Hunsur	799	908	14	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Bilikere	764	951	24	E
Gowdargyare	767	941	23	E
Hanagoadu	976	944	-3	N
Krishnarajanagar	735	923	26	E
Krishnarajanagar	735	884	20	E
Chanachanakatte	698	956	37	E
Hebbalu	721	848	18	N
Hasa Agrahar	682	842	24	E
Mirale	690	978	42	E
Saligram	662	1002	51	E
Mysuru	810	1070	32	E
Mysuru	810	1122	38	E
Elivala	757	974	29	E
Jayapura	774	1083	40	E
Varuna	738	1083	47	E
Nanjanagud	730	847	16	N
Nanjangud	730	805	10	N
Biligere	726	869	20	E
Chikkayyana Chattra	732	1058	44	E
Hullahalli	788	778	-1	N
Doddakowlande	731	832	14	N
Periyapatna	852	987	16	N
Periyapatna	852	970	14	N
Bettadpur	770	993	29	E
Haranahalli	957	1079	13	N
Ravanduru	810	864	7	N
T.NARASIPURA	738	1006	36	E
T.Narasipur	738	1099	49	E
Bannur	721	1000	39	E
Muguru	781	894	14	N
Sosale	738	1092	48	E
Talakad	777	942	21	E
Saraguru	949	898	-5	N
Saraguru	949	860	-9	N
B.Matakere	937	923	-2	N
MANDYA	699	1011	45	E
Krishnarajapet	747	925	24	E
Krishnarajapet	747	945	26	E
Akkihebalu	699	784	12	N
Bukanakere	700	788	13	N
Kikkeri	719	856	19	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Santebachahalli	652	1107	70	LE
Silanare	698	1050	51	E
Maddur	767	973	27	E
Madduru_2	767	1005	31	E
Koppa_2	883	959	9	N
Chikkaarasinakere_1	753	982	30	E
Autaguru	779	1146	47	E
Madduru_1	758	972	28	E
Koppa_2	739	990	34	E
Koppa_1	832	913	10	N
Koppa_3	769	968	26	E
Chikaarasinakere_2	742	797	7	N
Chikaarasinakere_3	734	734	0	N
Malavalli	703	973	39	E
Malavalli_1	703	925	32	E
Halaguru	799	980	23	E
Kirgavalu_1	719	1128	57	E
B G Pura_2	778	1024	32	E
Malavalli_2	748	864	15	N
Malavalli_3	772	839	9	N
Kirgavalu_2	721	935	30	E
Kirgavalu_3	719	1007	40	E
B G Pura_1	773	989	28	E
Mandya	699	1008	44	E
Mandya_1	699	930	33	E
Basaralu_1	610	999	64	LE
Dudda_1	649	1016	57	E
Keragodu_1	735	1263	72	LE
Kottatti_1	697	899	29	E
Mandya_2	737	920	25	E
Kottatti_2	709	941	33	E
Keragodu_2	747	1202	61	LE
Dudda_2	681	961	41	E
Basaralu_2	796	941	18	N
Nagamangala	765	1147	50	E
Nagamangala	765	1109	45	E
Belluru	520	1415	172	LE
Bendaganavele	556	1186	113	LE
Devalapura	692	1081	56	E
Honakere	465	980	111	LE
Pandavapura	679	1001	47	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Pandavapura_1	679	971	43	<i>E</i>
Chinkurali	684	1022	49	<i>E</i>
Melukote	702	1013	44	<i>E</i>
Pandavapura_2	660	949	44	<i>E</i>
Srirangapatna	638	1006	58	<i>E</i>
Srirangapatna	638	1031	62	<i>LE</i>
Arakere	701	1038	48	<i>E</i>
Belagola	748	818	9	<i>N</i>
K Shettihalli_2	650	1070	65	<i>LE</i>
K Shettihalli_1	643	1084	69	<i>LE</i>
BALLARI	599	684	14	<i>N</i>
Ballari	516	710	38	<i>E</i>
Ballari	516	670	30	<i>E</i>
Moka	524	711	36	<i>E</i>
Rupanagudi	505	824	63	<i>LE</i>
Koluru	525	609	16	<i>N</i>
KUDLIGI	590	696	18	<i>N</i>
Kudligi	590	818	39	<i>E</i>
Gudekote	521	602	15	<i>N</i>
Hosahalli	504	742	47	<i>E</i>
Sandur	819	786	-4	<i>N</i>
Sandur	819	800	-2	<i>N</i>
Choranuru	627	824	31	<i>E</i>
Toranagallu	612	710	16	<i>N</i>
Siruguppa	675	631	-7	<i>N</i>
Siruguppa	675	633	-6	<i>N</i>
Hachcholli	655	634	-3	<i>N</i>
Karuru	563	677	20	<i>E</i>
Tekkalakote	630	597	-5	<i>N</i>
Kurugodu	499	616	23	<i>E</i>
Kurugodu	499	582	16	<i>N</i>
Koluru	514	667	30	<i>E</i>
KOPPALA	614	640	4	<i>N</i>
Gangavathi	583	589	1	<i>N</i>
Gangavathi	583	674	16	<i>N</i>
Marali	571	509	-11	<i>N</i>
Venkatagiri	586	582	-1	<i>N</i>
KOPPALA	635	727	14	<i>N</i>
Koppal	635	899	42	<i>E</i>
Alawandi	587	603	3	<i>N</i>
Hitnal	640	667	4	<i>N</i>

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Irkalgada	627	706	13	N
Kushtagi	597	648	9	N
Kushtagi	597	633	6	N
Hanumanhal	658	654	-1	N
Hanamsagar	627	578	-8	N
Tavaragera	591	744	26	E
Yelburga	597	596	0	N
Yelburga	597	599	0	N
Hire Wankalkunti	595	615	3	N
Karatagi	640	551	-14	N
Karatgi	640	566	-12	N
Siddapur	593	539	-9	N
Kukanuru	693	617	-11	N
Kukanoor	693	600	-13	N
Manglur	630	658	4	N
Kanakagiri	525	590	12	N
Kanakagiri	525	580	10	N
Hulihaidar	558	677	21	E
Nauli	595	548	-8	N
RAICHUR	654	624	-5	N
Deodurga	759	567	-25	D
Devadurga	759	643	-15	N
Arakeri	658	491	-25	D
Gabbur	683	565	-17	N
Jalihalli	690	548	-21	D
Lingsugur	631	643	2	N
Lingasuguru	631	670	6	N
Gurgunta	622	628	1	N
Mudgal	624	642	3	N
Manvi	652	656	1	N
Manvi	652	614	-6	N
Hire Katankal	644	780	21	E
Kurdi	663	590	-11	N
Raichur	736	601	-18	N
Raichur	736	628	-15	N
Chandrabanda	733	571	-22	D
Devarsugur	723	586	-19	N
Gilasuguru	610	563	-8	N
Kalmali	678	624	-8	N
Yergara	763	632	-17	N
Sindhnanur	691	620	-10	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Sindhanur	691	590	-15	N
Badarli	663	741	12	N
Gorebal	649	519	-20	D
Gunjihalli	634	623	-2	N
Hadganhal	655	650	-1	N
Huda	650	650	0	N
Jalihah	638	460	-28	D
Jawalgeri	656	740	13	N
Kunatgi	660	624	-5	N
Salgundi	660	668	1	N
Turvihal	627	602	-4	N
Walkamdinni	645	755	17	N
Maski	558	714	28	E
Maski	558	649	16	N
Halapur	586	778	33	E
Pamankallur	601	794	32	E
Balganur	598	665	11	N
Gunjihalli	609	675	11	N
Turvihal	603	987	64	LE
Gudadur	573	641	12	N
Lingsugur	592	704	19	N
Sirivara	589	573	-3	N
Sirwar	589	528	-10	N
Kallur	671	530	-21	D
Mallat	624	621	-1	N
Kavital	622	611	-2	N
KALABURAGI	770	943	22	E
Afzalpur	692	825	19	N
Afzalpur	692	753	9	N
Atanur	707	915	29	E
Karajgi	664	751	13	N
Aland	763	994	30	E
Aland	763	1013	33	E
Khajuri	757	1087	44	E
Madana Hipparga	735	943	28	E
Narona	766	901	18	N
Nimbarga Tanda	761	959	26	E
Chincholi	913	920	1	N
Chincholi	913	891	-2	N
Ainapur	783	970	24	E
Sulepet	874	851	-3	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Kodli Chincholi	896	1019	14	N
CHITTAPUR	771	1066	38	E
Chittapur	771	1073	39	E
Gundgurti	777	1158	49	E
Nalavara	791	1000	26	E
Kalaburagi	794	1036	31	E
Kalaburagi	794	1047	32	E
Aurad	777	1070	38	E
Farhatabad	779	939	21	E
Pattan	772	1049	36	E
Jevargi	805	819	2	N
Jewargi	805	823	2	N
Andola	792	858	8	N
Nelogi	753	747	-1	N
Sedam	791	913	15	N
Sedam	791	910	15	N
Adki	807	883	9	N
Kodla	799	928	16	N
Mudhol	807	866	7	N
Kalagi	766	1263	65	LE
Kalagi	766	1311	71	LE
Kodli	774	1193	54	E
Gundgurti	773	1223	58	E
Kamalapura	762	959	26	E
Kamalapur	762	944	24	E
Mahagaon Tanda	772	985	28	E
Narona	770	889	15	N
Ainapur	780	1049	35	E
Yadrami	687	630	-8	N
Yadrami	687	652	-5	N
Ijeri	750	592	-21	D
Shahbadha	758	1036	37	E
Shahabad	758	1020	34	E
BIDAR	838	907	8	N
Aurad	854	984	15	N
Aurad	854	875	2	N
Chintaki	872	1077	23	E
Santpur	874	996	14	N
Bidar	939	917	-2	N
Bidar	939	1017	8	N
Bagadhhal	843	935	11	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Bidar South	935	894	-4	N
Janwada	909	826	-9	N
Kamthana	906	941	4	N
Manalli	890	849	-5	N
Bhalki	874	942	8	N
Bhalki	874	901	3	N
Halburga	875	859	-2	N
Khatak Chincholi	833	823	-1	N
Lakangaon	877	995	13	N
Nittur Buzurg	873	1151	32	E
Saigaon	769	868	13	N
Basavakalyan	790	833	5	N
Basavakalyan	790	805	2	N
Kohinoor	775	829	7	N
Matala	787	816	4	N
Mudabi	779	816	5	N
Rajeshwar	813	882	8	N
Humnabad	834	851	2	N
Humnabad	834	836	0	N
Dubalgundi	822	860	5	N
Hallikheda	827	846	2	N
Chittaguppa	759	842	11	N
Chitguppa	759	853	12	N
Bhimalkhed	838	797	-5	N
Nirna	794	854	8	N
Kamalanagara	902	949	5	N
Kamalnagar	902	806	-11	N
Dabaka C.	877	1009	15	N
Thanakushanur	873	1097	26	E
Hulasuru	739	886	20	E
Hulsoor	739	873	18	N
BELAGAVI	826	983	19	N
Athani	539	515	-4	N
Athani	539	488	-9	N
Anantapur	517	569	10	N
Telsang	507	487	-4	N
Bailhongal	816	1008	23	E
Bailhongal	816	968	19	N
Nesargi	771	1034	34	E
Belagavi	1363	1319	-3	N
Belagavi	1363	1330	-2	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Hirebagevadi	1041	1180	13	N
Kakti	1131	1193	6	N
Uchagaon	1341	1553	16	N
Chikkodi	666	852	28	E
Chikkodi	666	863	30	E
Nagaramonnali	634	862	36	E
Sadalgi	663	785	18	N
Gokak	524	699	33	E
Gokak	524	766	46	E
Kowjalgi	537	568	6	N
Arbhavi	560	665	19	N
Hukkeri	649	955	47	E
Hukkeri	649	900	39	E
Sankeswar	812	1041	28	E
Yamkanmardi	685	929	36	E
Khanapur	1950	2145	10	N
Khanapur	1950	1638	-16	N
Bidi	1413	1442	2	N
Gunji	2263	2394	6	N
Jamboti	1856	2456	32	E
RAMADURGA	540	682	26	E
Ramdurg	540	626	16	N
Bidki	534	679	27	E
Katkol	536	782	46	E
Mudkavi	543	575	6	N
Raibagh	483	582	21	E
Raibagh	483	596	23	E
Kudchi	529	570	8	N
Soundatti	568	848	49	E
Savadatti	568	837	47	E
Manoli	562	649	15	N
Muragoda	607	946	56	E
Yargatti	533	949	78	LE
Kitthuru	1036	1200	16	N
Kittur	1036	1182	14	N
Nippani	838	1025	22	E
Nippani	838	1117	33	E
Sadalgi	767	877	14	N
Kagavada	541	569	5	N
Kagwad	541	566	5	N
Mudagali	534	570	7	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Arbhavi	534	584	10	N
Kowjalgi	529	560	6	N
BAGALKOTE	582	550	-6	N
Badami	600	585	-2	N
Badami	600	570	-5	N
Kerur	570	556	-2	N
Kulgeri	583	612	5	N
Bagalkote	613	521	-15	N
Bagalkote	613	597	-3	N
Kaladgi	548	441	-19	N
Rampura	612	495	-19	N
Bilgi	609	501	-18	N
Bilgi	609	500	-18	N
Anagvadi	599	498	-17	N
Hungund	670	687	3	N
Hungund	670	700	5	N
Amingarh	633	677	7	N
Karadi	652	669	3	N
Jamkhandi	548	445	-19	N
Jamakhadi	548	424	-23	D
Savalagi	530	462	-13	N
Terdal	543	441	-19	N
Mudhol	532	512	-4	N
Mudhol	532	490	-8	N
Lokapur	473	535	13	N
Guledagudda	607	653	8	N
Guledagudda	607	647	7	N
Ilkal	651	667	2	N
Ilkal	651	645	-1	N
Amingarh	636	640	1	N
Karadi	654	756	16	N
Rabakavi Banahatti	496	404	-19	N
Terdal	496	405	-18	N
Mudhol	550	408	-26	D
VIJAYAPURA	591	587	-1	N
BAGEVADI	669	574	-14	N
Basavana Bagewadi	669	576	-14	N
Huvin Hippargi	647	603	-7	N
Managuli	608	544	-11	N
Vijayapura	671	584	-13	N
Vijayapura	671	581	-13	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Nagathan	392	588	50	<i>E</i>
Indi	620	579	-7	<i>N</i>
Indi	620	583	-6	<i>N</i>
Ballolli	563	564	0	<i>N</i>
Muddebihal	652	561	-14	<i>N</i>
Muddebihal	652	566	-13	<i>N</i>
Dhavalagi	638	591	-7	<i>N</i>
Nalatvad	691	528	-24	<i>D</i>
Sindgi	658	635	-3	<i>N</i>
Sindhagi	658	618	-6	<i>N</i>
Almel	646	652	1	<i>N</i>
Babaleshwara	545	468	-14	<i>N</i>
Babaleshwar	545	422	-23	<i>D</i>
Mamdapur	569	572	1	<i>N</i>
Chadachana	552	662	20	<i>E</i>
Chadchan	552	660	19	<i>E</i>
Nidagundi	616	479	-22	<i>D</i>
Nidagundi	616	463	-25	<i>D</i>
Basavana Bagewadi	631	450	-29	<i>D</i>
Huvin Hiprgi	629	532	-15	<i>N</i>
Muddebihal	615	508	-17	<i>N</i>
Dhavalagi	624	432	-31	<i>D</i>
Talikote	586	637	9	<i>N</i>
Talikoti	586	647	10	<i>N</i>
Devarhipargi	597	624	4	<i>N</i>
Dhavalagi	612	670	9	<i>N</i>
Huvinhipargi	603	536	-11	<i>N</i>
Tikota	406	593	46	<i>E</i>
Tikota	406	593	46	<i>E</i>
Kolhara	606	513	-15	<i>N</i>
Kolhar	606	512	-16	<i>N</i>
Devara Hipparagi	630	663	5	<i>N</i>
Devar Hipparagi	630	652	3	<i>N</i>
Huvinhiprgi	625	643	3	<i>N</i>
GADAG	624	678	9	<i>N</i>
Gadag	659	734	11	<i>N</i>
Gadag	659	907	38	<i>E</i>
Betageri	655	605	-8	<i>N</i>
Mundargi	557	583	5	<i>N</i>
Mundargi	557	623	12	<i>N</i>
Dambal	462	560	21	<i>E</i>

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Naragund	557	693	24	E
Naragund	557	727	31	E
Konnur	583	642	10	N
Ron	699	629	-10	N
Ron	699	647	-7	N
Hole Alur	623	629	1	N
Nargil	668	658	-1	N
Shirahatti	689	714	4	N
Shirahatti	689	713	4	N
Gajendragad	737	660	-10	N
Rona	737	764	4	N
Nargil	660	627	-5	N
Laxmeshwar	594	823	39	E
Laxmeshwar	594	822	38	E
HAVERI	800	1013	27	E
Byadgi	679	1062	57	E
Byadgi	679	960	41	E
Kaginelli	797	1195	50	E
Hanagal	1044	1160	11	N
Hangal	1044	1278	22	E
Akki Alur	1067	1151	8	N
Bommanhalli	1024	1056	3	N
Haveri	778	893	15	N
Haveri	778	971	25	E
Guttal	619	826	34	E
Karajgi	732	925	26	E
Hirekerur	856	1074	25	E
Hirekerur	856	1168	36	E
Haunsbhavi	918	986	7	N
RANEBENNUR	623	966	55	E
Ranebennur	623	1010	62	LE
Kuppelur	708	1047	48	E
Medleri	651	864	33	E
Savanur	699	952	36	E
Savanur	699	876	25	E
Hatti Mattur	717	1020	42	E
Shiggaon	814	975	20	E
Shiggaon	814	839	3	N
Bankapur	808	1015	26	E
Dhundsai	955	1045	9	N
Ratteehalli	790	1085	37	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Rattihalli	790	1091	38	E
Hirekerur	830	1074	29	E
DHARWAD	787	965	23	E
Dharwad	777	1060	36	E
Dharwad	777	1156	49	E
Aminbhavi	792	863	9	N
Garag	908	1119	23	E
Hubballi	772	935	21	E
Chabbi	772	1136	47	E
Shirguppi	699	809	16	N
Kalghatgi	979	1253	28	E
Kalghatgi	979	1329	36	E
Dummavada	852	1205	42	E
Tabkad Honnihalli	965	1209	25	E
Kundgol	661	841	27	E
Kundgol	661	833	26	E
Saunshi	696	842	21	E
Navalgund	631	711	13	N
Moraba	631	707	12	N
Hubballi Nagara	746	1009	35	E
Hubballi Urban	746	1007	35	E
Alnavara	1267	1416	12	N
Alnavar	1267	1411	11	N
Annigeri	651	797	23	E
Annigeri	651	801	23	E
SHIVAMOGGA	2325	2444	5	N
Bhadravathi	866	1292	49	E
Bhadravathi_1	866	1420	64	LE
Bhadravathi_2	936	1268	35	E
Hole Honnuru_1	883	1090	24	E
Hole Honnuru_3	846	1194	41	E
Hole Honnuru_2	800	1266	58	E
Kudligere	882	1353	53	E
HOSANAGARA	3071	3285	7	N
Hosanagar	3071	3270	6	N
Huncha	2490	2433	-2	N
Kerehalli	1764	1807	2	N
Nagar	5205	4654	-11	N
SAGARA	2495	3240	30	E
Sagar	2495	2139	-14	N
Anandapuram	1702	2038	20	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Baragadde	4040	3789	-6	N
Anahalli	2692	2442	-9	N
Karauru	4154	4836	16	N
Talguppa	2710	2768	2	N
SHIKARIPURA	975	1399	43	E
Shikaripur	975	1472	51	E
Anjanapura	1171	1470	26	E
Husuru	861	1334	55	E
Udagani	1037	1359	31	E
Talagunda	1050	1385	32	E
Shivamogga	842	1498	78	LE
Shivamogga_2	842	1346	60	E
Shivamogga_1	1150	1409	22	E
Haranahalli	1037	1389	34	E
Holalur_1	843	1316	56	E
Holalur_2	913	1160	27	E
Kumsi	984	1761	79	LE
Nidige_1	951	1498	58	E
Nidige_2	1193	1478	24	E
Ayanuru	1043	1717	65	LE
SORABA	1541	1811	18	N
Sorab	1541	1815	18	N
Anavatti	1261	1419	13	N
Chandragutti	2332	1974	-15	N
Jade	1478	1622	10	N
Kuppagadde	1417	1906	34	E
Ulvi	1895	1962	4	N
Tirthahalli	2867	3083	8	N
Thirthahalli	2867	3040	6	N
Agrahara	2713	3039	12	N
Agumbe	7565	4152	-45	D
Mandagadde	1690	2435	44	E
Malur	2579	2650	3	N
HASSAN	1142	1363	19	N
Alur	1149	1259	10	N
Alur	1149	1191	4	N
Kenchamman Hoskote	1814	1528	-16	N
Kundur	1136	983	-13	N
Palya	1581	1232	-22	D
ARKALGUD	885	1100	24	E
Arkalgud	885	957	8	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Doddamagge	899	1001	11	N
Konanuru	797	1140	43	E
Mallipatna	1246	1354	9	N
Ramanathapura	830	1077	30	E
ARASIKERE	696	1036	49	E
Arasikere	696	1059	52	E
Banavara	564	1078	91	LE
Gandasi	661	1151	74	LE
Javagal	934	951	2	N
Kanakatte	595	980	65	LE
Belur	1021	1163	14	N
Belur	1021	1170	15	N
Arehalli	1790	1512	-16	N
Bikkodu	1213	1269	5	N
Halebeedu	1305	978	-25	D
Madihalli	2378	917	-61	LD
Channarayapatna	690	1130	64	LE
Channarayapatna	690	965	40	E
Baguru	779	1267	63	LE
Dandiganahalli	692	1018	47	E
Hirisave	768	1205	57	E
Nuggehalli	669	1227	83	LE
Shravan Belgola	733	1103	50	E
Hassan	846	1028	22	E
Hassan	846	1045	24	E
Dudda	652	999	53	E
Katty	693	1002	45	E
Salagame	816	1069	31	E
Shantigrama	661	1014	53	E
HOLENARASIPURA	768	948	23	E
Holenarasipur	768	933	21	E
Halekote	778	1068	37	E
Halli Mysore	767	878	15	N
SAKALESH PURA	2247	2947	31	E
Sakaleshpur	2247	2331	4	N
Balegodu	1790	1600	-11	N
Hanbalu	2377	3479	46	E
Hettur	2218	3316	49	E
Yaslur	1783	2908	63	LE
CHIKKAMAGALURU	1833	2070	13	N
CHIKKAMAGALURU	836	1755	110	LE

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Chikkamagaluru	836	1548	85	LE
Amble	938	1234	32	E
Aldur	1643	2038	24	E
Sangmeswrpet	2339	2230	-5	N
Lakya	1283	1275	-1	N
Avathi	1340	2017	50	E
Jagar	909	2003	120	LE
Vasthare	1048	1641	57	E
Kadur	639	1075	68	LE
Kadur	639	1163	82	LE
Birur	677	1232	82	LE
Hirenalluru	643	998	55	E
Sakkarepatna	813	1050	29	E
Shingatagere	630	1001	59	E
Yagati	632	968	53	E
Panchanahalli	594	1058	78	LE
Koppa	2907	3013	4	N
Koppa	2907	2782	-4	N
Hariharpur	3046	3185	5	N
Meguda	3122	3058	-2	N
Mudigere	2315	3386	46	E
Mudigere	2315	2308	0	N
Bankal	4139	3326	-20	D
Gonibidu	2268	3492	54	E
Kalasa	3491	3691	6	N
Baluru	3866	3344	-13	N
NARASIMHARAJAPURA	1609	2183	36	E
Narasimharajapur	1609	1906	18	N
Balehonnur	2590	2509	-3	N
Sringeri	3887	3940	1	N
Sringeri	3887	3308	-15	N
Kigga	4377	4107	-6	N
Tarikere	914	1280	40	E
Tarikere	914	1167	28	E
Amrutapur	881	1091	24	E
Lakavalli	1256	1461	16	N
Lingadahalli	825	1338	62	LE
Ajjampura	669	1060	59	E
Ajjampura	669	1054	58	E
Chowlahiriyur	607	1020	68	LE
Shivani	575	1114	94	LE

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Amrutpura	698	910	30	<i>E</i>
Hirenalluru	645	1070	66	<i>LE</i>
KODAGU	2729	2656	-3	<i>N</i>
Madikeri	3265	3522	8	<i>N</i>
Madikeri	3265	3206	-2	<i>N</i>
Bhagamandala	5784	4224	-27	<i>D</i>
Napoklu	2833	2842	0	<i>N</i>
Sampaje	4418	3556	-19	<i>N</i>
Somwarpet	2098	2150	2	<i>N</i>
Somwarpet	2098	1936	-8	<i>N</i>
Kodlipet	1613	1767	10	<i>N</i>
Kushalnagar	978	1492	52	<i>E</i>
Sanivarsante	1863	1721	-8	<i>N</i>
Santhahalli	2294	3357	46	<i>E</i>
Suntikoppa	1589	2265	43	<i>E</i>
Virajpet	2468	2210	-10	<i>N</i>
Virajpet	2468	2836	15	<i>N</i>
Ammati	1992	1851	-7	<i>N</i>
Blale	1798	1710	-5	<i>N</i>
Hudakere	2403	2617	9	<i>N</i>
Ponnampet	2267	2019	-11	<i>N</i>
Srimangala	2753	1925	-30	<i>D</i>
DAKSHINA KANNADA	4006	3963	-1	<i>N</i>
Beltangadi	4426	4427	0	<i>N</i>
Belthangady	4426	4383	-1	<i>N</i>
Kokkada	4261	4499	6	<i>N</i>
Venur	4117	4262	4	<i>N</i>
Bantwal	3856	3369	-13	<i>N</i>
Bantwal	3856	3559	-8	<i>N</i>
Pane Mangalore	3885	3361	-13	<i>N</i>
Vittal	3984	3153	-21	<i>D</i>
Mangaluru	3609	3486	-3	<i>N</i>
Mangaluru_A	3609	3382	-6	<i>N</i>
Mangaluru_B	3631	3366	-7	<i>N</i>
Gurpur	3801	3458	-9	<i>N</i>
Mulki	3788	3602	-5	<i>N</i>
Suratkal	3834	3422	-11	<i>N</i>
Puttur	4058	3592	-12	<i>N</i>
Puttur	4058	3609	-11	<i>N</i>
Uppinangadi	3939	3472	-12	<i>N</i>
Sulya	3592	3885	8	<i>N</i>

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Sullia	3592	3741	4	N
Panaje	4015	4136	3	N
Mudabidri	4010	3873	-3	N
Mudbidri	4010	3824	-5	N
Kadaba	4135	4329	5	N
Kadaba	4135	4214	2	N
Panaje	4215	4027	-4	N
Uppinangadi	3495	4681	34	E
UDUPI	4535	4797	6	N
Karkala	4777	4736	-1	N
Karkala	4777	4474	-6	N
Ajekar	4755	5051	6	N
Kundapur	3786	4784	26	E
Kundapur	3786	4469	18	N
Vandse	4260	4838	14	N
Udupi	3862	4149	7	N
Udupi	3862	4031	4	N
Brahmavara	4333	4171	-4	N
Bynduru	4428	4865	10	N
Bainduru	4428	4811	9	N
Bramhavara	4043	4259	5	N
Brahmavara	4043	4237	5	N
Kota	3525	4120	17	N
Kapu	3757	4145	10	N
Kapu	3757	4079	9	N
Hebri	5802	6033	4	N
Ajekar	5802	6085	5	N
Kundapur	5073	5473	8	N
UTTARA KANNADA	2936	3346	14	N
Ankola	3532	4083	16	N
Ankola	3532	4152	18	N
Belikere	3517	3904	11	N
Basagod	3438	3823	11	N
Blale	3364	3994	19	N
Bhatkal	4322	4569	6	N
Susgadi	4322	4539	5	N
Mavalli	4071	4536	11	N
Haliyal	1339	1955	46	E
Haliyal	1339	1869	40	E
Murkvad	1061	1831	72	LE
Sambrani	1260	2006	59	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Dandeli	1371	2174	59	E
Honnavar	3728	4613	24	E
Honnavar	3728	4238	14	N
Manki	3668	4172	14	N
Mavinakurvei	3869	4958	28	E
Karwar	3234	4293	33	E
Baad	3234	3643	13	N
Ghadasaya	3611	4611	28	E
Kinnar	3448	3723	8	N
Savantvada	3329	4381	32	E
Kumta	3523	3503	-1	N
Kumta	3523	3494	-1	N
Gokarna	3243	3430	6	N
Kujahalli	3978	3563	-10	N
Mirjan	3526	3347	-5	N
Mundgod	1438	1675	17	N
Mundgod	1438	1488	3	N
Pala	1243	1904	53	E
SIDDAPUR	3016	3682	22	E
Umbalamani	4456	3390	-24	D
Siddapura	3016	3187	6	N
Kodkani	3371	4209	25	E
SIRSI	2360	3194	35	E
Sirsi	2360	2750	17	N
Banavasi	1511	2384	58	E
Hulekal	2174	3146	45	E
Sampakanda	4141	4152	0	N
SUPA	2578	3483	35	E
Supa	2578	2556	-1	N
Kasalrock	4658	4899	5	N
Kumbarawada	3073	3178	3	N
YELLAPUR	2668	2599	-3	N
Yellapur	2668	3030	14	N
Manchikeri	1989	2205	11	N
Dandelli	1540	2064	34	E
Dhandeli	1540	2053	33	E
YADGIR	719	669	-7	N
Shahapur	848	716	-16	N
Shahpur	848	701	-17	N
Doranailli	816	830	2	N
Gogi	775	653	-16	N

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Hayyalbuzurg	735	735	0	N
Shorapur	721	613	-15	N
Shorapur	721	674	-7	N
Kakkeri	576	626	9	N
Kembhavi	584	548	-6	N
Yadgir	908	761	-16	N
Yadgir	908	778	-14	N
Balichakra	773	469	-39	D
Hattikuni	854	821	-4	N
Saidapur	754	824	9	N
Gurumithakala	773	737	-5	N
Gurmitakal	773	831	7	N
Konakal	776	663	-15	N
Balichakra	763	660	-14	N
Vadagera	617	728	18	N
Wadagera	617	678	10	N
Dorannahli	715	809	13	N
Hayyala Buzurg	722	740	2	N
Hunisigi	501	492	-2	N
Hunasagi	501	506	1	N
Kodekal	622	481	-23	D
Kakkera	571	511	-11	N
VIJAYANAGAR	643	772	20	E
Hosapete	704	777	10	N
Hospet	704	881	25	E
Kamalapura	658	681	4	N
Mariyammanahalli	673	805	20	E
Hadagali	641	783	22	E
Hadagali	641	776	21	E
Hirehadagalli	652	833	28	E
Ittigi	667	741	11	N
HAGARIBOMMANAHALLI	635	772	22	E
Hagaribommanahalli	635	700	10	N
Hampa Sagara	617	653	6	N
Tambarahalli	628	856	36	E
Kogali	617	774	26	E
HARAPPANAHALLI	755	835	11	N
Harapanahalli	755	737	-2	N
Arasikere	656	1002	53	E
Chigateri	761	681	-11	N
Telagi	665	904	36	E

District/Taluk/Hobli	Annual Rainfall 2021 (1 st January to 31 st December)			
	Normal (mm)	Actual (mm)	%DEP	Class
Kotturu	533	749	40	E
Kotturu	533	758	42	E
Kogali	641	635	-1	N
Hoshalli	560	819	46	E
Kampli	531	591	11	N
Kampli	531	602	13	N
Kurugodu	553	524	-5	N
1.SIK	714	1050	47	E
2.NIK	702	780	11	N
3.MALNAD	1950	2100	8	N
4.COASTAL	3518	3784	8	N
State	1153	1337	16	N

Figure 1.7: District wise Rainfall (mm) pattern during 2021.

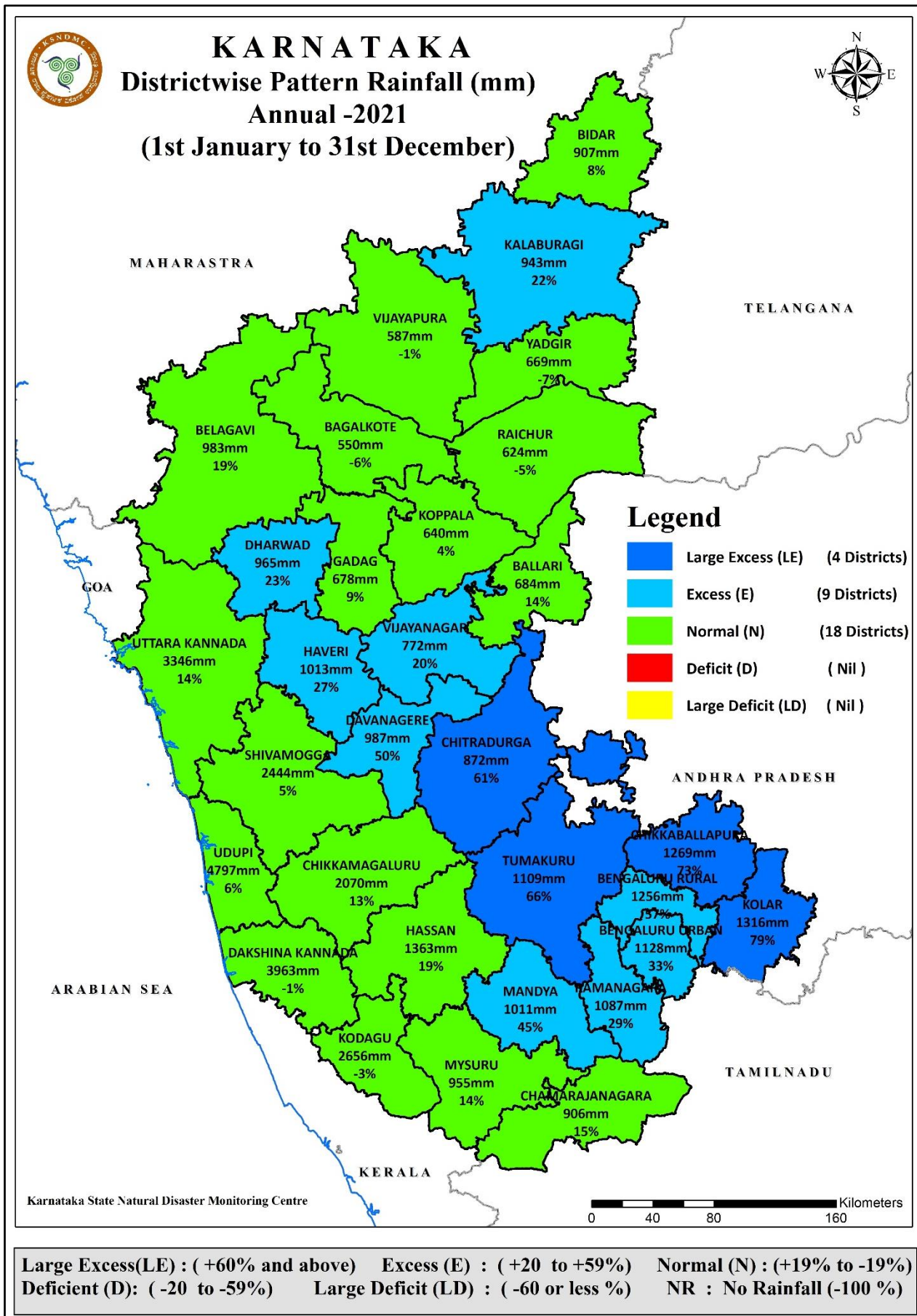


Figure 1.8: Taluk wise Rainfall (mm) pattern during 2021.

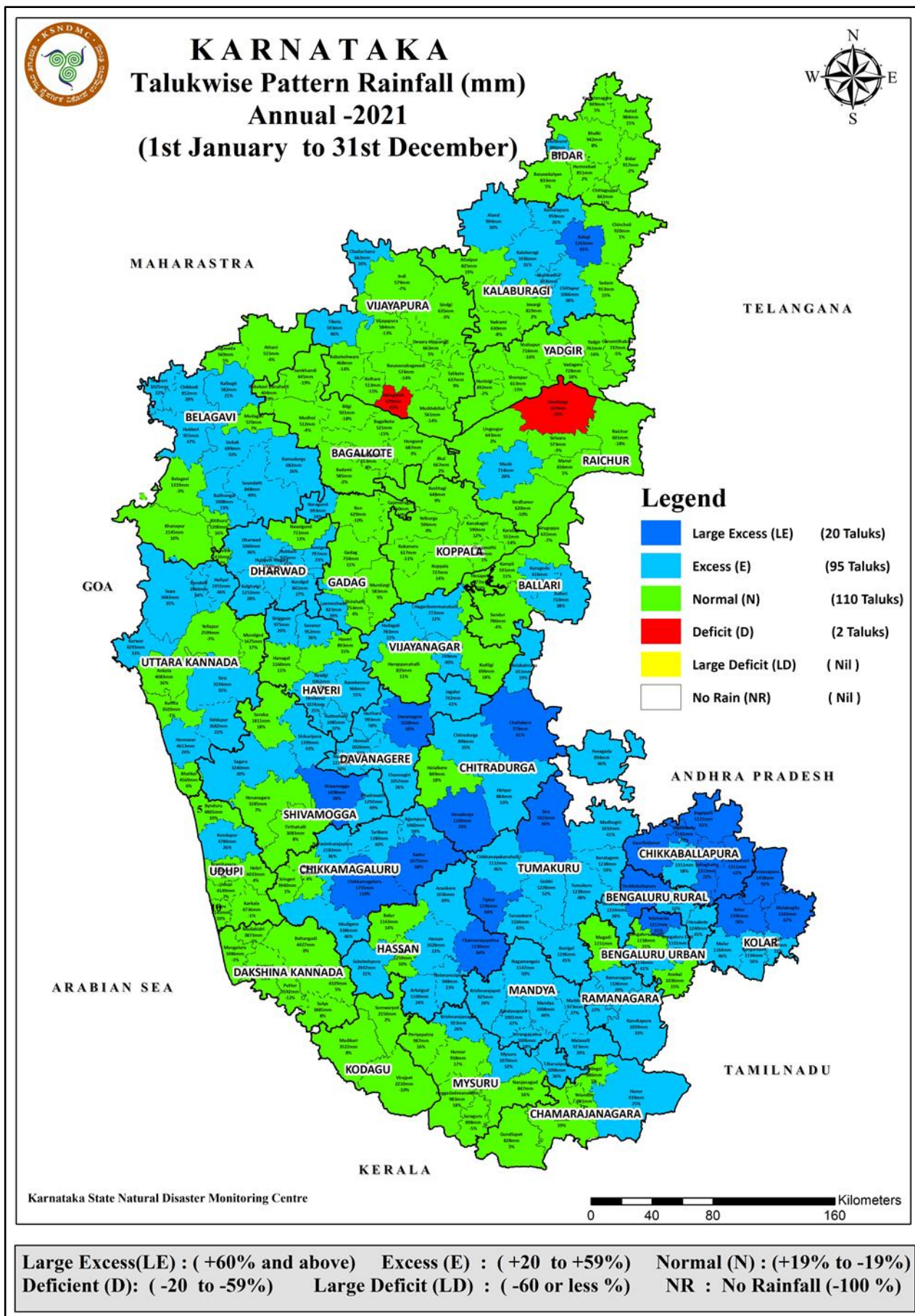


Figure 1.9: Hobli wise Rainfall (mm) pattern during 2021

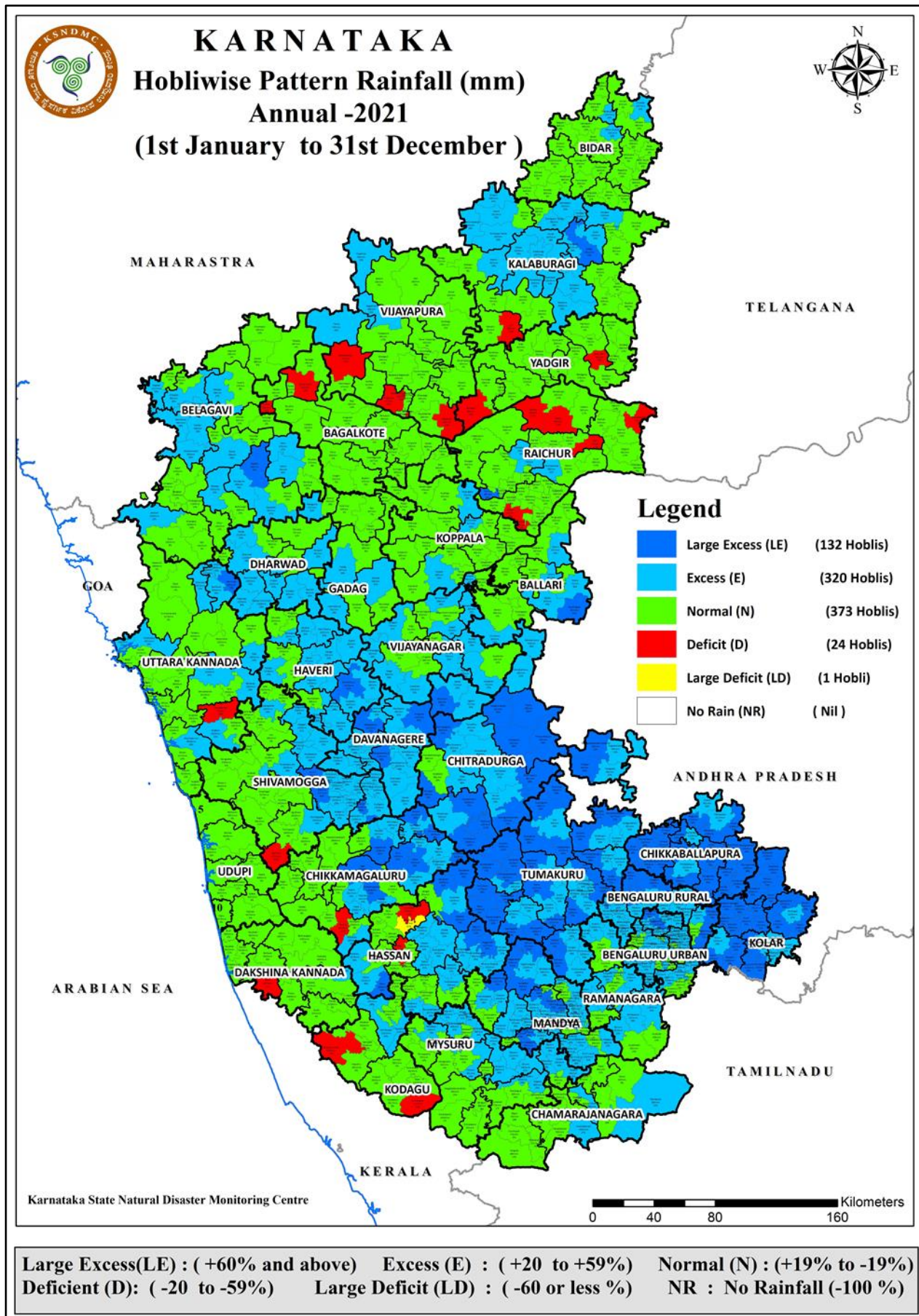


Table: 1.2: Classification of Taluk wise Rainfall pattern (1st January to 31st December)

SL.No.	District	Total Taluks / Hoblis	Large Excess		Excess		Normal		Total		Deficit		Large Deficit		No Rain		Total	
			Taluks	Hoblis	Taluks	Hoblis	Taluks	Hoblis	Taluks	Hoblis	Taluks	Hoblis	Taluks	Hoblis	Taluks	Hoblis	Taluks	Hoblis
1	BENGALURU URBAN	5/49	1	3	2	34	2	12	5	49	0	0	0	0	0	0	0	0
2	BENGALURU RURAL	4/20	1	7	3	12	0	1	4	20	0	0	0	0	0	0	0	0
3	RAMANAGARA	4/20	0	0	3	12	1	8	4	20	0	0	0	0	0	0	0	0
4	KOLAR	6/28	3	22	3	6	0	0	6	28	0	0	0	0	0	0	0	0
5	CHIKKABALLAPURA	6/26	5	22	1	4	0	0	6	26	0	0	0	0	0	0	0	0
6	TUMAKURU	10/53	2	29	8	24	0	0	10	53	0	0	0	0	0	0	0	0
7	CHITRADURGA	6/22	2	11	3	9	1	2	6	22	0	0	0	0	0	0	0	0
8	DAVANAGERE	6/20	1	4	5	16	0	0	6	20	0	0	0	0	0	0	0	0
9	CHAMARAJANAGARA	5/16	0	0	1	3	4	13	5	16	0	0	0	0	0	0	0	0
10	MYSURU	8/33	0	0	3	18	5	15	8	33	0	0	0	0	0	0	0	0
11	MANDYA	7/49	0	10	7	28	0	11	7	49	0	0	0	0	0	0	0	0
		67/336	15	108	39	166	13	62	67	336	0	0	0	0	0	0	0	0
12	BALLARI	5/16	0	1	2	7	3	8	5	16	0	0	0	0	0	0	0	0
14	KOPPALA	7/20	0	0	0	3	7	17	7	20	0	0	0	0	0	0	0	0
15	RAICHUR	7/40	0	1	1	3	5	30	6	34	1	6	0	0	0	0	1	6
16	KALABURAGI	11/36	1	1	5	19	5	15	11	35	0	1	0	0	0	0	0	1
18	BIDAR	8/30	0	0	1	3	7	27	8	30	0	0	0	0	0	0	0	0
19	BELAGAVI	14/38	0	1	8	14	6	23	14	38	0	0	0	0	0	0	0	0
20	BAGALKOTE	9/22	0	0	0	0	9	20	9	20	0	2	0	0	0	0	0	2
21	VIJAYAPURA	12/28	0	0	2	3	9	20	11	23	1	5	0	0	0	0	1	5
22	GADAG	7/13	0	0	2	4	5	9	7	13	0	0	0	0	0	0	0	0
23	HAVERI	8/20	0	1	6	14	2	5	8	20	0	0	0	0	0	0	0	0
24	DHARWAD	8/14	0	0	6	10	2	4	8	14	0	0	0	0	0	0	0	0
17	YADGIR	6/20	0	0	0	0	6	18	6	18	0	2	0	0	0	0	0	2
13	VIJAYANAGAR	6/19	0	0	3	10	3	9	6	19	0	0	0	0	0	0	0	0
	North Interior Karnataka	108/316	1	5	36	90	69	205	106	300	2	16	0	0	0	0	2	16
25	SHIVAMOGGA	7/41	1	3	3	20	3	17	7	40	0	1	0	0	0	0	0	1
26	HASSAN	8/38	1	6	5	16	2	13	8	35	0	2	0	1	0	0	0	3
27	CHIKKAMAGALURU	8/36	2	9	4	13	2	13	8	35	0	1	0	0	0	0	0	1
28	KODAGU	3/16	0	0	0	3	3	11	3	14	0	2	0	0	0	0	0	2
	Malnad	26/131	4	18	12	52	10	54	26	124	0	6	0	1	0	0	0	7
29	DAKSHINA KANNADA	7/19	0	0	0	1	7	17	7	18	0	1	0	0	0	0	0	1
30	UDUPI	7/12	0	0	1	0	6	12	7	12	0	0	0	0	0	0	0	0
31	UTTARA KANNADA	12/36	0	1	7	11	5	23	12	35	0	1	0	0	0	0	0	1
	Coastal	26/67	0	1	8	12	18	52	26	65	0	2	0	0	0	0	0	2
	State	227/850	20	132	95	320	110	373	225	825	2	24	0	1	0	0	2	25

1.4 SEASONAL RAINFALL DURING 2021

1.4.1. PRE-MONSOON SEASON RAINFALL:

The Pre-Monsoon season covers Five months, from January to May, of which January and February pertains to winter and the later three months, March to May, is characterized with hot weather condition.

The Pre-Monsoon Normal rainfall for the State is **120 mm** which constitutes only **10%** of the Annual Normal rainfall. The Pre-Monsoon Normal rainfall varies from **67 mm** in Raichur District to **270 mm** in Kodagu District. The Normal rainfall for the State during January to March is only **9 mm**, whereas the Normal rainfall during April and May is **35 mm** and **83 mm** respectively.

Rainfall pattern during Pre-Monsoon-2021.

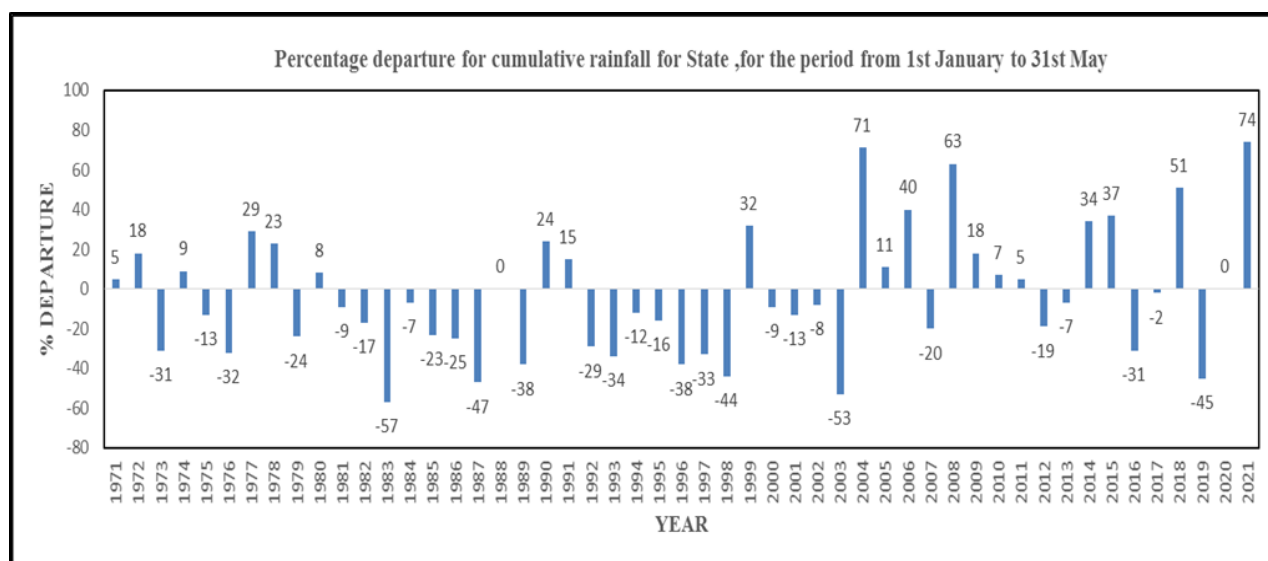
During Pre-Monsoon season 2021 the state as a whole recorded an actual amount of **207 mm** of rainfall as against the Normal rainfall of **120 mm** with percentage departure from Normal being **(74%)**. Thus the State as whole is classified under **Large Excess** Category.

The comparison of Zone wise rainfall pattern during the period from **Pre- Monsoon 2021** with the rainfall of corresponding week in the last **4** years is as follows.

Region/State	Normal (mm)	2017		2018		2019		2020		2021	
		Actual (mm)	Dep%	Actual (mm)	Dep%	Actual (mm)	Dep%	Actual (mm)	Dep%	Actual (mm)	Dep%
1.SIK	143.3	204	35	235	56	121	-20	168	17	180.7	26
2.NIK	83.2	54	-43	109	16	38	-60	81	-2	121.5	46
3.MALNAD	167.5	178	-2	308	69	90	-51	183	9	338.2	102
4.COASTAL	158.2	148	-13	312	82	44	-74	149	-6	514.7	225
State	120	126	-2	194	51	71	-45	120	0	207	74

The percentage departure of rainfall from Normal for the state during Pre-Monsoon which is **good** when compared to the corresponding period of preceding year.

The percentage departure of rainfall from Normal for the state as a whole, during the period **Pre-Monsoon** since 1971, in given figure below:



The figure shows that the percentage departure of rainfall from Normal for the State which is the **highest** in the corresponding period of **last 50** years.

District wise Rainfall pattern during Pre-Monsoon 2021 is given in the following :(**Total 31 Districts in the State**):

SI. No.	District	Normal	Actual	% Dep
1	Uttara Kannada	103	408	296
2	Udupi	201	616	207
3	Dakshina Kannada	243	666	175
4	Shivamogga	129	321	149
5	Chikkamagaluru	164	386	135
6	Haveri	122	256	111
7	Dharwad	125	252	101
8	Chitradurga	103	200	93
9	Davanagere	105	180	71
10	Belagavi	95	158	67
11	Kodagu	253	418	65
12	Chikkaballapura	108	171	58
13	Kalaburagi	67	106	58
14	Gadag	106	166	57
15	Tumakuru	125	195	56
16	Hassan	168	261	55
17	Vijayanagar	99	137	39
18	Kolar	117	160	36
19	Ballari	74	101	35
20	Bidar	71	90	26
21	Koppala	82	102	25
22	Mandya	166	193	16
23	Vijayapura	63	71	13
24	Yadgir	68	75	11
25	Bengaluru Rural	141	154	9
26	Ramanagara	178	193	9
27	Bengaluru Urban	156	169	8
28	Raichur	69	72	5
29	Bagalkote	80	78	-2
30	Mysuru	205	171	-17
31	Chamarajanagara	203	158	-22
	STATE	120	207	74

The district wise rainfall pattern indicates: **(Total 31 Districts in the State):**

Rainfall category	No. of Districts
Large Excess ($\geq 60\%$)	11 Districts
Excess (+20 to +59%)	10 Districts
Normal (-19 to +19%)	9 Districts
Deficient (-20 to -59%)	1 District
Large Deficient (-60 to -99%)	Nil
No rain ($\leq -100\%$)	Nil

During **Pre-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **11** Districts, **Excess** in **10** Districts, **Normal** in **9** Districts and **Deficient** in **1** District. During the corresponding period of the preceding year (2020), the rainfall was **Excess** in **5** Districts, **Normal** in **23** Districts and **Deficient** in **2** Districts.

41.1.2 Taluk wise Rainfall pattern during Pre-Monsoon 2021 is given in the following table. **(Total 227 Taluks in the State):**

Rainfall category	No. of Taluks
Large Excess ($\geq 60\%$)	84 Taluks
Excess (+20 to +59%)	68 Taluks
Normal (-19 to +19%)	55 Taluks
Deficient (-20 to -59%)	20 Taluks
Large Deficient (-60 to -99%)	Nil
No rain ($\leq -100\%$)	Nil

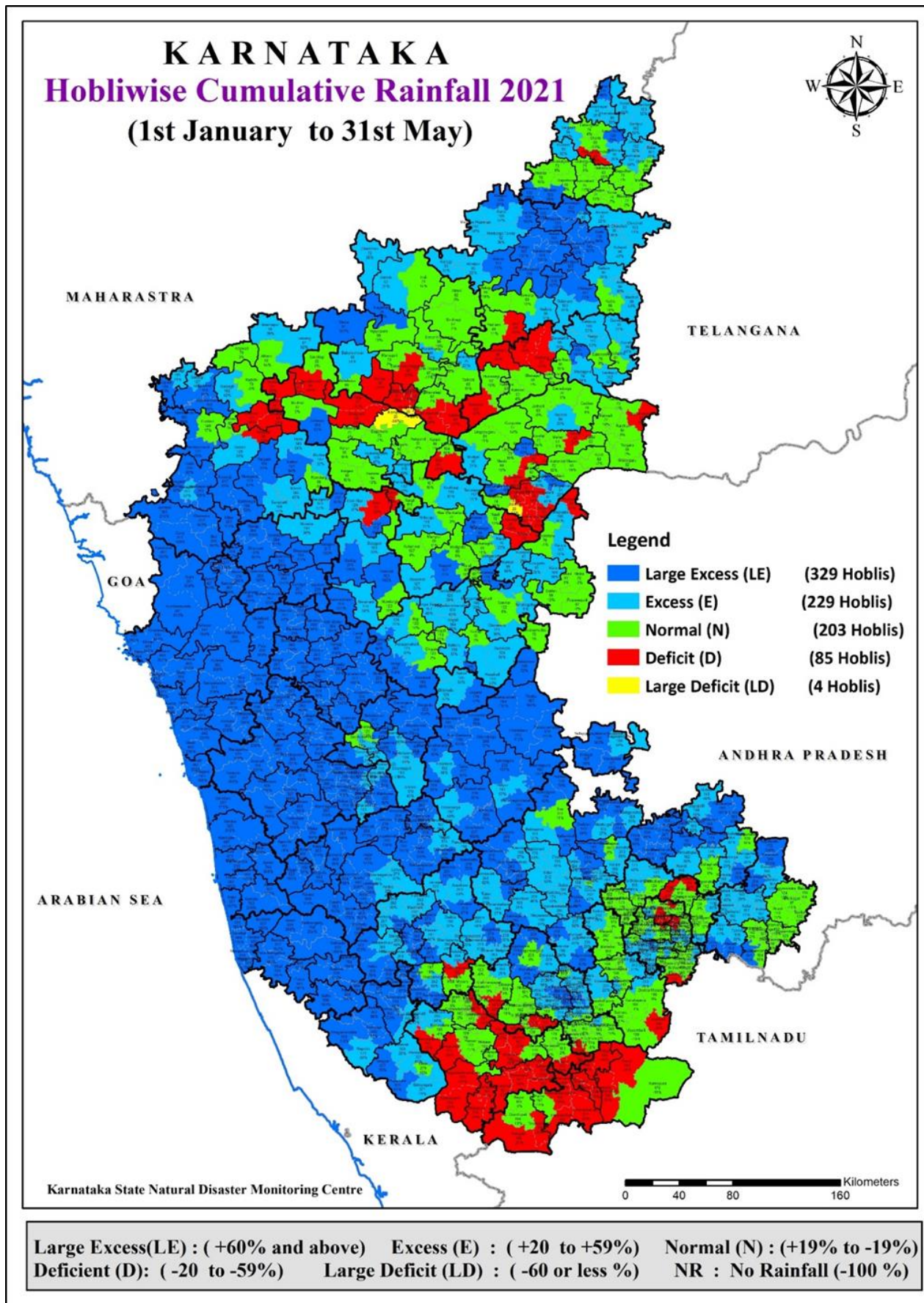
During **Pre-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **84** Taluks, **Excess** in **68** Taluks, **Normal** in **55** Taluks and **Deficient** in **20** Taluks. During the preceding year (2020), the rainfall was **Large Excess** in **8** Taluks, **Excess** in **43** Taluks, **Normal** in **114** Taluks, **Deficient** in **59** Taluks and **Large Deficient** in **3** Taluks.

The Hobli-wise rainfall pattern during **Pre-Monsoon 2021** is given in the following table **(Total 850 Hoblis in the State):**

Rainfall category	No. of Hoblis
Large Excess ($\geq 60\%$)	329 Hoblis
Excess (+20 to +59%)	229 Hoblis
Normal (-19 to +19%)	203 Hoblis
Deficient (-20 to -59%)	85 Hoblis
Large Deficient (-60 to -99%)	4 Hoblis
No rain ($\leq -100\%$)	Nil

During **Pre-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **329** Hoblis, **Excess** in **229** Hoblis, **Normal** in **203** Hoblis, **Deficient** in **85** Hoblis and **Large Deficient** in **4** Hoblis. During the preceding year (2020), the rainfall was **Large Excess** in **65** Hoblis, **Excess** in **231** Hoblis, **Normal** in **363** Hoblis, **Deficient** in **180** Hoblis and **Large Deficient** in **11** Hoblis .

Figure 1.9: Hobli-Wise Rainfall pattern during the Pre-Monsoon Season 2021



1.4.2. SOUTH WEST (SW) MONSOON SEASON 2021 RAINFALL:

The South-West (SW) Monsoon season (June to September) contributes **76%** of the Normal Annual rainfall of the State. The onset of SW-Monsoon over the State normally takes place by the first week of June. The Normal SW-Monsoon season rainfall varies from as **low** as **276 mm** in **Chitradurga** District to as high as **4,071 mm** in **Udupi** District. The Kharif agricultural production in the State heavily depends on the timeliness, quantum and distribution of the SW-Monsoon season rainfall.

Rainfall Condition during the South West Monsoon season 2021:

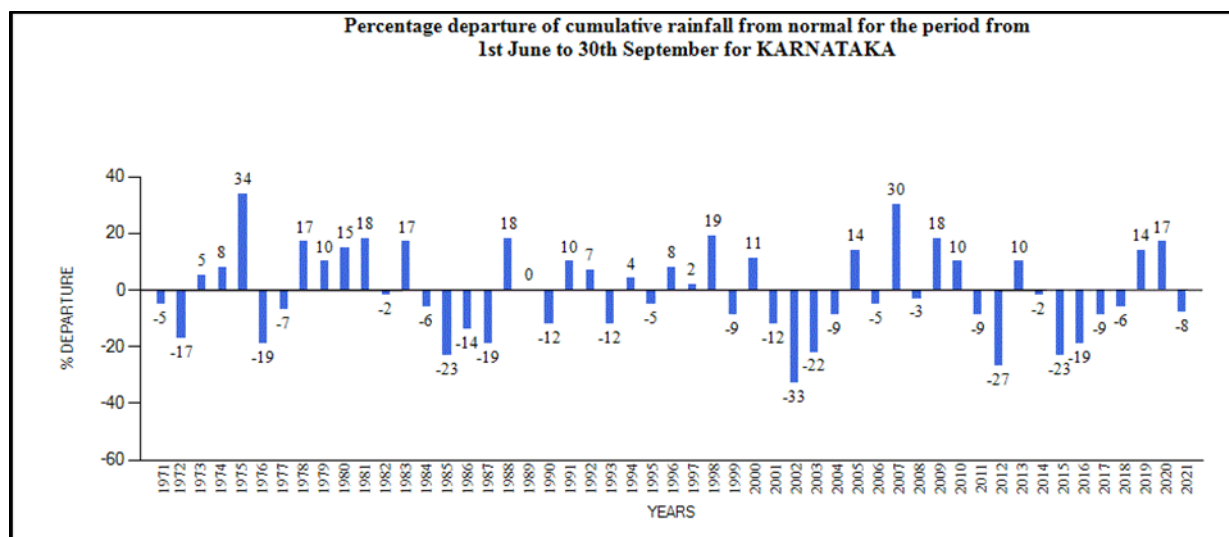
During the **SW-Monsoon season 2021**, the State as a whole recorded **787 mm** of rainfall as against the Normal rainfall of **852 mm** with a **(-) 8%** departure from the Normal. Thus, the rainfall over the State during the SW-Monsoon season 2021 is classified as **Normal category**.

The comparison of Zone-wise rainfall pattern during the SW-Monsoon season **2019** with the rainfall of corresponding season in the last 4 years is as follows.

Region/ State	Normal (mm)	2017		2018		2019		2020		2021	
		Actual (mm)	% Dep	Actual (mm)	% Dep	Actual (mm)	% Dep	Actual (mm)	% Dep	Actual (mm)	% Dep
1.SIK	369	457	24	333	-10	411	11	512	39	384	4
2.NIK	479	462	-3	311	-35	506	6	650	36	496	4
3.MALNAD	1556	1236	-21	1858	19	1834	18	1448	-7	1283	-18
4.COASTAL	3101	2579	-17	3104	0	3734	20	3458	12	2692	-13
State	852	774	-9	804	-6	975	14	993	17	787	-8

The departure (%) of rainfall from the Normal during SW-Monsoon season is **(-) 8%**, which is **bad** when compared to the corresponding periods of the **last** year.

The percentage departure of rainfall from Normal for the State during the SW-Monsoon season, since 1971 is given in the following Figure 1.10:



The figure indicates that the departure (%) of rainfall from the Normal during SW-Monsoon season 2021 is **(-) 8%**, which is **less** than the corresponding period of the **last** year.

District wise Rainfall pattern during South West Monsoon 2021.

Sl. No.	District	Normal	Actual	Percentage Departure
1	KOLAR	399	621	56
2	KALABURAGI	576	723	25
3	BENGALURU RURAL	444	542	22
4	CHIKKABALLAPURA	416	496	19
5	BIDAR	650	731	12
6	DAVANAGERE	393	436	11
7	VIJAYAPURA	396	423	7
8	CHITRADURGA	282	298	6
9	BELAGAVI	599	613	2
10	TUMAKURU	358	361	1
11	VIJAYANAGARA	389.1	393.9	1
12	BAGALKOTE	362	360	-1
13	BENGALURU URBAN	471	468	-1
14	KOPPALA	383	378	-1
15	GADAG	372	361	-3
16	MANDYA	316	306	-3
17	CHAMARAJANAGARA	320	306	-4
18	UTTARA KANNADA	2647	2532	-4
19	RAMANAGARA	436	408	-6
20	YADGIR	517	484	-6
21	DHARWAD	514	477	-7
22	RAICHUR	440	409	-7
23	BALLARI	389	394	-9
24	HAVERI	512	448	-13
25	UDUPI	4022	3444	-14
26	SHIVAMOGGA	1991	1694	-15
27	HASSAN	754	634	-16
28	CHIKKAMAGALURU	1447	1183	-18
29	KODAGU	2188	1692	-23
30	MYSURU	419	312	-26
31	DAKSHINA KANNADA	3388	2479	-27
	State	852	787	-8

The District wise rainfall pattern indicates: Among 31 Districts

Large Excess ($\geq 60\%$)	Nil
Excess (+20 to +59%)	3 Districts
Normal (-19 to +19%)	25 Districts
Deficit (-20 to -59%)	3 Districts
Large Deficit (-60 to -99%)	Nil
No rain ($\leq -100\%$)	Nil

During **South West-Monsoon 2021**, the above data shows that, the rainfall was **Excess** in **3** Districts, **Normal** in **25** Districts and **Deficient** in **3** Districts. Last year for the same period rainfall was **Excess** in **21** Districts and **Normal** in **9** Districts.

Taluk wise Rainfall pattern during South-West Monsoon 2021

Among the **227** Taluks of the state the rainfall was:

Large Excess ($\geq 60\%$)	3 Taluks
Excess (+20 to +59%)	32 Taluks
Normal (-19 to +19%)	167 Taluks
Deficit (-20 to -59%)	25 Taluks
Large Deficit (-60 to -99%)	Nil
No rain ($\leq -100\%$)	Nil

During **South West-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **3** Taluks, **Excess** in **32** Taluks, **Normal** in **167** Taluks and **Deficient** in **25** Taluks. Last year for the same period rainfall was **Excess** in **160** Taluks, **Normal** in **66** Taluks and **Deficit** in **1** Taluk.

Hobli wise Rainfall pattern during South-West Monsoon 2021

Among the **850** Hoblis of the state the rainfall was:

Large Excess ($\geq 60\%$)	19 Hoblis
Excess (+20 to +59%)	151 Hoblis
Normal (-19 to +19%)	512 Hoblis
Deficit (-20 to -59%)	166 Hoblis
Large Deficit (-60 to -99%)	2 Hoblis
No rain ($\leq -100\%$)	Nil

During **South West-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **19** Hoblis, **Excess** in **151** Hoblis, **Normal** in **512** Hoblis, **Deficit** in **166** Hoblis and **Large Deficit** in **2** Hoblis. Last year for the same period rainfall was **Excess** in **581** Hoblis, **Normal** in **238** Hoblis and **Deficit** in **30** Hoblis and **Large Deficit** in **1** Hobli.

KARNATAKA
Hobliwise
Cumulative Rainfall (mm)
Southwest Monsoon 2021
(1st June to 30th September)

MAHARASTRA
 GOA
 TELANGANA
 ANDHRA PRADESH
 TAMILNADU
 KERALA
 ARABIAN SEA

Legend

Large Excess (LE)	(19 Hoblis)
Excess (E)	(151 Hoblis)
Normal (N)	(512 Hoblis)
Deficit (D)	(166 Hoblis)
Large Deficit (LD)	(2 Hoblis)

Karnataka State Natural Disaster Monitoring Centre

0 40 80 160 Kilometers

1.4.3. NORTH EAST (NE) MONSOON SEASON RAINFALL:

The North-East (NE) Monsoon season (October to December) contributes about **15%** of rainfall to the Annual Normal rainfall for the State. Regionally, the NE-Monsoon season rainfall contributes about **8%** to the Annual Normal rainfall in the Coastal area, **12%** in Malnad region, about **20%** in NIK and **29%** in SIK. The rainfall during the NE-Monsoon season is very important for the later stages of Kharif crops and for the Rabi crops as well in the State.

Rainfall during North-East Monsoon season 2021 in the State.

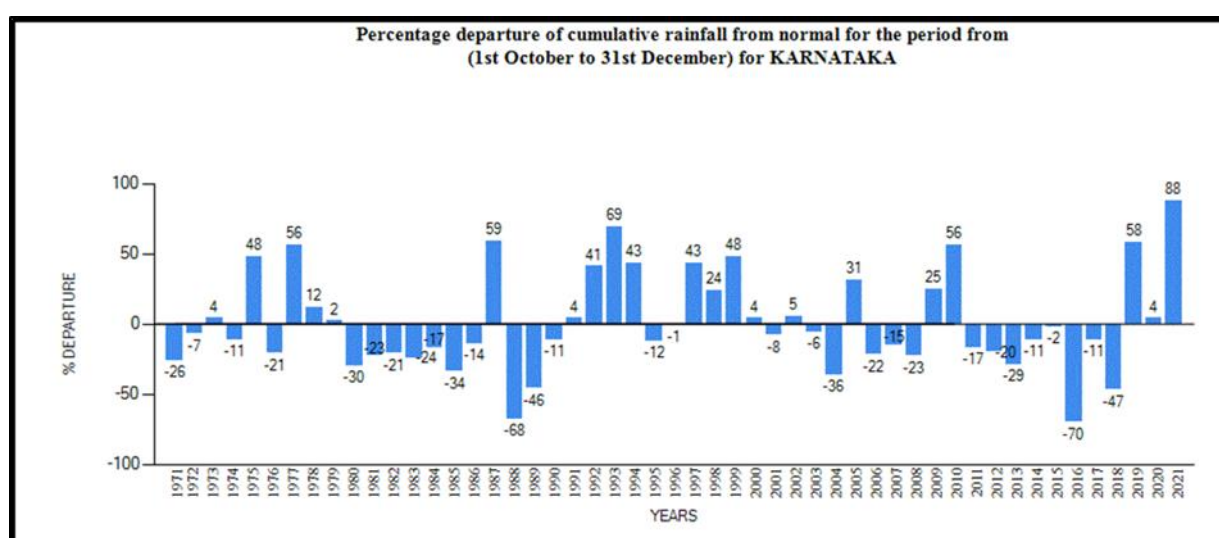
During the **NE-Monsoon season**, the State as a whole recorded **342 mm** of rainfall as against the Normal rainfall of **182 mm** with a **(+)88%** departure from Normal rainfall for the season. Thus, the rainfall for the State during the NE-Monsoon season 2021 is considered as **Large Excess** category.

The comparison of Zone-wise rainfall pattern during the **NE-Monsoon season 2021** with the rainfall of corresponding season in the last 4 years is as follows.

Region/State	Normal (mm)	2017		2018		2019		2020		2021	
		Actual (mm)	Dep%	Actual (mm)	Dep%	Actual (mm)	Dep%	Actual (mm)	Dep%	Actual (mm)	Dep%
1.SIK	201.9	227.1	12	118.7	-41	287.4	42	196.4	-3	485	140
2.NIK	139.7	124.5	-11	49.2	-65	201.5	44	150.8	8	162.9	17
3.MALNAD	225.7	126.1	-44	137	-39	376.2	67	207.3	-8	477.8	112
4.COASTAL	259.4	196.2	-24	186.7	-28	579.8	124	330	27	577.1	122
State	182.2	162.7	-11	95.8	-47	287.8	58	190	4	342	88

The data indicates that the departure (%) of rainfall for the State during **NE-Monsoon 2021** was **(+) 88%** which is **better** when compared to the corresponding periods of the last **4** years.

The percentage departure of rainfall from Normal for the State during the **NE-Monsoon season**, since 1971 is given in the following Figure:



The figure indicates that the departure (%) of rainfall from the Normal during the NE-Monsoon season 2021 is **(+) 88 %** which is **highest in** the corresponding periods of the last 50 years.

District wise Rainfall pattern during North-East Monsoon 2021.

SL. No.	District	Normal(mm)	Actual(mm)	Percentage Departure
1	Tumakuru	186	554	197
2	Chikkaballapura	211	603	186
3	Bengaluru Rural	213	559	162
4	Kolar	219	536	144
5	Chitradurga	155	374	141
6	Mandya	217	513	136
7	Udupi	312	737	136
8	Davanagere	161	371	130
9	Chikkamagaluru	221	501	126
10	Bengaluru Urban	219	491	124
11	Mysuru	214	473	121
12	Uttara Kannada	187	407	118
13	Dakshina Kannada	376	818	118
14	Ramanagara	226	485	114
15	Hassan	220	468	113
16	Shivamogga	205	429	109
17	Kodagu	288	546	89
18	Haveri	166	310	87
19	Chamarajanagara	263	442	68
20	Dharwad	148	236	60
21	Belagavi	133	212	59
22	Ballari	159	249	56
23	Vijayanagar	155	242	56
24	Koppala	149	158	6
25	Gadag	147	151	2
26	Raichur	146	143	-2
27	Kalaburagi	127	114	-10
28	Yadgir	134	110	-18
29	Bagalkote	141	112	-20
30	Bidar	117	86	-26
31	Vijayapura	133	93	-30
	State	186	342	88

The District wise Rainfall pattern indicates:

Rainfall category	No. of Districts
Large Excess ($\geq 60\%$)	19 Districts
Excess (+20 to +59%)	4 Districts
Normal (-19 to +19%)	5 Districts
Deficit (-20 to -59%)	3 Districts
Large Deficit (-60 to -99%)	Nil
No rain ($\leq -100\%$)	Nil

During **North East-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **19** Districts, **Excess** in **4** Districts, **Normal** in **5** Districts and **Deficit** in **3** Districts. During the corresponding period of the preceding year (2020), the Rainfall was **Excess** in **6** Districts, **Normal** in **20** Districts and **Deficit** in **4** Districts.

1.2.2 Taluk wise Cumulative Rainfall pattern during 1st October to 31st December 2021 is given in the following table. (**Total 227 Taluks in the State**):

Rainfall category	No. of Taluks
Large Excess ($\geq 60\%$)	133 Taluks
Excess (+20 to +59%)	34 Taluks
Normal (-19 to +19%)	28 Taluks
Deficit (-20 to -59%)	31 Taluks
Large Deficit (-60 to -99%)	1 Taluk
No rain ($\leq -100\%$)	Nil

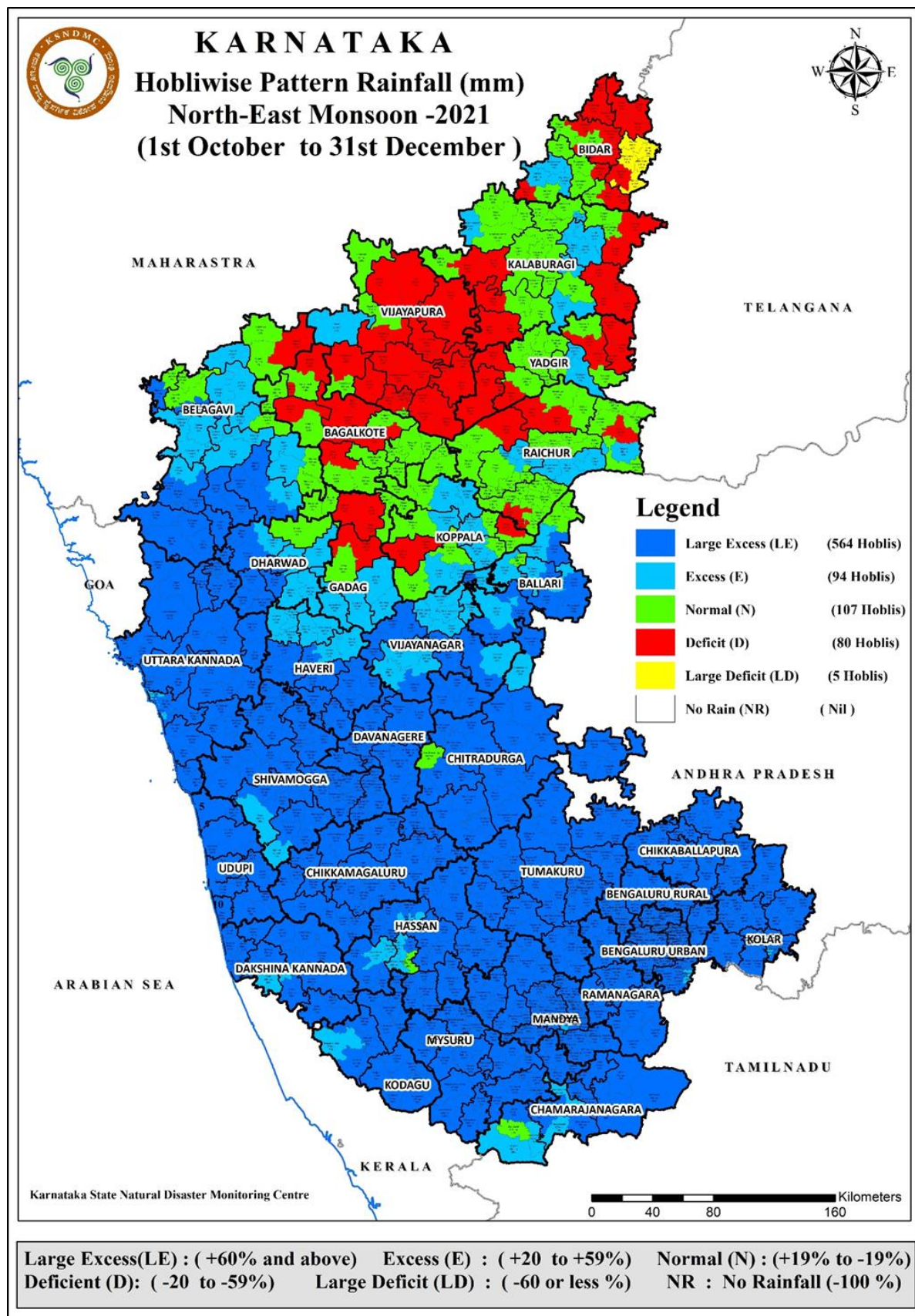
During **North East -Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **133** Taluks, **Excess** in **34** Taluks, **Normal** in **28** Taluks, **Deficit** in **31** Taluks and **Large Deficit** in **1** Taluk. During the preceding year (2020), the Rainfall was **Large Excess** in **13** Taluks, **Excess** in **43** Taluks, **Normal** in **126** Taluks, **Deficit** in **44** Taluks and **Large Deficit** in **1** Taluk.

The Hobli-wise Rainfall pattern during **1st October to 31st December 2021** is given in the following Table (**Total 850 Hoblis in the State**):

Rainfall category	No. of Hoblis
Large Excess ($\geq 60\%$)	564 Hoblis
Excess (+20 to +59%)	94 Hoblis
Normal (-19 to +19%)	107 Hoblis
Deficit (-20 to -59%)	80 Hoblis
Large Deficit (-60 to -99%)	5 Hoblis
No rain ($\leq -100\%$)	Nil

During **North East-Monsoon 2021**, the above data shows that, the rainfall was **Large Excess** in **564** Hoblis, **Excess** in **94** Hoblis, **Normal** in **107** Hoblis, **Deficit** in **80** Hoblis and **Large Deficit** in **5** Hoblis. During the preceding year (2020), the Rainfall was **Large Excess** in **56** Hoblis, **Excess** in **181** Hoblis, **Normal** in **436** Hoblis, **Deficit** in **173** Hoblis and **Large Deficit** in **4** Hoblis.

Figure 1.12: Hobli-wise Rainfall pattern during the North East Monsoon Season 2021:



2. AGRICULTURE SITUATION IN KARNATAKA 2021-2022

Kharif season (June to September), accounts for about 75% of the total agricultural area sown in the state. **Rabi season (October to December)** and **Summer season (January to May)** constitutes 25% and less than 1% of the total agricultural sown area.

Table no. 2.1 provides the normal area for different crops and the actual area covered during the current a season. During 2021 a total of **104.92 (108.41) lakh hectares** was sown as against the normal of **102.17 lakh hectares**.

The figures in parenthesis in the following analysis indicate last year's coverage for the respective crops unless otherwise indicated.

During 2021, coverage by cereals was **96% (104%)** of the normal. The area covered as percentage of normal under Cereals crops are **Rice- 92%, Jowar- 83%, Ragi- 105%, Maize- 110%, Bajra- 71%, Wheat- 85% and Minor Millets- 72%**.

In case of pulses, the area sown was **106% (104%)** of the normal. The area covered as percentage of normal under Pulses crops are **Tur- 133%, Bengalgram- 87%, Horsegram- 82%, Blackgram- 96%, Greengram- 115%, Cowpea & others- 90%, Avare- 98% and Mothbean- 23%**.

In case of oilseeds, the area sown was **106% (106%)** of the normal. The area covered as percentage of normal under Oilseeds crops are **Groundnut- 102%, Sesamum- 89%, Sunflower- 95%, Castor- 88%, Niger- 61%, Mustard- 19%, Soyabean- 123%, Safflower- 119% and Linseed- 112%**.

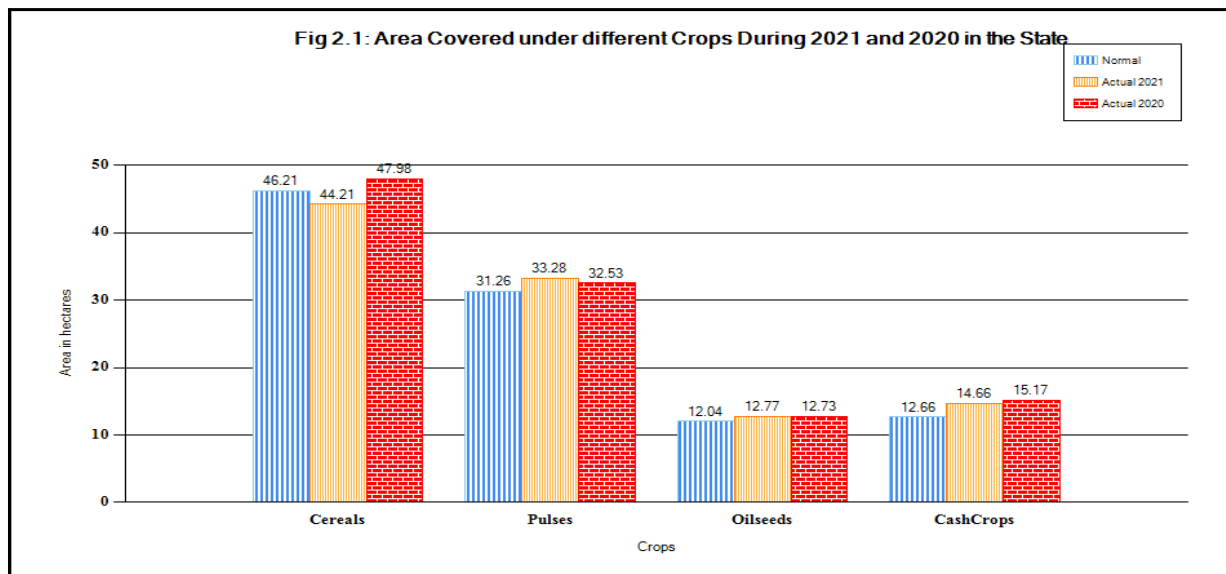
In case of cashcrops, the area sown was **116% (120%)** of the normal. The area covered as percentage of normal under Cashcrops crops are **Cotton- 112%, Sugarcane- 123% and Tobacco- 93%**.

Table: 2.1: Normal area and areas actually sowed under different major crops during 2021 in the state

(Area in lakh ha.)

Sl. no.	Crops	Annual Normal (Kharif + Rabi + Summer)	Kharif 2021	Rabi 2021	Summer 2022	Total Area '21 (Col.4+5+6)	Col.7 as% of Col.3	Total Area-2020 (K+R+S)	Col.9 as % of Col.3
1	2	3	4	5	6	7	8	9	10
1	Rice	11.87	10.22	0.05	0.60	10.87	92	13.20	111
2	Jowar	9.42	0.64	7.14	0.00	7.78	83	8.38	89
3	Ragi	6.86	6.88	0.31	0.02	7.21	105	7.10	103
4	Maize	13.67	14.16	0.75	0.07	14.97	110	15.12	111
5	Bajra	2.16	1.53	0.00	0.00	1.53	71	1.94	90
6	Wheat	1.83	0.00	1.56	0.00	1.56	85	1.90	104
7	Minor Millets	0.40	0.29	0.00	0.00	0.29	72	0.35	88
	Total Cereals	46.21	33.71	9.81	0.68	44.21	96	47.98	104
8	Tur	10.96	14.56	0.00	0.00	14.56	133	13.03	119
9	Bengalgram	12.62	0.00	10.94	0.00	10.94	87	11.75	93
10	Horsegram	1.49	0.34	0.88	0.00	1.22	82	1.25	84
11	Blackgram	1.03	0.97	0.01	0.00	0.98	96	1.12	110
12	Greengram	3.67	4.18	0.02	0.00	4.20	115	3.96	108
13	Cowpea & others	0.87	0.65	0.13	0.00	0.78	90	0.77	88
14	Avare	0.61	0.51	0.08	0.00	0.60	98	0.63	104
15	Mothbean	0.01	0.00	0.00	0.00	0.00	23	0.02	123
	Total Pulses	31.26	21.22	12.06	0.01	33.28	106	32.53	104
	Total Foodgrains	77.47	54.93	21.87	0.69	77.49	100	80.51	104
16	Groundnut	6.27	4.90	1.32	0.16	6.38	102	6.96	111
17	Sesamum	0.27	0.24	0.00	0.00	0.24	89	0.27	101
18	Sunflower	1.86	1.10	0.67	0.01	1.78	95	1.71	92
19	Castor	0.07	0.06	0.00	0.00	0.06	88	0.08	110
20	Niger	0.05	0.03	0.00	0.00	0.03	61	0.05	101
21	Mustard	0.02	0.00	0.00	0.00	0.00	19	0.01	71
22	Soyabean	3.18	3.84	0.06	0.01	3.91	123	3.30	104
23	Safflower	0.29	0.00	0.34	0.00	0.34	119	0.30	106
24	Linseed	0.03	0.00	0.03	0.00	0.03	112	0.03	121
	Total Oilseeds	12.04	10.17	2.43	0.18	12.77	106	12.73	106
25	Cotton	5.92	6.39	0.23	0.00	6.62	112	7.46	126
26	Sugarcane	5.87	6.39	0.80	0.03	7.22	123	6.92	118
27	Tobacco	0.87	0.81	0.00	0.00	0.81	93	0.79	91
	Total Cashcrops	12.66	13.60	1.03	0.03	14.66	116	15.17	120
	State Total	102.17	78.70	25.33	0.90	104.92	103	108.41	106

Fig. 2.1 provides a diagrammatic representation of the coverage by various crop groups during **2021**



2.2. Districtwise details of Area sown during Kharif, Rabi & Summer

(Area in lakh ha.)

Sl. no.	Crops	Normal Area (Kharif + Rabi + Summer)	Kharif 2021	Rabi 2021	Summer 2022	Total Area 2021 (Col.4+5 +6)	Col.7 as% of Col.3	Total Area 2020 (K+R+S)	Col.9 as % of Col.3
1	2	3	4	5	6	7	8	9	10
1	Bengaluru rural	0.52	0.62	0.01	0.00	0.63	121	0.57	110
2	Bengaluru urban	0.17	0.21	0.00	0.00	0.21	120	0.19	112
3	Chamarajanagara	1.58	1.26	0.31	0.01	1.58	100	1.50	95
4	Chikkaballapura	1.29	1.39	0.02	0.01	1.42	110	1.36	106
5	Chitradurga	3.48	3.44	0.51	0.04	3.99	115	4.18	120
6	Davanagere	3.26	2.35	0.12	0.00	2.48	76	3.00	92
7	Kolar	0.87	0.90	0.01	0.00	0.91	104	0.96	110
8	Mandya	2.11	1.77	0.29	0.01	2.07	98	2.35	111
9	Mysuru	4.46	3.77	0.54	0.00	4.32	97	4.62	104
10	Ramanagara	0.97	0.86	0.03	0.00	0.90	92	0.96	99
11	Tumakuru	2.90	3.47	0.06	0.01	3.54	122	3.63	125
	SIK	21.61	20.05	1.92	0.07	22.04	102	23.33	108
12	Bagalkote	5.78	2.72	2.47	0.00	5.19	90	5.79	100
13	Ballari	5.29	4.29	0.71	0.31	5.30	100	5.83	110
14	Belagavi	9.86	7.18	2.85	0.06	10.08	102	10.15	103
15	Bidar	4.52	3.71	1.12	0.00	4.83	107	4.79	106
16	Dharwad	4.12	2.73	1.96	0.02	4.70	114	4.12	100
17	Gadag	4.82	3.01	2.61	0.02	5.65	117	5.71	118
18	Haveri	3.81	3.31	0.66	0.02	3.99	105	3.98	105
19	Kalaburagi	9.91	7.50	2.33	0.01	9.85	99	10.31	104
20	Koppala	4.68	3.09	1.74	0.00	4.82	103	5.19	111
21	Raichur	6.80	4.72	2.27	0.33	7.32	108	7.83	115
22	Vijayapura	9.27	6.43	3.45	0.00	9.88	107	9.37	101
23	Yadgir	4.28	3.78	0.80	0.00	4.58	107	4.95	116
	NIK	73.14	52.46	22.97	0.78	76.21	104	78.02	107
24	Chikkamagalur	1.51	1.16	0.26	0.00	1.42	94	1.52	101
25	Hassan	2.41	2.31	0.11	0.00	2.42	100	2.41	100
26	Kodagu	0.27	0.27	0.00	0.00	0.27	98	0.27	99
27	Shivamogga	1.74	1.32	0.00	0.06	1.38	79	1.60	92
	MALNAD	5.93	5.06	0.38	0.06	5.49	93	5.80	98
28	D.Kannada	0.24	0.10	0.01	0.00	0.12	49	0.14	60
29	Udupi	0.47	0.36	0.04	0.00	0.40	83	0.44	92
30	U.Kannada	0.78	0.68	0.01	0.00	0.69	87	0.75	95
	COASTAL	1.49	1.14	0.06	0.00	1.20	80	1.33	89
	State Total	102.17	78.71	25.33	0.91	104.94	103	108.00	106

1. WATER BALANCE METHODOLOGY FOR MONITORING OF DROUGHT PERIODS AND THEIR SEVERITIES DURING AGRICULTURAL GROWING SEASON

The understanding of agricultural drought pattern requires not only analysis of rainfall records but also adequacy of soil moisture patterns and deficiencies of the same during the crop growing season of a particular year or between different years. It is more realistic to adopt a suitable method of water budgeting and deal with the soil moisture available in a crop growing season. Drought occurs when there is insufficient moisture in the root zone of the crop. Where direct measurement of soil moisture and its determination are not possible, the concept of potential evapo-transpiration and the water budgeting provide an indirect method for determining actual evapo-transpiration (AE) and changes in soil moisture.

Moisture Adequacy Index:

The ratio AE / PE expressed in percentage known as Moisture Adequacy Index (MAI) is a useful index for scientific crop planning and drought monitoring. The systems analysis approach using the distribution of Moisture Adequacy Index with in crop growing season would help in determining optimum times for sowing, selection of suitable crop varieties and other cultural operations for specific regions.

Decrease of MAI from 100% would indicate soil moisture stress conditions experienced by the crops. Up to MAI value of 75%, there would be hardly any moisture stress. So period with MAI >75% can be denoted as humid period. Many dry land crops would experience only slight moisture stress even up to MAI of 50%. So period for which MAI is 50% -75% or above is considered as agricultural condition. When MAI is between 25% and 50% crops would experience only moderate drought conditions. So some of the drought resistant crops like Jowar, Ragi, Bajra, Minor millets, Groundnut, Sunflower and Pulses etc., would be able to withstand such droughts for a limited period. But when MAI becomes less than 25% severe drought would set in. The results of moisture adequacy index studies at the end of the South-West Monsoon season are presented in the figures 4.1

The Salient findings are as follows:

At the end of **September 2021**, due to **Normal** rainfall over major parts of the State, **35%** of the geographical area is falling under **Moderate to Severe** condition and remaining **65%** of the geographical area is falling under **Normal agriculturally favorable** condition.

At the end of **December 2021**, due to **Normal** rainfall over major parts of the State **35%** of the area is falling under **moderate to severe** condition and remaining **65%** of the geographical area is falling under **Normal agriculturally favorable** condition.

Figure 3.1: Moisture Adequacy Index (MAI) for SW Monsoon 2021

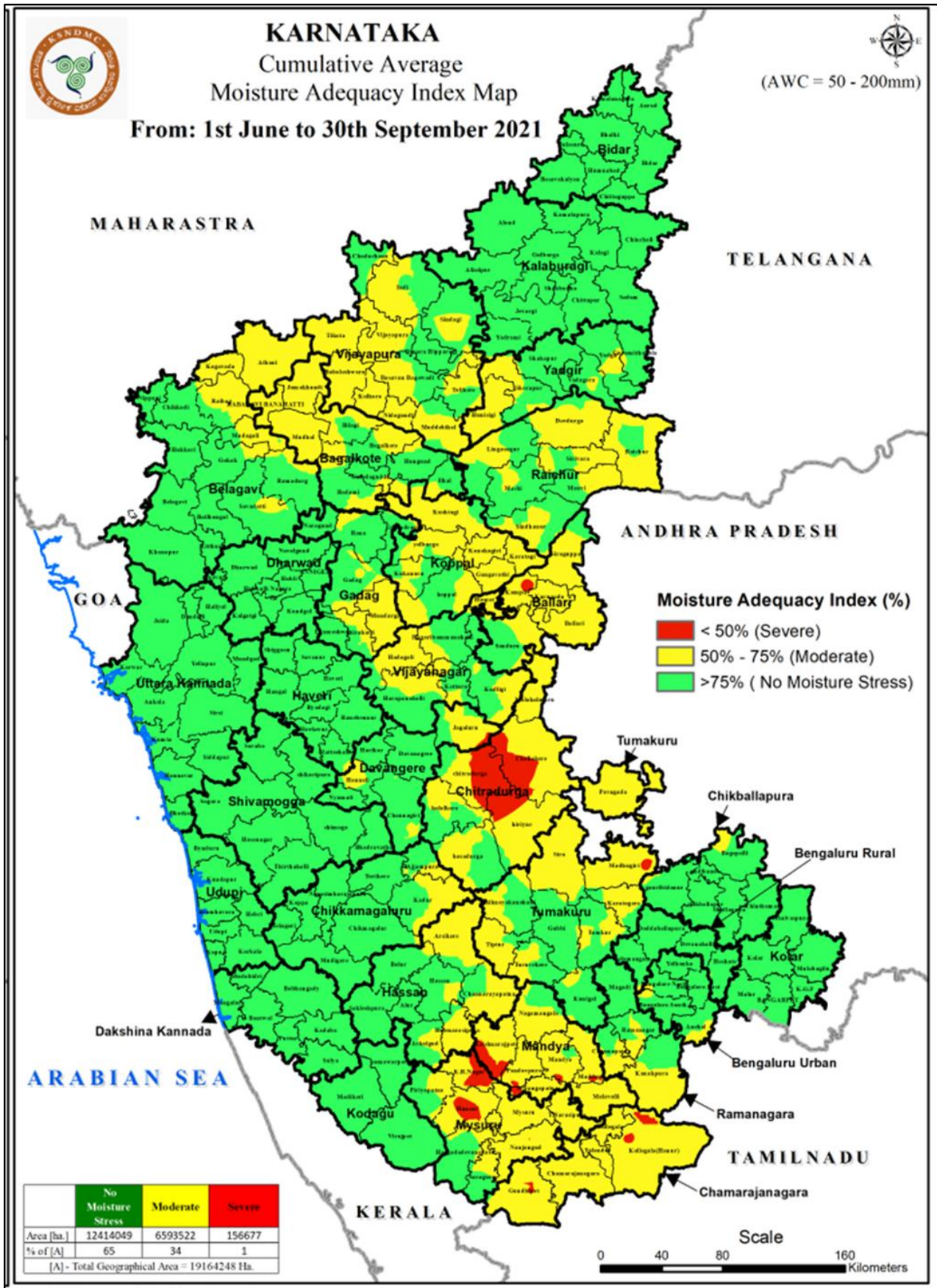
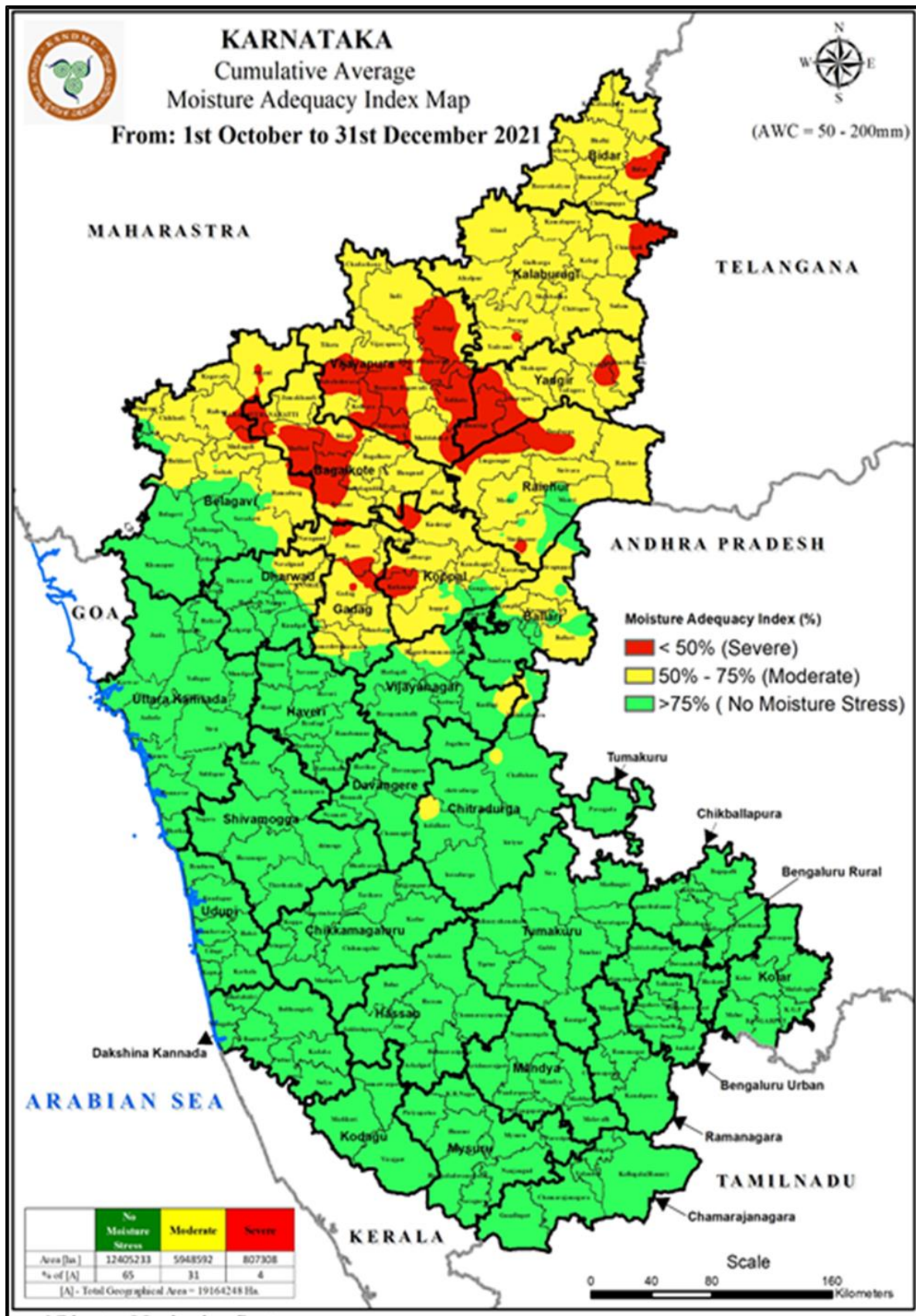


Figure 3.2: Moisture Adequacy Index (MAI) for NE Monsoon 2021



4. MINOR IRRIGATIONS TANKS IN THE STATE

Table 4.1: Zone wise / District-wise Status of Minor Irrigation Tanks (Abstract)

Sl No.	DISTRICT	No Of Tanks	Full Capacity mcft.	Total atchkat area designed	No.of tanks not received water	30%	31-50%	51-99%	100%
1	2	3	4	5	6	7	8	9	10
(a)	Minor Irrigation South Zone as on 31/12/2021								
1	Bangalore Urban	46	1400	4530	2	17	2	10	15
2	Bangalore Rural	98	3107	9681	0	7	28	22	41
3	Ramanagara	102	4216	15092	0	10	15	14	63
4	Kolar	138	5182	12147	0	1	9	115	13
5	Chikkaballapura	201	7954	27107	1	6	22	28	143
6	Tumkur	371	17101	36956	0	85	76	82	128
7	Chitradurga	166	9131	21431	8	92	16	22	28
8	Davanagere	72	5121	8815	6	29	8	12	17
9	Shimoga	306	3556	22981	0	0	4	261	41
10	Mysore	50	896	6989	4	5	9	20	12
11	Chamarajnagar	64	2552	13088	19	8	9	16	12
12	Mandya	48	1232	4319	5	2	0	3	38
13	Hassan	170	4946	12502	8	37	13	13	99
14	Chikkamagalur	124	4267	16846	0	13	9	14	88
15	Dakshina Kannada	2	7	131	1	0	0	1	0
16	Udupi	4	39	283	0	0	0	4	0
17	Kodagu	29	495	1953	0	1	1	24	3
	Total	1991	71202	214851	54	313	221	661	741
(b)	Minor Irrigation North Zone as on 31/12/2021								
1	Belgaum	280	3196	30160	48	50	36	134	12
2	Bijapur	156	3649	23304	18	44	40	53	1
3	Bagalkote	65	1574	12132	17	14	21	7	6
4	Dharwad	112	1741	14076	1	3	16	92	0
5	Gadag	31	1363	7702	13	0	3	10	5
6	Haveri	264	4009	23247	0	5	73	146	40
7	Uttara kannada	91	1773	13755	1	0	0	83	7
8	Gulbarga	166	3903	28441	6	5	20	133	2
9	Yadgiri	72	1510	6614	4	0	9	22	37
10	Bidar	124	2863	21064	4	16	12	46	46
11	Bellary	92	3629	13882	22	23	12	19	16
12	Koppala	122	1937	15844	22	33	16	41	10
13	Raichur	73	1793	8779	19	17	16	16	5
30	Total	1648	32942	219000	175	210	274	802	187
	State Total (a & b)	3639	104144	433851	229	523	495	1463	928

Source: Minor Irrigation Department, Government of Karnataka,

The above table shows the status of the Minor Irrigation (MI) Tanks in the State.

The Southern zone (comprises 17 Districts). There are 1991 MI tanks in the Southern zone Districts. Only 741 Tanks in this zone are filled upto their full capacity as on 31st December 2021. **The Northern zone** (comprises 13 Districts). There are 1648 MI tanks in the Northern zone Districts. Only 187 tanks are filled upto their full capacity as on 31st December 2021.

Out of total 3639 MI tanks in the state, only 66% of the tanks had storages more than 50% of their respective capacity, 28% of the tanks were 30% to 50% storages of their respective capacity and the remaining 6% of the tanks are dry or having insignificant storage.

5. MAJOR RESERVOIR LEVELS IN THE STATE

The position of reservoir levels from 23rd standard week (01.06.2021) to 52nd standard week (31.12.2021), their respective maximum levels, previous year levels reservoir level during recent 10 years depicting maximum, minimum and average levels during particular standard weeks, difference in RL compared to the 10 years average level and difference in RL compared to the previous year level are given in table no. 5.2 to 5.14

Hydel generation reservoirs: Linganamakki, Supa and Varahi are the three main Hydel generation reservoirs of the state which come under west coast basin. The state receives maximum rainfall in the catchments of these basins and the annual rainfall is about 3000 to 4000 mm.

During the water year 2021, the levels in **Linganamakki** reservoir levels in most of the standard weeks were **highest** compared to the recent 10 years average levels. Maximum rise in reservoir level of **9.60 feet** was during **30th std week**. The highest level of **1816.30 feet** was reached during **37th std. week** against full reservoir level of **1819 feet**. The level during the season was **more** by **13.64 feet** compared to the average level and also **more** by **35.20 feet** compared to previous year level.

In the **Supa** reservoir, levels in most of the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **25.36 feet** was during **30th week**. The highest level of **1827.75 feet** was reached during **41st std. week** against full reservoir level of **1849.92 feet**. The level during the season was **more** by **37.06 feet** compared to the average level and **more** by **57.63 feet** compared to previous year level.

In the **Varahi** reservoir, levels in most of the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **11.09 feet** was during **25th week**. The highest level of **1928.57 feet** was reached during **37th std. week** against full reservoir level of **1949.50 feet**. The level during the season was **more** by **0.72 feet** compared to the average level and **more** by **17.64 feet** compared to previous year level.

Reservoirs Cauvery Basin: The 4 major reservoirs of **Cauvery basin viz., Harangi, Hemavathi, K.R.S and Kabini** are used for irrigation purpose.

In the **Harangi** reservoir, levels in most of the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **10.86 feet** was during **28th week**. The highest level of **2858.63 feet** was reached during **38th std. week** against full reservoir level of **2859.00 feet**. The level during the season was **more** by **48.92 feet** compared to the average level and **more** by **35.35 feet** compared to previous year level.

In the **Hemavathi** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **11.08 feet** was during **25th week**. The highest level of **2920.41 feet** was reached during **32nd std. week** against full reservoir level of **2922.00 feet**. The level during the season was **more** by **27.12 feet** compared to the average level and also **more** by **22.91 feet** compared to previous year level.

In the **K.R.S** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **12.06 feet** was during **29th week**. The full reservoir level of **124.80 feet** was reached during **44th std. week**. The level during the season was **more** by **15.40 feet** compared to the average level and **more** by **8.5 feet** compared to previous year level.

In the **Kabini** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **6.73 feet** was during **25th std. week**. The full reservoir level of **2284.00 feet** was reached during **44th std. week**. The level during the season was **more** by **13.01 feet** compared to the average level and **more** by **14.13 feet** compared to previous year level.

Krishna Basin reservoirs: Bhadra, Tungabhadra, Ghataprabha, Malaprabha, Alamatti and Narayanapura are the major irrigation reservoirs under **Krishna basin**.

In **Bhadra** reservoir, levels during all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **13.46 feet** was during **30th week**. The full reservoir level of **2158.00 feet** was reached during **41st std. week**. The level during the season was **more** by **21.74 feet** compared to the average level and **more** by **27.87 feet** compared to previous year level.

In **Tungabhadra** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **15.70 feet** was during **25th week**. The full reservoir level of **1633.00 feet** was reached during **40th std. week**. The level during the season was **more** by **20.30 feet** compared to the average level and also **more** by **20.44 feet** compared to previous year level.

In **Ghataprabha** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **37.88 feet** was during **25th std. week**. The full reservoir level of **2175.00 feet** was reached during **33rd std. week**. The level during the season was **more** by **47.78 feet** compared to the average level and **more** by **32.90 feet** compared to previous year level.

In **Malaprabha** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **12.00 feet** was during **25th week**. The full reservoir level of **2079.50 feet** was reached during **37th std. week**. The level during the season was **more** by **23.32 feet** compared to the average level and **more** by **13.80 feet** compared to previous year level.

In the **Alamatti** reservoir, levels in all the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **27.59 feet** was during **25th week**. The full reservoir level of **1704.70 feet** was reached during **34th std. week**. The level during the season was **more** by **28.77 feet** compared to the average level and **more** by **9.09 feet** compared to previous year level.

In the **Narayanapura** reservoir, levels in most of the standard weeks were **higher** compared to the recent 10 years average levels. Maximum rise in reservoir level of **6.37 feet** was during **31st week**. The full reservoir level of **1614.88 feet** was reached during **39th std. week**. The level during the season was **more** by **10.45 feet** compared to the average level and **more** by **6.23 feet** compared to previous year level.

The levels at all the major reservoirs were better when compared to average levels and also previous year levels.

Table-5.1

Name of the Reservoir: (1) LINGANAMAKKI

Basin: HYDEL GENERATION RESERVOIR

Full Reservoir Level: 1819

Unit: in feet

Reservoir level (RL): above mean sea level

Std.	Reservoir Level information during			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020.	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	1764.70	1742.40	1752.75	1775.80	23.05	1764.70	11.10
24	1764.65	1744.65	1753.31	1779.25	25.94	1759.65	19.60
25	1766.05	1744.10	1754.96	1785.60	30.64	1758.65	26.95
26	1773.45	1746.55	1759.32	1785.05	25.73	1754.60	30.45
27	1784.50	1748.55	1765.92	1783.95	18.03	1761.25	22.70
28	1792.45	1753.05	1771.19	1788.10	16.91	1766.10	22.00
29	1801.35	1757.60	1779.29	1796.60	17.31	1771.00	25.60
30	1811.50	1767.90	1785.68	1806.20	20.52	1771.00	35.20
31	1817.00	1776.40	1791.74	1809.65	17.91	1777.60	32.05
32	1818.00	1784.45	1800.29	1812.00	11.71	1793.94	18.06
33	1819.00	1785.45	1803.35	1812.55	9.20	1801.75	10.80
34	1819.00	1787.07	1805.02	1812.60	7.58	1805.60	7.00
35	1818.90	1787.24	1807.05	1812.80	5.75	1806.20	6.60
36	1818.95	1787.20	1808.18	1813.85	5.67	1807.75	6.10
37	1818.75	1787.94	1808.69	1816.30	7.61	1809.55	6.75
38	1819.00	1790.95	1809.63	1816.10	6.47	1813.15	2.95
39	1818.80	1791.79	1809.85	1815.90	6.05	1814.35	1.55
40	1818.65	1792.44	1809.88	1816.15	6.27	1814.20	1.95
41	1818.80	1793.01	1809.76	1815.80	6.04	1814.40	1.40
42	1818.95	1792.98	1809.56	1815.10	5.54	1816.00	-0.90
43	1818.50	1793.04	1808.89	1815.05	6.16	1813.95	1.10
44	1818.40	1793.01	1808.67	1814.30	5.63	1815.35	-1.05
45	1817.95	1793.24	1807.99	1813.80	5.81	1814.50	-0.70
46	1817.25	1793.25	1807.21	1813.60	6.39	1813.65	-0.05
47	1816.30	1793.19	1806.47	1813.05	6.58	1812.70	0.35
48	1815.40	1793.00	1805.65	1812.30	6.65	1811.95	0.35
49	1814.40	1792.25	1804.60	1811.45	6.85	1811.40	0.05
50	1813.25	1791.70	1803.69	1810.35	6.66	1811.00	-0.65
51	1812.10	1791.10	1802.72	1809.35	6.63	1810.05	-0.70
52	1810.65	1790.25	1801.42	1807.95	6.53	1808.85	-0.90

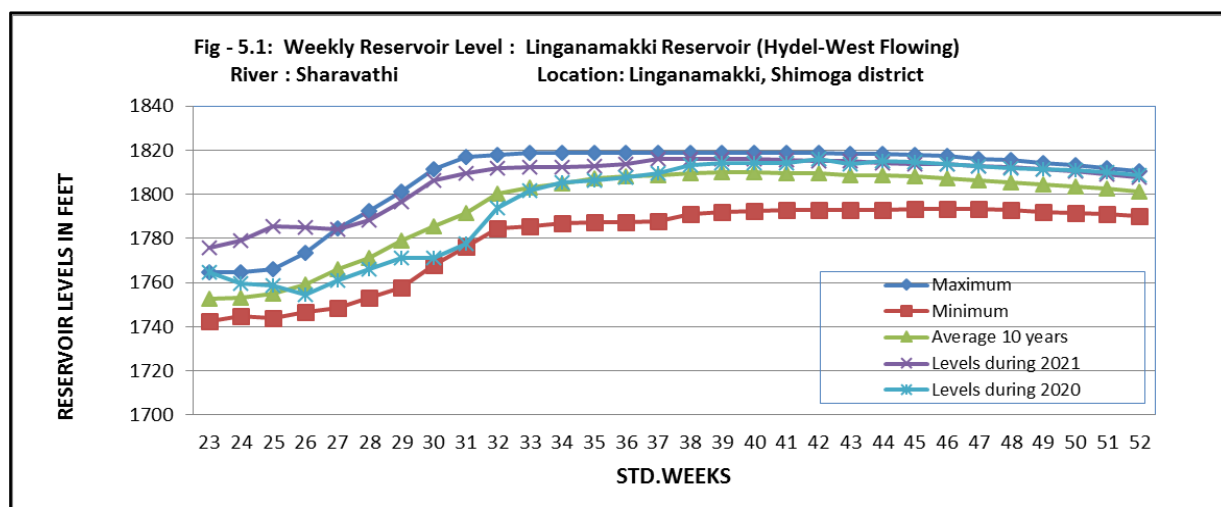


Table-5.2

Name of the Reservoir: (2) SUPA

Basin: HYDEL GENERATION RESERVOIR

Full Reservoir Level: 1849.89 Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020.	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	1753.21	1698.00	1733.85	1757.21	23.36	1741.06	16.15
24	1755.13	1692.00	1734.00	1759.93	25.93	1738.76	21.17
25	1752.79	1692.64	1731.93	1768.98	37.06	1735.54	33.44
26	1757.32	1690.68	1734.56	1767.87	33.31	1730.86	37.01
27	1763.59	1700.35	1740.80	1764.69	23.89	1738.73	25.96
28	1784.65	1703.96	1749.24	1771.74	22.50	1747.85	23.89
29	1803.18	1709.86	1761.92	1782.90	20.97	1753.00	29.90
30	1811.87	1730.99	1773.84	1808.26	34.41	1751.03	57.23
31	1824.07	1748.57	1783.89	1815.38	31.49	1757.75	57.63
32	1839.82	1771.20	1797.37	1819.31	21.94	1784.98	34.34
33	1845.30	1774.69	1804.21	1819.74	15.53	1802.20	17.55
34	1846.34	1772.49	1807.22	1820.17	12.94	1812.36	7.80
35	1846.97	1770.66	1811.81	1820.20	8.40	1816.40	3.80
36	1848.35	1764.88	1814.55	1822.60	8.04	1819.32	3.28
37	1846.64	1769.94	1815.93	1826.86	10.93	1821.12	5.74
38	1846.64	1772.02	1817.89	1827.65	9.76	1826.27	1.38
39	1846.48	1772.09	1818.52	1826.63	8.11	1830.31	-3.67
40	1846.64	1772.53	1818.49	1827.02	8.54	1831.68	-4.66
41	1846.77	1773.38	1818.39	1827.75	9.36	1832.11	-4.36
42	1846.90	1773.06	1817.36	1826.14	8.78	1832.86	-6.73
43	1848.80	1773.39	1817.16	1825.29	8.13	1831.62	-6.33
44	1848.58	1773.66	1816.67	1824.14	7.47	1832.86	-8.73
45	1848.28	1773.96	1815.94	1823.15	7.21	1832.37	-9.22
46	1847.23	1773.99	1814.78	1822.07	7.29	1831.85	-9.78
47	1845.92	1774.00	1813.44	1821.22	7.77	1830.86	-9.65
48	1844.15	1774.00	1812.12	1820.36	8.25	1829.49	-9.12
49	1842.84	1774.02	1810.46	1818.95	8.49	1827.78	-8.83
50	1840.80	1773.98	1809.05	1816.82	7.77	1827.45	-10.63
51	1838.37	1773.43	1807.54	1814.98	7.45	1825.68	-10.70
52	1834.70	1772.45	1805.49	1812.42	6.94	1823.19	-10.76

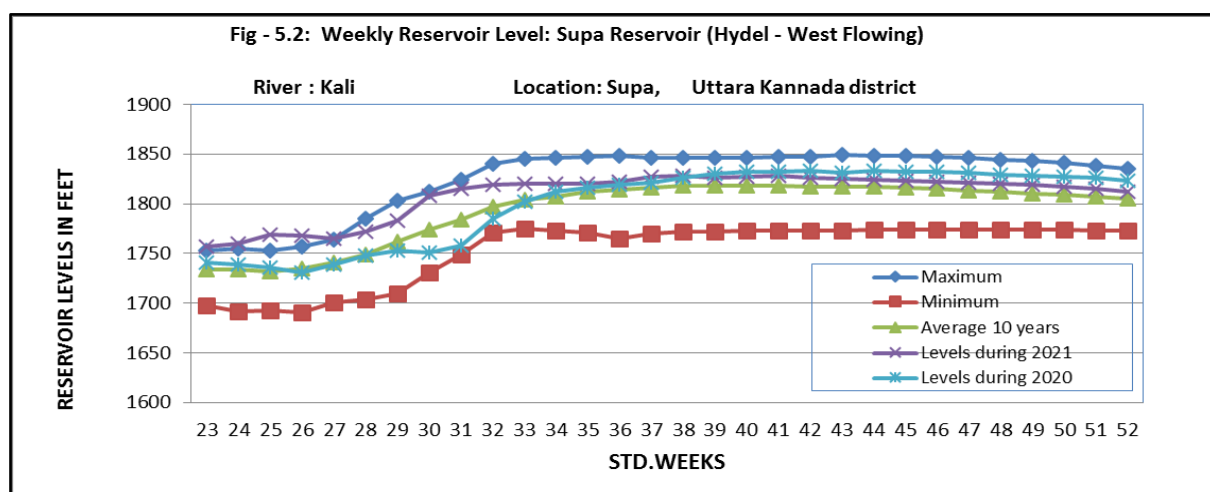


Table-5.3

Name of the Reservoir: (3) VARAHI

Basin: HYDEL GENERATION RESERVOIR

Full Reservoir Level: 1949.44

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	1886.41	1872.00	1878.98	1868.82	-10.16	1875.83	-7.01
24	1893.74	1870.00	1880.47	1871.88	-8.59	1876.62	-4.74
25	1893.48	1868.35	1882.24	1882.97	0.72	1877.44	5.53
26	1898.79	1873.73	1886.50	1875.88	-10.62	1875.57	0.31
27	1907.39	1878.39	1891.91	1881.85	-10.06	1881.67	0.18
28	1914.86	1885.44	1896.92	1888.08	-8.84	1885.93	2.15
29	1923.72	1889.15	1904.77	1897.27	-7.49	1891.51	5.76
30	1933.72	1890.46	1911.58	1907.51	-4.07	1890.46	17.05
31	1939.69	1896.43	1916.16	1914.07	-2.09	1896.43	17.64
32	1941.83	1909.94	1923.80	1918.86	-4.94	1909.94	8.92
33	1947.66	1915.06	1928.08	1920.83	-7.25	1917.23	3.60
34	1948.45	1918.67	1930.11	1922.01	-8.10	1921.23	0.78
35	1948.52	1919.62	1932.08	1922.80	-9.28	1921.69	1.11
36	1948.42	1920.11	1934.05	1925.42	-8.63	1923.13	2.29
37	1947.66	1920.11	1935.01	1928.57	-6.44	1925.03	3.54
38	1947.66	1921.42	1936.21	1928.37	-7.83	1930.02	-1.64
39	1947.70	1923.06	1936.31	1928.37	-7.93	1931.53	-3.15
40	1947.96	1923.12	1936.23	1927.98	-8.25	1931.62	-3.64
41	1947.37	1922.74	1935.77	1927.52	-8.24	1931.53	-4.00
42	1946.61	1921.75	1935.32	1926.34	-8.98	1932.51	-6.17
43	1946.02	1920.70	1934.49	1926.01	-8.48	1931.33	-5.32
44	1945.83	1920.31	1934.05	1925.55	-8.50	1931.82	-6.27
45	1945.04	1919.62	1933.11	1925.23	-7.89	1930.94	-5.71
46	1943.27	1919.03	1931.75	1925.03	-6.72	1929.92	-4.89
47	1941.66	1918.73	1930.77	1924.83	-5.93	1928.77	-3.94
48	1940.38	1918.01	1929.81	1923.98	-5.83	1927.33	-3.35
49	1938.97	1917.00	1928.78	1926.47	-2.31	1925.88	0.59
50	1937.23	1916.57	1927.54	1923.13	-4.41	1925.10	-1.97
51	1935.20	1916.24	1926.55	1922.21	-4.34	1924.05	-1.84
52	1933.43	1915.39	1925.09	1920.89	-4.20	1922.67	-1.78

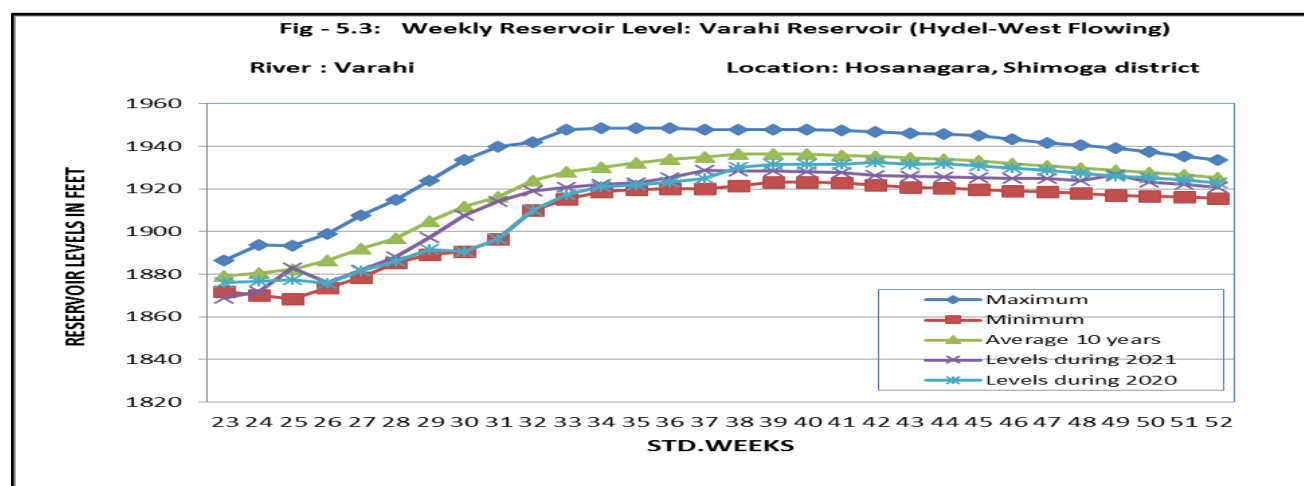


Table-5.4

Name of the Reservoir: (4) HARANGI

Basin: CAUVERY GENERATION RESERVOIR

Full Reservoir Level: 2859

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2019	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	2837.38	2797.77	2810.21	2823.24	13.03	2831.44	-8.20
24	2840.61	2801.28	2816.30	2831.57	15.27	2833.52	-1.95
25	2844.86	2806.81	2822.75	2838.93	16.18	2836.88	2.05
26	2857.14	2808.07	2833.78	2841.32	7.55	2839.44	1.88
27	2856.73	2812.30	2839.91	2842.83	2.92	2847.32	-4.49
28	2857.30	2818.81	2845.33	2853.69	8.36	2851.52	2.17
29	2858.26	2827.56	2851.00	2855.56	4.56	2855.21	0.35
30	2858.53	2833.79	2854.06	2855.56	1.50	2857.54	-1.98
31	2858.41	2833.29	2854.89	2855.69	0.81	2855.94	-0.25
32	2858.26	2854.39	2856.87	2855.61	-1.25	2856.39	-0.78
33	2858.06	2851.72	2856.82	2858.21	1.39	2857.96	0.25
34	2858.75	2854.88	2857.19	2857.65	0.46	2858.00	-0.35
35	2858.40	2853.84	2856.92	2858.12	1.21	2856.99	1.13
36	2858.75	2851.40	2856.32	2858.06	1.74	2856.40	1.66
37	2858.56	2843.79	2855.44	2858.48	3.05	2857.67	0.81
38	2858.47	2842.58	2854.75	2858.63	3.88	2858.05	0.58
39	2858.88	2841.17	2854.60	2857.57	2.97	2858.88	-1.31
40	2857.96	2835.59	2852.40	2858.22	5.83	2857.96	0.26
41	2858.25	2833.25	2850.97	2858.50	7.53	2858.25	0.25
42	2858.39	2829.05	2849.63	2858.33	8.70	2858.39	-0.06
43	2857.68	2823.31	2847.76	2858.15	10.39	2857.68	0.47
44	2856.86	2816.06	2842.93	2857.15	14.22	2855.41	1.74
45	2854.98	2809.62	2839.21	2857.67	18.46	2851.56	6.11
46	2851.89	2802.06	2833.45	2858.04	24.60	2847.19	10.85
47	2848.06	2792.63	2829.20	2857.51	28.31	2843.00	14.51
48	2843.87	2787.80	2824.09	2856.87	32.78	2837.48	19.39
49	2839.66	2784.78	2818.51	2855.16	36.65	2831.03	24.13
50	2835.58	2783.47	2813.25	2853.96	40.71	2824.65	29.31
51	2834.00	2783.26	2808.98	2854.09	45.11	2819.45	34.64
52	2831.72	2782.28	2806.06	2854.98	48.92	2819.63	35.35

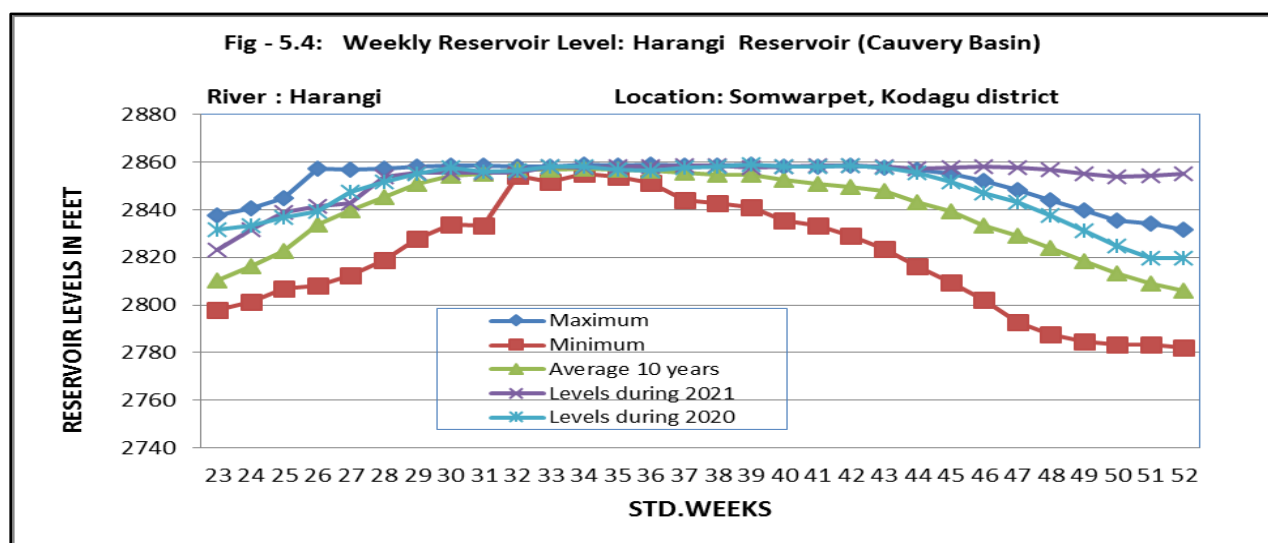


Table-5.5

Name of the Reservoir: (5) HEMAVATHI

Basin: CAUVERY GENERATION RESERVOIR

Full Reservoir Level: 2922

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	2879.97	2852.70	2866.89	2879.74	12.85	2879.97	-0.23
24	2898.66	2855.93	2871.93	2883.35	11.42	2880.47	2.88
25	2902.20	2858.10	2875.71	2894.43	18.72	2882.78	11.65
26	2906.96	2865.29	2882.22	2895.82	13.60	2883.85	11.97
27	2908.91	2870.30	2888.73	2896.10	7.37	2889.04	7.06
28	2920.15	2874.18	2893.91	2899.19	5.28	2891.62	7.57
29	2919.93	2885.72	2900.13	2908.32	8.19	2895.01	13.31
30	2920.75	2892.33	2905.19	2919.35	14.16	2896.44	22.91
31	2921.08	2894.27	2908.24	2919.75	11.51	2901.85	17.90
32	2921.71	2895.83	2914.51	2920.41	5.90	2919.92	0.49
33	2921.97	2893.50	2914.45	2919.61	5.16	2921.32	-1.71
34	2921.81	2893.58	2913.86	2918.22	4.37	2921.50	-3.28
35	2921.93	2894.20	2913.53	2916.46	2.93	2920.15	-3.69
36	2921.75	2890.40	2912.64	2915.28	2.64	2920.01	-4.73
37	2921.95	2877.50	2910.64	2916.98	6.34	2919.18	-2.20
38	2921.81	2873.41	2909.53	2915.74	6.21	2921.22	-5.48
39	2921.75	2876.35	2908.94	2914.06	5.12	2921.50	-7.44
40	2921.41	2875.33	2907.36	2912.92	5.56	2920.04	-7.12
41	2921.25	2871.70	2905.76	2911.59	5.83	2919.42	-7.83
42	2920.75	2872.25	2904.74	2910.52	5.78	2920.34	-9.82
43	2921.71	2870.81	2903.09	2910.45	7.36	2919.59	-9.14
44	2921.04	2868.02	2900.89	2909.33	8.44	2918.00	-8.67
45	2919.75	2868.04	2899.38	2908.93	9.55	2915.57	-6.64
46	2917.75	2864.81	2897.37	2909.85	12.48	2913.21	-3.36
47	2915.29	2864.93	2895.66	2913.04	17.38	2910.25	2.79
48	2912.55	2864.94	2893.72	2913.89	20.17	2906.97	6.92
49	2910.25	2864.95	2890.78	2913.58	22.80	2903.31	10.27
50	2907.26	2865.06	2887.91	2912.51	24.60	2899.66	12.85
51	2904.20	2865.10	2885.19	2911.04	25.85	2896.44	14.60
52	2900.98	2865.08	2882.45	2909.57	27.12	2893.30	16.27

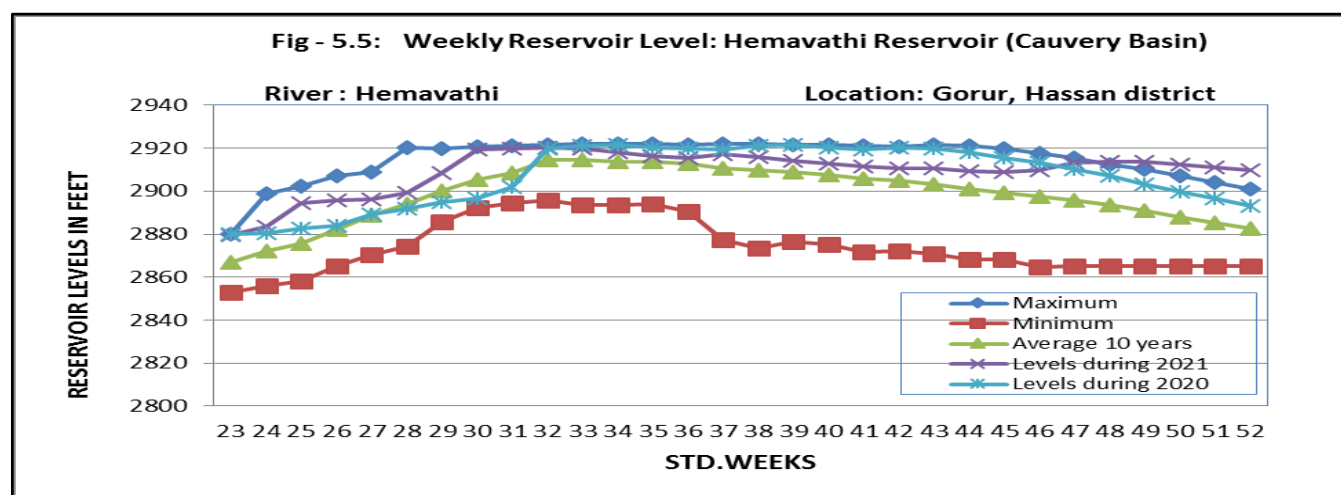


Table-5.6

Name of the Reservoir: (6) K.R.S

Basin: CAUVERY GENERATION RESERVOIR

Full Reservoir Level: 124.8

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during			Levels during 2021	Difference in	Levels during 2020	Difference in RL
	recent 10 years				RL of 2021 compared to the		of 2021 compared
	Maximum	Minimum	Average 10 years		Average level		Maximum
23	93.65	63.35	77.27	83.64	6.37	92.45	-8.81
24	100.75	67.86	80.13	84.62	4.49	92.87	-8.25
25	105.15	68.00	83.13	95.40	12.28	95.75	-0.35
26	108.20	72.40	88.57	92.86	4.29	97.14	-4.28
27	108.77	77.70	93.81	89.62	-4.19	100.33	-10.71
28	123.43	76.80	97.97	89.62	-8.35	104.46	-14.84
29	123.25	75.60	102.10	101.68	-0.42	107.70	-6.02
30	123.08	75.27	104.34	113.40	9.06	106.52	6.88
31	123.63	79.35	105.14	115.68	10.54	107.17	8.51
32	124.80	92.80	113.48	120.98	7.50	122.55	-1.57
33	124.80	90.60	114.26	120.02	5.76	124.10	-4.08
34	124.80	92.12	114.04	119.52	5.48	124.54	-5.02
35	124.80	93.03	114.48	116.82	2.35	123.30	-6.48
36	124.80	91.22	115.18	116.18	1.00	124.28	-8.10
37	124.80	86.10	114.92	116.98	2.07	124.70	-7.72
38	124.80	87.15	115.00	114.56	-0.43	123.55	-8.99
39	124.80	89.35	115.54	112.72	-2.82	124.72	-12.00
40	124.80	86.85	115.22	115.00	-0.21	124.80	-9.80
41	124.80	81.40	115.11	117.34	2.23	124.80	-7.46
42	124.80	81.96	115.70	120.20	4.50	124.80	-4.60
43	124.80	78.30	115.14	124.50	9.37	124.80	-0.30
44	124.80	81.65	114.90	124.80	9.90	124.18	0.62
45	124.80	81.64	114.82	124.80	9.98	123.90	0.90
46	124.80	77.23	113.76	124.80	11.04	123.14	1.66
47	124.29	78.05	113.08	124.80	11.72	121.95	2.85
48	123.53	78.61	111.11	124.64	13.53	120.76	3.88
49	123.10	78.75	110.64	124.80	14.16	120.00	4.80
50	122.28	78.90	109.97	124.80	14.84	119.83	4.97
51	121.72	79.30	109.12	124.52	15.40	119.38	5.14
52	121.64	79.48	108.00	123.22	15.22	118.85	4.37

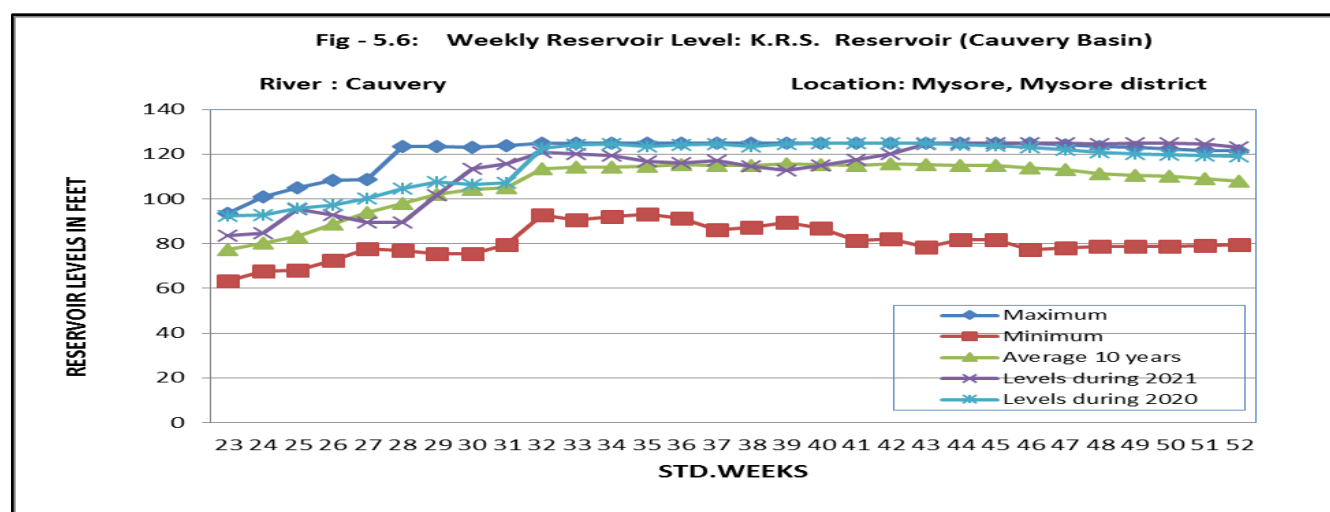


Table-5.7

Name of the Reservoir: (7) KABINI

Basin: CAUVERY GENERATION RESERVOIR

Full Reservoir Level: 2284

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	2265.52	2241.75	2256.70	2264.26	7.56	2262.17	2.09
24	2279.80	2242.18	2260.10	2269.09	8.99	2262.24	6.85
25	2280.70	2244.85	2264.64	2275.82	11.18	2262.19	13.63
26	2282.35	2257.51	2269.25	2275.79	6.54	2261.66	14.13
27	2282.82	2263.30	2272.07	2275.81	3.74	2267.88	7.93
28	2282.78	2264.53	2274.29	2278.71	4.42	2270.98	7.73
29	2283.33	2268.17	2277.09	2280.76	3.67	2276.90	3.86
30	2283.23	2272.75	2277.87	2279.94	2.07	2276.97	2.97
31	2283.17	2269.60	2278.47	2281.05	2.58	2279.87	1.18
32	2283.14	2269.56	2279.55	2282.25	2.70	2283.14	-0.89
33	2283.79	2267.01	2279.83	2283.27	3.44	2283.73	-0.46
34	2283.84	2270.16	2280.11	2282.41	2.30	2283.84	-1.43
35	2283.87	2275.74	2280.48	2280.18	-0.30	2282.64	-2.46
36	2284.00	2274.55	2280.74	2281.00	0.26	2283.02	-2.02
37	2284.00	2270.27	2280.31	2283.32	3.01	2284.00	-0.68
38	2284.00	2269.88	2280.32	2283.22	2.90	2284.00	-0.78
39	2284.00	2271.26	2279.56	2280.33	0.78	2283.87	-3.54
40	2283.76	2268.70	2278.41	2279.79	1.38	2283.27	-3.48
41	2283.73	2267.23	2277.88	2279.60	1.72	2283.73	-4.13
42	2284.00	2266.71	2277.83	2282.07	4.24	2283.17	-1.10
43	2283.94	2265.24	2277.32	2283.53	6.21	2283.02	0.51
44	2283.94	2265.76	2276.43	2284.00	7.58	2280.28	3.72
45	2283.56	2265.26	2275.57	2283.91	8.34	2279.05	4.86
46	2282.81	2263.94	2274.23	2284.00	9.77	2277.03	6.97
47	2281.04	2263.68	2273.08	2283.89	10.81	2274.77	9.12
48	2279.17	2262.50	2271.80	2283.63	11.83	2273.01	10.62
49	2278.41	2259.68	2270.97	2283.73	12.76	2271.37	12.36
50	2277.35	2258.35	2270.72	2283.55	12.83	2271.39	12.16
51	2276.64	2257.15	2270.44	2283.45	13.01	2271.02	12.43
52	2276.85	2256.38	2270.33	2283.31	12.98	2271.25	12.06

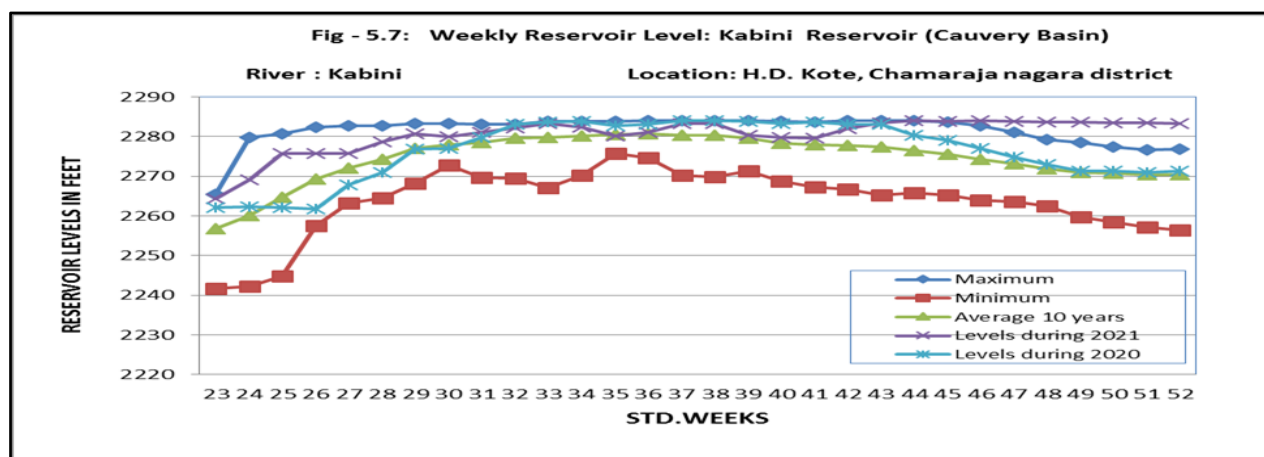


Table-5.8

Name of the Reservoir: (8) BHADRA

Basin: KRISHNA GENERATION RESERVOIR

Full Reservoir Level: 2158

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	2116.41	2073.29	2096.90	2111.33	14.43	2105.06	6.27
24	2121.31	2079.25	2100.72	2116.00	15.28	2106.58	9.42
25	2124.16	2084.00	2103.59	2125.33	21.74	2110.00	15.33
26	2130.50	2092.00	2109.07	2126.75	17.68	2111.33	15.42
27	2131.54	2096.70	2114.92	2127.66	12.74	2116.41	11.25
28	2141.25	2098.83	2120.30	2131.00	10.70	2120.00	11.00
29	2152.83	2108.75	2127.88	2139.91	12.03	2125.16	14.75
30	2156.83	2113.50	2133.42	2153.37	19.95	2125.95	27.42
31	2156.85	2116.50	2136.18	2156.12	19.94	2128.25	27.87
32	2157.06	2119.91	2144.17	2156.54	12.37	2147.33	9.21
33	2157.56	2122.50	2146.42	2156.95	10.53	2152.33	4.62
34	2158.00	2127.16	2147.77	2157.08	9.31	2154.81	2.27
35	2158.00	2129.83	2148.98	2157.41	8.43	2154.75	2.66
36	2158.00	2130.41	2149.74	2157.45	7.71	2156.08	1.37
37	2158.00	2129.58	2150.04	2157.41	7.38	2157.58	-0.17
38	2158.00	2129.20	2149.92	2157.22	7.30	2157.33	-0.11
39	2158.00	2130.25	2149.96	2156.83	6.87	2157.54	-0.71
40	2158.66	2129.52	2150.10	2157.66	7.56	2157.54	0.12
41	2158.00	2127.79	2149.47	2158.00	8.53	2157.14	0.86
42	2158.00	2125.91	2149.00	2158.00	9.00	2157.25	0.75
43	2157.66	2124.79	2148.28	2158.00	9.72	2157.60	0.40
44	2157.75	2121.58	2147.46	2157.66	10.20	2156.83	0.83
45	2157.60	2119.25	2146.66	2157.33	10.67	2155.57	1.76
46	2157.16	2116.95	2145.53	2158.00	12.47	2153.70	4.30
47	2156.39	2116.02	2145.09	2157.91	12.82	2152.72	5.19
48	2156.00	2116.02	2144.92	2157.95	13.03	2152.35	5.60
49	2156.24	2116.00	2144.86	2158.00	13.14	2151.85	6.15
50	2156.54	2116.18	2144.89	2158.00	13.11	2151.41	6.59
51	2154.68	2116.22	2144.59	2158.00	13.41	2150.97	7.03
52	2156.92	2116.27	2144.18	2157.97	13.79	2150.47	7.50

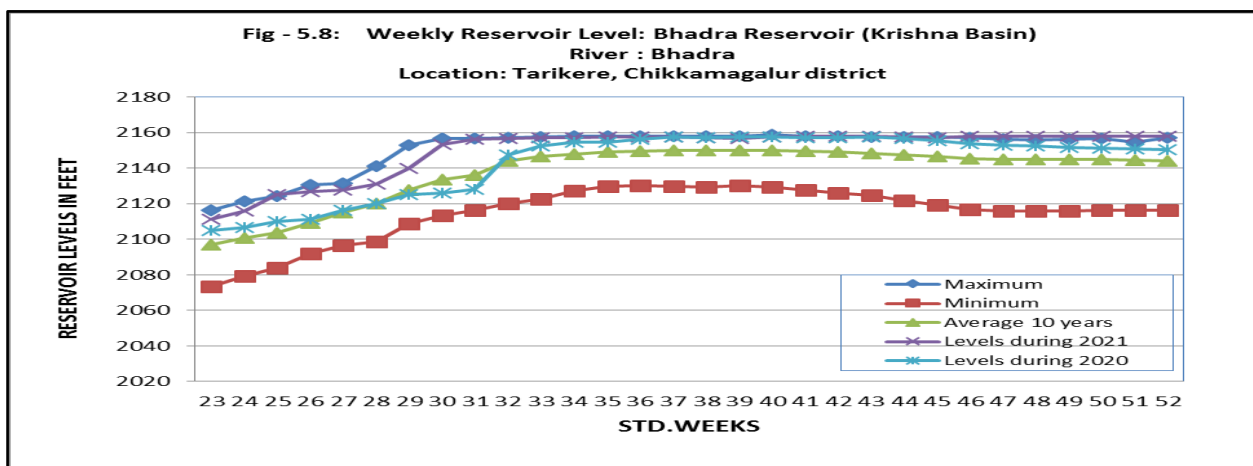


Table-5.9

Name of the Reservoir: (9) TUNGABHADRA
 Basin: KRISHNA GENERATION RESERVOIR
 Full Reservoir Level: 1633

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	1589.19	1568.85	1580.42	1590.09	9.67	1584.37	5.72
24	1600.36	1568.95	1583.30	1590.29	6.99	1584.17	6.12
25	1605.10	1569.15	1585.69	1605.99	20.30	1587.24	18.75
26	1610.10	1573.38	1590.67	1608.90	18.23	1590.70	18.20
27	1617.65	1572.91	1598.09	1610.01	11.92	1592.36	17.65
28	1625.12	1592.94	1606.38	1610.86	4.48	1603.22	7.64
29	1631.65	1595.27	1613.05	1621.44	8.39	1609.53	11.91
30	1631.52	1603.57	1618.62	1632.75	14.13	1612.31	20.44
31	1632.98	1609.78	1620.96	1632.01	11.05	1612.09	19.92
32	1633.00	1616.15	1626.98	1632.62	5.64	1628.60	4.02
33	1633.00	1617.80	1628.60	1633.00	4.40	1632.01	0.99
34	1633.00	1617.89	1629.23	1632.61	3.38	1633.00	-0.39
35	1633.00	1616.80	1629.66	1632.82	3.16	1632.93	-0.11
36	1633.00	1614.86	1629.43	1632.88	3.45	1633.00	-0.12
37	1633.00	1612.77	1629.24	1632.87	3.63	1633.00	-0.13
38	1633.00	1612.90	1628.96	1632.90	3.94	1632.38	0.52
39	1633.00	1614.49	1628.94	1632.60	3.66	1633.00	-0.40
40	1633.00	1614.69	1628.85	1633.00	4.15	1632.90	0.10
41	1633.00	1611.65	1628.38	1633.00	4.62	1633.00	0.00
42	1633.00	1608.24	1627.94	1632.81	4.87	1633.00	-0.19
43	1632.85	1604.71	1626.80	1633.00	6.20	1632.85	0.15
44	1633.00	1599.37	1625.54	1632.65	7.11	1632.46	0.19
45	1633.00	1593.60	1623.97	1632.45	8.48	1631.58	0.87
46	1632.32	1589.31	1622.27	1633.00	10.73	1630.47	2.53
47	1631.21	1589.13	1621.01	1633.00	11.99	1628.93	4.07
48	1629.98	1589.94	1619.77	1633.00	13.23	1627.87	5.13
49	1629.01	1589.64	1618.42	1633.00	14.58	1627.57	5.43
50	1628.00	1588.60	1617.08	1632.95	15.87	1626.81	6.14
51	1626.96	1588.08	1615.74	1632.34	16.60	1625.64	6.70
52	1625.99	1587.94	1614.14	1631.37	17.23	1624.00	7.37

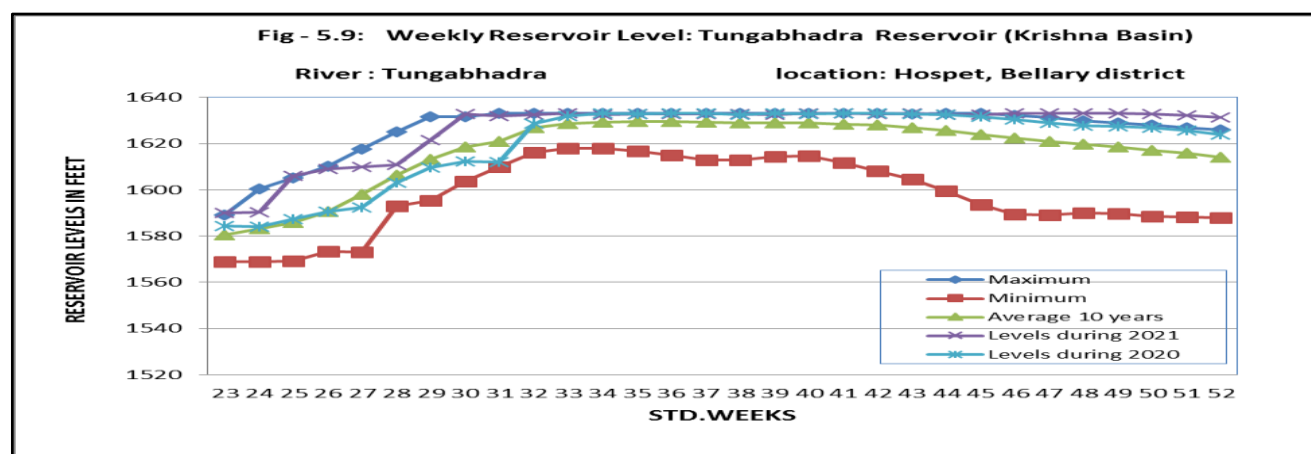


Table-5.10

Name of the Reservoir: (10) GHATAPRABHA
 Basin: KRISHNA GENERATION RESERVOIR
 Full Reservoir Level: 2175

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	2096.70	2066.00	2076.69	2081.75	5.06	2096.70	-14.95
24	2098.96	2065.00	2078.64	2091.58	12.94	2098.96	-7.38
25	2108.23	2065.13	2081.69	2129.47	47.78	2106.05	23.42
26	2123.60	2066.25	2089.37	2134.60	45.23	2103.70	30.90
27	2132.63	2069.18	2102.83	2136.33	33.51	2111.86	24.47
28	2138.45	2072.71	2116.26	2139.88	23.62	2128.43	11.45
29	2161.78	2100.20	2130.35	2151.37	21.01	2136.20	15.17
30	2170.66	2116.70	2142.52	2172.86	30.34	2139.96	32.90
31	2173.80	2121.05	2153.37	2173.58	20.21	2145.25	28.33
32	2175.00	2125.80	2162.51	2173.70	11.19	2171.60	2.10
33	2175.00	2129.43	2163.18	2175.00	11.82	2173.03	1.97
34	2175.00	2130.60	2163.67	2175.00	11.34	2174.40	0.60
35	2175.00	2130.20	2164.91	2175.00	10.09	2175.00	0.00
36	2175.00	2128.05	2166.09	2175.00	8.91	2175.00	0.00
37	2175.00	2127.71	2165.92	2175.00	9.08	2175.00	0.00
38	2175.00	2127.71	2166.04	2175.00	8.96	2175.00	0.00
39	2175.00	2127.70	2165.83	2175.00	9.17	2175.00	0.00
40	2175.00	2127.73	2165.69	2175.00	9.31	2175.00	0.00
41	2175.00	2128.15	2165.21	2175.00	9.79	2175.00	0.00
42	2175.00	2128.11	2165.12	2175.00	9.88	2175.00	0.00
43	2175.00	2127.93	2164.74	2174.22	9.48	2175.00	-0.78
44	2175.00	2127.76	2164.33	2171.57	7.24	2175.00	-3.43
45	2175.00	2127.58	2162.64	2168.87	6.23	2175.00	-6.13
46	2175.00	2127.41	2160.46	2166.55	6.10	2175.00	-8.45
47	2175.00	2123.38	2157.15	2165.63	8.48	2173.41	-7.78
48	2174.61	2122.81	2154.62	2165.00	10.38	2169.58	-4.58
49	2172.21	2116.35	2150.98	2166.17	15.19	2167.68	-1.51
50	2168.65	2114.80	2149.14	2166.17	17.03	2167.51	-1.34
51	2167.33	2114.56	2147.41	2163.67	16.26	2167.33	-3.66
52	2164.92	2113.61	2143.68	2158.55	14.87	2163.16	-4.61

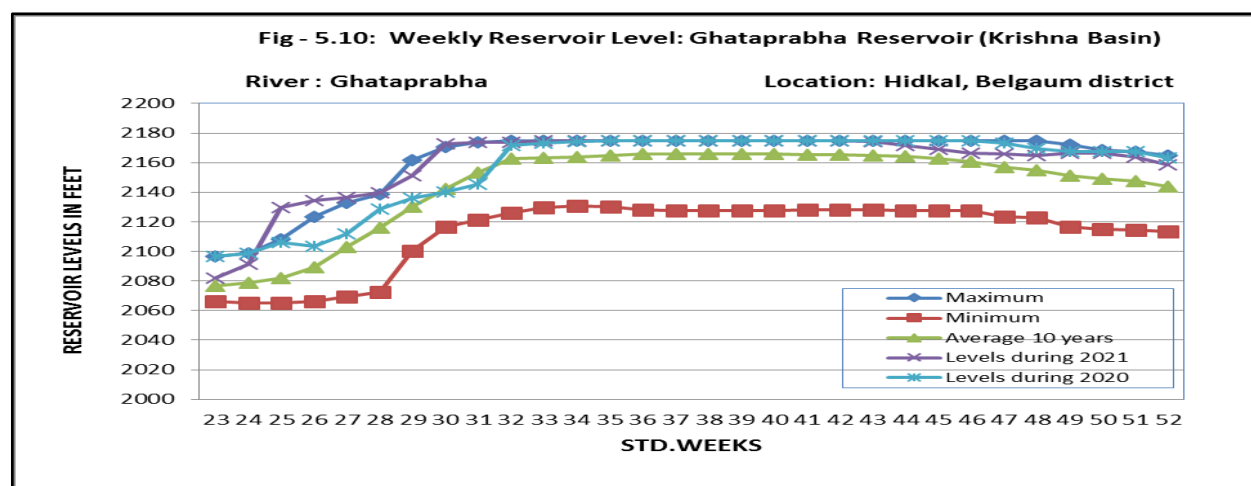


Table-5.11

Name of the Reservoir: (11) MALAPRABHA
 Basin: KRISHNA GENERATION RESERVOIR
 Full Reservoir Level: 2079.5

Unit: in feet
 Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during 2020.	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	2054.26	2033.30	2038.49	2050.08	11.59	2054.26	-4.18
24	2053.77	2032.88	2038.32	2050.00	11.68	2053.77	-3.77
25	2055.80	2031.97	2038.68	2062.00	23.32	2055.80	6.20
26	2054.15	2031.63	2040.37	2062.75	22.38	2054.15	8.60
27	2055.68	2032.00	2042.61	2063.10	20.49	2053.30	9.80
28	2058.15	2033.10	2046.70	2064.00	17.30	2058.15	5.85
29	2061.49	2035.00	2051.02	2066.10	15.08	2060.00	6.10
30	2065.42	2041.40	2055.39	2074.10	18.71	2060.95	13.15
31	2071.00	2047.05	2059.90	2075.90	16.00	2062.10	13.80
32	2077.00	2053.40	2063.96	2077.00	13.04	2073.10	3.90
33	2079.20	2053.80	2065.49	2077.70	12.21	2076.90	0.80
34	2079.50	2052.95	2065.96	2078.30	12.34	2077.20	1.10
35	2079.50	2054.20	2066.71	2078.70	11.99	2077.90	0.80
36	2079.50	2055.05	2067.59	2078.90	11.31	2078.45	0.45
37	2079.50	2055.18	2067.83	2079.50	11.67	2078.00	1.50
38	2079.50	2054.85	2067.83	2079.30	11.47	2078.35	0.95
39	2079.50	2054.70	2067.91	2078.90	10.99	2078.65	0.25
40	2079.50	2054.75	2068.31	2079.00	10.70	2079.50	-0.50
41	2079.50	2055.42	2068.34	2079.50	11.16	2079.10	0.40
42	2079.50	2055.41	2068.20	2079.40	11.20	2078.70	0.70
43	2079.50	2055.33	2068.05	2078.90	10.85	2079.50	-0.60
44	2079.50	2055.15	2067.62	2077.95	10.33	2078.90	-0.95
45	2079.50	2054.92	2067.05	2076.97	9.93	2079.00	-2.03
46	2079.50	2053.37	2066.17	2076.60	10.43	2078.70	-2.10
47	2079.50	2049.66	2064.93	2077.00	12.07	2077.97	-0.97
48	2079.00	2047.66	2063.30	2077.15	13.85	2076.93	0.22
49	2078.17	2047.47	2061.79	2077.35	15.56	2075.81	1.54
50	2077.17	2047.19	2060.14	2077.00	16.86	2074.55	2.45
51	2076.00	2046.87	2058.64	2076.23	17.59	2073.21	3.02
52	2074.46	2046.34	2057.02	2074.96	17.94	2071.61	3.35

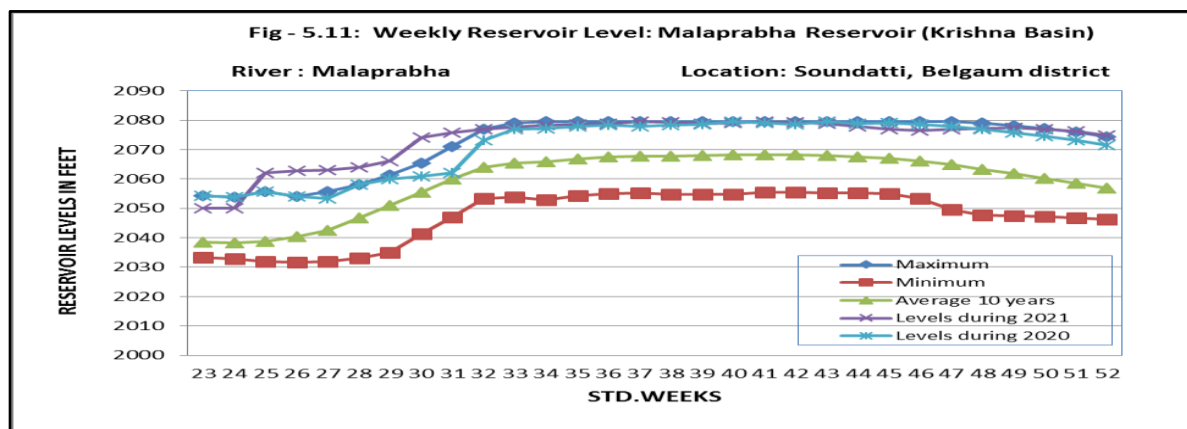


Table-5.12

Name of the Reservoir: (12) ALAMATTI

Basin: KRISHNA GENERATION RESERVOIR

Full Reservoir Level: 1708.17

Unit: in feet

Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during No.	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	1674.20	1652.38	1664.25	1668.71	4.47	1674.20	-5.48
24	1676.92	1652.18	1665.01	1669.70	4.69	1676.59	-6.89
25	1688.20	1654.44	1668.51	1697.29	28.77	1688.20	9.09
26	1691.45	1658.78	1673.51	1697.72	24.20	1691.45	6.27
27	1693.98	1664.39	1680.04	1697.68	17.64	1693.98	3.70
28	1699.07	1664.48	1688.84	1698.40	9.56	1697.92	0.48
29	1704.48	1673.15	1694.43	1698.83	4.40	1697.16	1.67
30	1704.81	1686.29	1698.73	1696.17	-2.56	1697.16	-0.99
31	1704.81	1689.72	1700.06	1701.72	1.65	1697.92	3.80
32	1704.81	1692.29	1701.96	1703.82	1.86	1702.77	1.04
33	1704.81	1692.76	1702.75	1704.64	1.89	1699.72	4.92
34	1704.81	1692.21	1703.30	1704.70	1.40	1704.48	0.22
35	1704.81	1691.33	1703.29	1704.70	1.42	1704.80	-0.10
36	1704.81	1688.94	1702.32	1704.70	2.38	1704.81	-0.11
37	1704.81	1688.37	1703.08	1703.00	-0.08	1704.81	-1.81
38	1704.81	1690.73	1703.19	1704.70	1.52	1704.81	-0.11
39	1704.81	1692.38	1703.15	1704.70	1.56	1704.81	-0.11
40	1704.81	1691.81	1702.95	1704.70	1.75	1704.81	-0.10
41	1704.81	1692.15	1702.73	1704.70	1.97	1704.81	-0.10
42	1704.81	1690.80	1702.23	1704.70	2.48	1704.81	-0.11
43	1704.81	1688.31	1701.15	1704.24	3.10	1704.81	-0.56
44	1704.81	1686.45	1700.33	1702.37	2.05	1704.81	-2.43
45	1704.81	1683.86	1699.37	1701.92	2.55	1704.81	-2.89
46	1704.81	1681.54	1698.25	1700.57	2.32	1704.09	-3.52
47	1704.81	1679.69	1697.41	1700.90	3.49	1703.99	-3.09
48	1704.74	1676.69	1696.02	1701.36	5.34	1703.63	-2.27
49	1703.79	1675.35	1694.85	1703.62	8.77	1702.41	1.21
50	1702.58	1673.92	1693.78	1703.79	10.00	1701.53	2.26
51	1702.35	1672.00	1692.62	1703.06	10.44	1701.30	1.76
52	1700.84	1671.84	1690.38	1703.03	12.65	1699.56	3.47

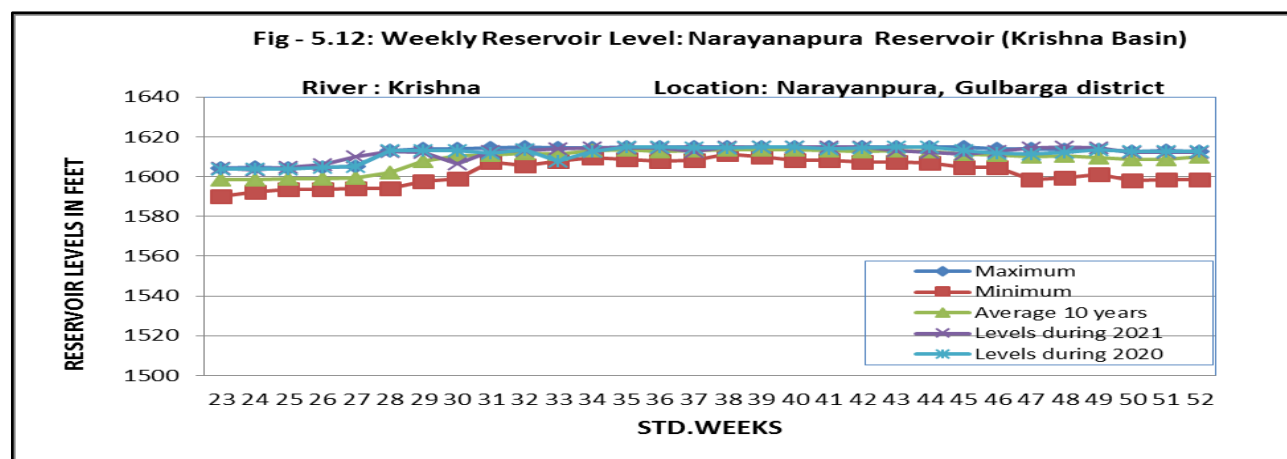


Table-5.13

Name of the Reservoir: (13) NARAYANAPURA
 Basin: KRISHNA GENERATION RESERVOIR
 Full Reservoir Level: 1615

Unit: in feet
 Reservoir level (RL): above mean sea level

Std. Week No.	Reservoir Level information during recent 10 years			Levels during 2021	Difference in RL of 2021 compared to the Average level	Levels during No.	Difference in RL of 2021 compared Maximum
	Maximum	Minimum	Average 10 years				
23	1604.27	1590.16	1598.42	1604.31	5.89	1603.88	0.43
24	1604.47	1592.29	1598.66	1603.36	4.70	1603.75	-0.39
25	1604.31	1593.76	1598.89	1604.64	5.75	1603.72	0.92
26	1604.74	1593.43	1599.04	1606.15	7.11	1604.74	1.41
27	1604.97	1593.90	1599.40	1609.82	10.42	1604.97	4.85
28	1613.17	1593.88	1602.13	1612.58	10.45	1613.17	-0.59
29	1613.84	1597.73	1607.71	1612.22	4.51	1613.30	-1.08
30	1614.12	1598.72	1610.59	1606.31	-4.28	1612.94	-6.63
31	1614.42	1607.30	1610.86	1612.68	1.81	1611.86	0.82
32	1615.00	1605.72	1611.73	1612.91	1.18	1613.56	-0.66
33	1614.34	1607.79	1611.47	1614.02	2.55	1607.79	6.23
34	1614.63	1609.35	1612.96	1614.35	1.39	1612.61	1.74
35	1615.03	1608.53	1613.39	1614.25	0.86	1614.84	-0.59
36	1615.01	1607.71	1612.57	1614.48	1.91	1614.65	-0.17
37	1614.91	1608.10	1613.29	1612.61	-0.68	1614.48	-1.87
38	1614.97	1611.46	1613.73	1614.65	0.92	1614.25	0.39
39	1615.07	1610.13	1613.39	1614.88	1.49	1614.71	0.17
40	1615.07	1608.22	1613.61	1614.78	1.17	1615.07	-0.30
41	1614.94	1608.25	1613.16	1614.81	1.65	1613.76	1.05
42	1614.94	1607.53	1612.76	1614.71	1.95	1614.42	0.29
43	1615.07	1607.25	1613.02	1613.14	0.12	1615.07	-1.94
44	1615.07	1607.06	1612.50	1612.25	-0.25	1615.07	-2.82
45	1615.07	1604.64	1611.27	1611.36	0.09	1613.27	-1.90
46	1614.09	1604.77	1610.89	1612.81	1.92	1611.89	0.92
47	1613.81	1598.50	1610.07	1614.22	4.15	1611.43	2.79
48	1613.75	1599.19	1610.55	1614.65	4.09	1612.38	2.26
49	1613.37	1601.13	1609.35	1614.38	5.03	1613.37	1.02
50	1612.83	1598.20	1608.77	1612.41	3.64	1612.68	-0.26
51	1612.95	1598.44	1608.57	1612.25	3.68	1612.71	-0.46
52	1612.86	1598.70	1609.89	1612.28	2.39	1612.81	-0.53

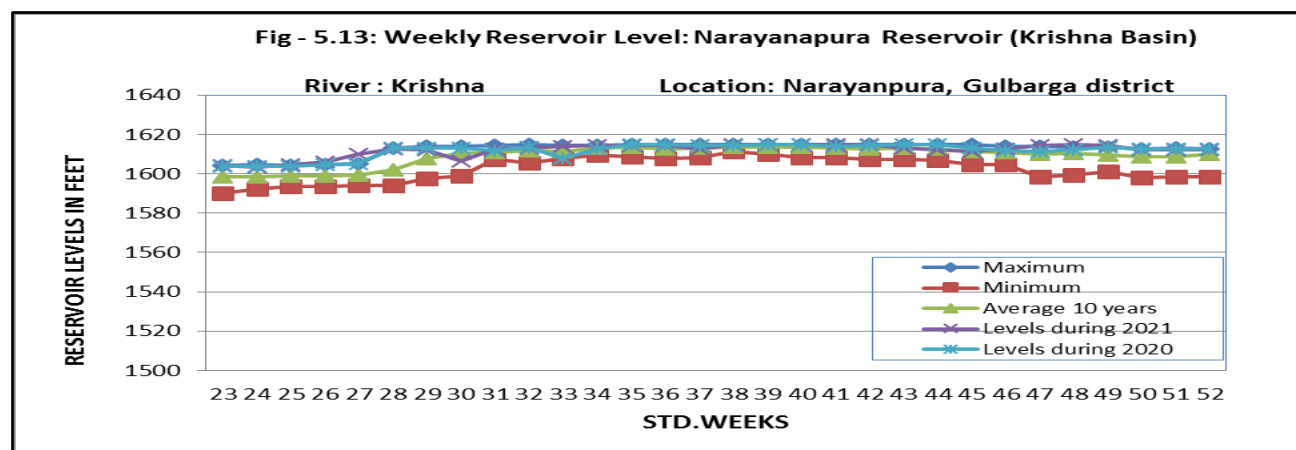


Table 5.14: Major Reservoir Levels in the State:

Units: in feet

Reservoir level (RL) above mean sea level

Sl. No.	Name of the Reservoir	Full Reservoir Level (FRL) feet above mean sea level	Reservoir level Information during recent 10 years (2011 to 2020) for the Annual (Water year) (01.06.2021 to 31.12.2021)			R.L. as on 01.06.2021	R.L. as on 31.12.2021	Increase/decrease in R.L. from 01.06.2021 to 31.12.2021	R.L. of 2021 compared to the Average R.L.	R.L. as on 31.12.2020	R.L. of 2021 compared to the R.L. of 2020.	Balance R.L. as on 31.12.2021
			Maximum	Minimum	Average							
1	2	3	4	5	6	7	8	9	10	11	12	13
(a) Hydel generation Reservoirs (Western Coast)												
1	Linganamakki	1819.00	1810.65	1790.25	1801.42	1778.15	1807.95	29.80	6.53	1808.85	-0.90	-11.05
2	Supa	1850.48	1834.70	1772.45	1805.49	1760.91	1812.42	51.51	6.94	1823.74	-11.32	-38.06
3	Varahi	1950.10	1933.43	1915.39	1925.09	1873.39	1920.89	47.51	-4.20	1922.99	-2.10	-29.20
(b) Reservoirs of Cauvery Basin:												
4	Harangi	2859.00	2831.72	2782.28	2806.06	2822.67	2854.98	32.31	48.92	2819.63	35.35	-4.02
5	Hemavathi	2922.00	2900.98	2865.08	2882.45	2883.30	2909.57	26.27	27.12	2893.30	16.27	-12.43
6	K.R.S*	124.80	121.64	79.48	108.00	87.60	123.22	35.62	15.22	118.85	4.37	-1.58
7	Kabini	2284.00	2276.85	2256.38	2270.33	2264.38	2283.31	18.93	12.98	2271.25	12.06	-0.69
(c) Reservoirs of Krishna Basin:												
8	Bhadra	2158.00	2156.92	2116.27	2144.18	2110.56	2157.97	47.41	13.79	2150.47	7.50	-0.03
9	Tungabhadra	1633.00	1625.99	1587.94	1614.14	1588.38	1631.37	42.99	17.23	1624.00	7.37	-1.63
10	Ghataprabha	2175.00	2164.92	2113.61	2143.68	2090.93	2158.55	67.62	14.87	2163.16	-4.61	-16.45
11	Malaprabha	2079.50	2074.46	2046.34	2057.02	2050.80	2074.96	24.16	17.94	2071.61	3.35	-4.54
12	Almati	1704.81	1700.84	1671.84	1690.38	1668.88	1703.03	34.15	12.65	1699.56	3.47	-1.78
13	Narayanapura	1615.00	1612.86	1598.70	1609.89	1604.28	1612.28	8.00	2.39	1612.81	-0.53	-2.72

6. LANDSLIDE VULNERABILITY OF KARNATAKA

Protection of life and properties from landslide disaster is indispensable in creating a safe environment for the Society. The national imperative towards safety due to landslide initiation is increasing in view of the higher rate of human settlement in the mountain slope across the Country. Landslides are significant amongst those hazards that can be disastrous to human life and property.

The term landslide or less frequently, landslip, refers to several forms of mass wasting that include a wide range of ground movements, such as rockfalls, deep-seated slope failures, mudflows, and debris flows. Landslides occur in a variety of environments, characterized by either steep or gentle slope gradients, from mountain ranges to coastal cliffs. Gravity is the primary driving force for a landslide to occur, but there are other factors affecting slope stability that produce specific conditions that make a slope prone to failure. Landslides can be triggered by many, sometimes associated causes like slope, geological condition & geological structures, soil moisture condition, vegetation cover, precipitation, erosion, blasting of explosions and seismicity. Often, individual phenomenon join together to generate instability over time, which often does not allow a reconstruction of the evolution of a particular landslide.

Older than the great Himalayan mountain chain, the Western Ghats of India are a geomorphic feature of immense global importance. It is sometimes called the Great Escarpment of India. The central part of Western Ghat which is better known as Sahyadri hill range, occur almost fringing the circular chain of hills forming a loop of mountain chain in Karnataka state.

The Western Ghats constitutes a very prominent physiographic feature on the western margin of the peninsular India. This magnificent hill ranges run nearly 1600 km in NNW-SSE direction starting from Cape Comorian in the south to Tapi valley in the north with an average width of 50 km. The average elevations of this mountain belt are about 1200m above MSL and occasionally rise up to 2400m. The distance of the scarp line from the Arabian seashore varies from 32km to 100km, but is seldom more than 64 km.

The State receives an annual normal rainfall of 1,155 mm out of which the Pre-Monsoon season contributes about 11%, the South-West Monsoon season contributes about 73% and the North-East Monsoon season contributes about 16%. The spatial and temporal distribution of rainfall varies significantly across the State, i.e., from West to East. Udupi District which lies in the extreme western part of the State, receives maximum annual rainfall of 4,599 mm and Bagalkote District, which lies in the northeastern part of the State, receives minimum annual rainfall of 558 mm. Most of the rainfall received in the State is during the SW Monsoon season.

The Western Ghat rises precipitously from the narrow Coastal region in the west and gentle slope towards the east - marked by a number of hills of lesser elevation and gradually merges with the

plains. The hill ranges form a great barrier in the western extremity of the Indian Peninsula and are covered by luxuriant forest and inhabited by large variety of wild life. The biodiversity is the most important characteristic feature of the Western Ghat Mountain and has been considered as one of the very few "biodiversity hotspots" of the World.

The Western Ghats, which forms a gorgeous mountain chain separating the Arabian Sea in the west and the eastern plain of the peninsular Indian shield, has been witnessing frequent landslides. The topography of Malnad and Coastal region is sensitive and any changes in the land use causes landslide or slope failure affecting the local population. Slope angle having $>35^\circ$ in Coastal and Malnad regions have experienced more numbers of landslides and is shown as **Figure 1**.

Landslides affect at least 13.05% of the land area of Karnataka, exceeding 25,024.9 km² which falls in the 23 taluks. From the past decade in Karnataka, the maximum numbers of landslides were occurred in Kodagu district followed by Uttara Kannada, Dakshina Kannada, Chikkamagaluru, Udupi, Shimoga, Dakshina Kannada and Hassan as shown in **Figure 2** and has caused widespread damage and many casualties, together with significant economic losses and social disruption.

During August 2018, the State experienced both flood and drought. Parts of Malnad and Coastal Karnataka were affected by floods and landslides/mudflows due to high-intensity rainfall causing damage to agriculture/horticulture/high value plantation crops, damage to public infrastructure and multiple houses and many families were rendered homeless. During August 2019, again large parts of the State were affected by floods and landslides due to high-intensity rainfall coupled with record discharge from Maharashtra State into the Dams in Upper Krishna and Bhima Basins.

During the first fortnight of August, 2021, Coastal, Malnad and parts of North Interior Karnataka experienced very heavy to exceptionally heavy rainfall. Malnad districts like Kodagu, Chikkamagaluru, Shivamogga and Hassan, which are predominantly the high rainfall regions, have recorded more than 500% of the normal rainfall. Heavy rains have also induced landslides in Ghat areas of Kodagu, Chikkamagaluru, Hassan and Dakshina Kannada districts. As many as 23 districts have been affected due to heavy rains, floods and landslides.

Landslides have been recorded for several decades in Karnataka, however the 2009 Kadwad landslide in Uttara Kannada district that has swept away 9 houses in the foothills had raised question on protection of social and economic loss that occurred. Slope modification, road cut failure, seepage along weaker zone and increase in pore pressure due to heavy rains have caused 19 numbers of casualties and huge economic losses. Economic losses due to landslides are great and apparently are growing as development locally expands into unstable hillside areas under the pressures of expanding populations. In addition to killing people and animals (both livestock and wildlife), landslides destroy

or damage residential land industrial developments as well as agricultural and forest lands and negatively affect water quality in rivers and streams.

In Malnad and Coastal districts of Karnataka, 23 taluks have experienced more landslides which is covering an area of 25,024.9 Km² is vulnerable to landslides. Households of 7.7 lakhs and population of 34.14 lakhs falls under moderate to high vulnerable zones for landslides.

In spite of improvements in recognition, prediction, mitigate measures, and warning systems, landslide activity in Karnataka is increasing and this trend is expected to continue in the coming decades. The factors causing this expected augmented activity are:

- Increased urbanization and development activities in the landslide-prone areas
- Continued deforestation of landslide-prone areas and
- Increased regional precipitation caused by changing climate patterns

Landslides can result in direct losses, i.e., loss of life, property, infrastructure and lifeline fatalities, resources, farmland, and places of cultural importance and indirect losses i.e., loss in productivity of agricultural or forest land, reduced property values, loss of revenue, increased cost, adverse effect in water quality and loss of human productivity. These direct and indirect losses due to landslides will take a long duration to attain its regular situation. For example, due to the high intensity rainfall and flood triggered landslides in Kodagu, Hassan, Dakshina Kannada and Chikkamagalur districts during 2018, 2019 and 2021 which had caused widespread damage and many casualties required a long duration to rebuild its infrastructure and roads etc., in the completely damaged regions, furthermore the slided and silt deposited land is no longer suitable for agricultural practices.

7. MONITORING OF SEISMIC ACTIVITY IN THE STATE

Earthquakes are one of the most costliest natural hazards faced by the entire human & living kind, posing a significant risk. The risks that earthquakes pose to the society, including death, injury, and economic loss, can be greatly reduced by better planning, construction, and mitigation practices before earthquakes happen and providing critical and timely information to improve response after they occur.

The disastrous earthquake in Killari in the early hours of September 30, 1993 caused considerable damages especially in the districts of Bidar, Gulbarga and Bijapur. The faults, shear zones and lineaments in Karnataka are considered to be potential risk zones of the Killari type of earthquakes which also caused damages in the adjacent villages of Karnataka.

In Historical years, the earthquakes were detected from the World Wide Seismic Stations Network (WWSSN) & United States Geological Survey (USGS). However, these stations are quite distant from the Peninsular India and hence were difficult to detect earthquakes with magnitudes less than 3.0. The lower magnitude earthquakes (2.0 and below) were reported by the local communities and recorded by the BARC seismic station (specially designed array of seismometers to detect nuclear explosions) at Gauribidanur but the location of these earthquakes are incomplete and highly biased as the tremors do not occur in the vicinity of this station.

The importance of seismological studies lies in the fact that information generated can be used to mitigate the earthquake hazards. Preparation of seismotectonic/seismic zonation maps is the first step in this direction. The basic data required for the preparation of these maps are:

- (i) a carefully compiled earthquake catalogue incorporating details about magnitude, location of epicenter, depth of focus etc., (ii) delineation of seismic source zones from all possible sources like recurrence relation, tectono-geological consideration, palaeoseismicity etc.,
- (iii) Estimation of upper bound magnitude through statistical procedure, cumulative seismic energy release, active fault length etc., and (iv) Attenuation of ground shaking for better results.

Karnataka State Natural Disaster Monitoring Centre (KSNDMC) is the nodal agency in the State for monitoring of seismic activity. Scientific approaches currently adopted worldwide to enhance our resilience to the Earthquake hazard are of two types.

- The first is aimed at providing long term protection to life and property and involves estimation of the earthquake hazard in different areas of a region and its translation into engineering aspects for earthquake resistant structures and land use patterns in the area.
- The second adopted with the first is to keep a constant vigil on the evolving character of ground motion records emitted by small earthquakes from a wide area.

Taking these into considerations, KSNDMC has set up a VSAT Enabled & Solar Powered Permanent Seismic Monitoring Stations (PSMS) Network in Karnataka at 14 locations including 10 Dam sites during the year 2009-2010. The present setup of Stations established are equipped with the state-of-the-art solar powered VSAT technology which includes a Broadband Seismometer, Strong Motion Accelerograph and a Digitizer synchronised with GPS along with associated accessories and VSAT Connectivity for data transmission to the Master Control Centre (MCC) at KSNDMC, Bengaluru on real time basis.

Table 7.1: List of VSAT Enabled PSMS Network of Karnataka

Sl. No.	District	Location of the Site
01.	Kalaburgi	Sharana Sirasagi Village-12 km from Gulbarga on Afzalpur Road
02.	Raichuru	In the Permanent Observatory of KSNDMC, premises of Science Education Trust, Mantralaya Road
03.	Bellary	In the Permanent Observatory of KSNDMC, premises of T. B. Dam Site
04.	Vijayapura	In the existing Almatti Dam Site observatory
05.	Belagavi	In the existing Hidkal Dam Site observatory
06.	Uttara Kannada	In the existing Supa Dam Site observatory
07.	Shivamogga	In the existing Linganmakki Dam Site observatory
08.	Hassan	In the existing Hemavathi Dam Site observatory
09.	Chitradurga	In the premises of Jogimatti Forest Guest House, 11 kms from Chitradurga
10.	Mandya	In the Permanent Observatory of KSNDMC, premises of K.R.S. Dam site
11.	Bangalore	In the premises of T.G. Halli Dam site at the existing old I.B
12.	Chamarajnagar	In the premises of Gundal Dam site at the existing I.B, 15 kms from Kollegal
13.	Kodagu	In the premises of Harangi Dam site at the existing Seismological Observatory, 11 kms from Kushalnagar
14.	Udupi	In the Premises of Zonal Agricultural & Horticultural Research Station, Brahmavara

Table 7.2: Earthquakes recorded & reported by VSAT Enabled PSMS Network of Karnataka during 2021

Sl. No.	Duration	Local	Regional	Teleseismic	Total
01.	January 2021	-Nil-	03	04	07
02.	February 2021	-Nil-	-Nil-	02	02
03.	March 2021	-Nil-	01	02	03
04.	April 2021	01	01	02	04
05.	May 2021	-Nil-	-Nil-	01	01
06.	June 2021	-Nil-	-Nil-	01	01
07.	July 2021	-Nil-	02	02	04
08.	August 2021	-Nil-	01	-Nil-	01
09.	September 2021	-Nil-	-Nil-	-Nil-	00
10.	October 2021	-Nil-	-Nil-	-Nil-	00
11.	November 2021	-Nil-	-Nil-	-Nil-	00
12.	December 2021	-Nil-	-Nil-	-Nil-	00
Total Earthquakes during 2021		01	08	14	23

Table 7.3: Details of Local Earthquake recorded by the VSAT Enabled PSMS Network of Karnataka during the Year 2021

Sl. No.	Origin Time (UTC)	Origin Time (IST)	Epicentre Region	Magnitude
1.	03:04:2021:11:48:10	03:04:2021:17:18:10	Arakalgudu - K R Nagara Border Region	2.6

8. ASSESSMENT OF FLOODS DURING THE YEAR 2021

In the past two decades, the State of Karnataka has been frequently confronted with various disasters such as drought, flood, hailstorm, etc, causing enormous loss and damage to life, property, crops and infrastructure.

In 2021, the State has been persistently experiencing extreme events since May 2021. Cyclone Tauktae during May, had caused damages to critical infrastructure in Coastal and parts of Malnad districts. During the South-West monsoon (June to Sep), a large part of the State experienced heavy rain resulting in floods and landslides, causing huge damages to crops, houses and critical infrastructure.

During the North-East monsoon (1st October to 21st November 2021), simultaneous cyclonic circulation and low pressures over Bay of Bengal and Arabian sea resulted in untimely incessant widespread heavy rainfall over the State, especially in the South Interior Karnataka, Malnad and Coastal region. From 1st October to 21st November 2021, the State received 307 mm as against its normal of 166 mm, recording 85 % more rainfall. 23 out of 31 districts have recorded excess to large excess rainfall.

Due to depression over the Bay of Bengal and a trough over the Arabian sea during October, the State experienced two extreme events i.e. one during 6th to 13th recorded a 110% excess rainfall and the second event during 21st to 25th October recorded 123% more than the normal rainfall.

In November 2021 due to 2 successive depressions over the Bay of Bengal and a trough in the Arabian Sea caused unprecedented and incessant rainfall over the State. The State received widespread heavy rainfall and recorded 592 % more than normal, which is the second-highest in the last 60 years. The region wise rainfall departures from normal shows that, South Interior Karnataka recorded 876 % more rain, which is highest in last 60 years. North interior Karnataka recorded 417 % more, Malnad recorded 502 % more, and the Coastal region recorded 498 % more rain, which is 2nd highest in last 60 years in all these three regions. The synoptic conditions which triggered untimely heavy rainfall leading to a flood-like situation in Karnataka.

Since 1990, there has been an increasing trend of intense cyclonic storms over Arabian Sea. As per IMD, Frequency of intense cyclones in Arabian Sea could be linked to climate change. The cyclone hitting the western shores of India- Cyclone Tauktae is the fourth cyclone in the consecutive years to have developed in the Arabian Sea. Apart from this, the cyclones in the region usually are seen post-monsoon, however, this is also the fourth cyclone to form in the pre-monsoon period and of high intensity.

During the Pre-Monsoon, under the influence of the Severe Cyclonic Storm over the Arabian sea, the parts of Coastal and Malnad districts of the State recorded extremely to very heavy rainfall accompanied with strong tidal waves and gusty winds during 15th to 16th May 2021. Significant wave height of 3.2-5.1 metres along the Karnataka Coast and surface current speeds reaching 40-50 kmph and gusting up to 60-70 kmph were recorded along and off Karnataka Coast. As a result, 125 villages of 8 Coastal, Malnad and North Interior districts have been affected at various degrees causing damage to critical infrastructure. The State has effectively managed the adverse impact of Cyclone Tauktae due to meticulous planning and preparedness and adopting best practices from Cyclone prone states like Odisha and Andhra Pradesh. Karnataka has focused on strengthening preparedness, infrastructure and institutional capability pertaining to Disaster Management.

Preparedness and action taken the State:

Dissemination: Karnataka State Natural Disaster Monitoring Center (KSNDMC) has been closing tracking the cyclogenesis right from the low pressure formation over southeast Arabian Sea. In fact, KSNDMC had alerted the districts on May 12th before the formal communication issued by IMD on the impending formation of cyclonic storm. All alerts/bulletins issued by IMC and INCOIS were disseminated to DEOCs of the Coastal and Malnad districts through phone, email, SMS, Whatsapp, local media and mobile Public Address system.

The fishermen were alerted by Indian Coast Guard in deep sea and port authorities to return to nearest harbor/port immediately and also advised not to venture into southeast Arabian Sea, Lakshadweep – Maldives areas, east central Arabian Sea along & off Karnataka coast till 18th May.

Monitoring and Supervision:

The development of the system was closely monitored by Chief Secretary, Addl. Chief Secretary to Govt, Relief Commissioner and Commissioner, KSDMA on hourly basis.

Hon'ble Revenue Minister Cum Vice Chairman and Hon'ble Home Minister reviewed the preparedness of various State Departments on 15-05-2021 in view of the Cyclonic Storm Tauktae with Officers from Revenue, Home Department, Fire and Emergencies Services and other related to departments.

Ensuring Fail-safe Communication System

- Department of Telecommunication was requested direct all the telecom and internet services providers in the Coastal and Malnad districts to ensure uninterrupted telecom and internet connectivity to enable district administrations to disseminate timely alerts and warning and to swiftly and effectively respond to any contingency arising due to heavy rainfall and squally winds as forecasted by IMD. Accordingly Internet services providers to deploy quick response teams to coastal districts to restore connectivity in case of disruption.
- In communication shadow region, existing VHF and UHF system of various agencies have been utilized to communicate.
- SEOCs and DEOCs of all Coastal and Malnad district activated.
- VSAT Communication developed under NDMS is ensured to be in serviceable conditions (SEOC and DEOC Uttara Kannada and Dakshina Kannada).
- Whatsapp Group created to dissemination of alerts and decision making.

Pre-deployment of rescue teams and other measures

- Two NDRF teams are pre-deployed to Dakshina Kannada (coastal district) and Kodagu (Malnad District) respectively.
- SDRF teams and additional Fire and Emergency teams are also deployed to Coastal and Malnad districts. In total, around 1200 rescue personnel were deployed in Coastal and Malnad region.
- GP level rescue teams have been constituted as per GP Disaster Management Plan.
- COVID 19 home isolation patients along with primary contacts residing in vulnerable areas have been identified, ambulances were arranged to ferry them to nearest COVID Care Center in case of inundation.

- Secondary source of electricity were provided to all COVID hospital to ensure uninterrupted power supply.

Relief Measures:

- No. of Relief camps based on the vulnerable population and COVID 19 social distancing protocol were identified and readied with stockpiling of relief materials. 8 Multipurpose Cyclone Shelters (MPCS) built under National Cyclone Risk Mitigation Project (NCRMP).
- Low lying area vulnerable to storm surge due to significant wave height have been identified. The people living in such areas have identified and shifted to relief camps. In total, 547 people were evacuated and housed in 16 relief camps. Social distancing as per COVID 19 protocol was ensured in relief camps. Adequate masks, sanitizers and other appropriate PPEs were provided.

Loss and damage:

Loss and damages were mainly due to squally winds and significant wave height. Sea erosion protection walls and parallel roads of 140 km including 40 Culverts and bridges have been damaged. 10 human lives have been lost and 2 persons still missing, 496 houses have been damaged; 170 boats and 187 nets have damaged severely impacting the livelihood of the fisherman; 1129 electric poles and 189 transformers have been damaged. Moreover, there were number of tree falls due gusty winds, which has damaged private properties.

The sea erosion protection wall repair is not covered under the prevailing SDRF/NDRF norms, the repair/reconstruction of which require extensive investment, which needs to borne from state fund, which puts enormous burden on already depleted State Finance. Further, there is dire need to have disaster resilient power infrastructure across the coastline given the increased frequency of cyclone originating from Arabian Sea.

District-wise Rainfall Pattern for the period 14th to 17th May 2021 is given below:

Sl. No.	District	Cumulative Rainfall Pattern (14th to 17th May 2021)			
		Normal (mm)	Actual (mm)	% Departure	Rainfall Category
1	Uttara Kannada	8	145	1690	Large Excess
2	Udupi	19	178	844	Large Excess
3	Dakshina Kannada	20	134	566	Large Excess
4	Kodagu	19	104	446	Large Excess
5	Shivamogga	13	69	423	Large Excess
6	Belagavi	8	33	337	Large Excess
7	Chikkamagaluru	15	57	270	Large Excess
8	Hassan	16	25	54	Excess

During the South-West Monsoon a low pressure area has formed in Northwest Bay of Bengal on 22nd July, 2021. The surface level winds and winds at 1.5 Kms above the surface level has been so stronger off coast to Karnataka and Maharashtra as a result of low pressure formation in North Bay. These winds were

laden with high amounts of moisture from an overheated Arabian Sea. As these winds rushed towards the low pressure area with abundant moisture in it, and they encountered the high range of the Western Ghats, resulted in heavy to extreme heavy rains. Also an Off-Shore trough at mean sea level runs from South Gujarat Coast to Kerala Coast was strong.

Due to the above weather conditions associated synoptic features resulted in widespread heavy to very heavy rains with isolated places extremely heavy rains all along the Coastal, Malnad & adjoining interior Karnataka districts during the period from 21st July to 26th July, 2021.

Parts of Coastal, Malnad, and North Interior Karnataka of the State received incessant torrential rainfall during 21st to 26th July triggering landslides and floods in Uttara Kannada, Belagavi, Dharwad, Chikkamagaluru, Kodagu, Shivamogga, Hassan, Haveri, and Davanagere districts. Certain places in Uttara Kannada received 400 mm to 500 mm extremely heavy rainfall in a span of 24 hours, such extreme rainfall events are comparable to the typical rainfall dumped by tropical cyclones during landfall. Subsequently, rainfall fall, though with less intensity compared to the July 22nd rainfall, continued for 23rd and 24th July. Further, the incessant very heavy to extremely heavy rainfall in the upper Krishna catchment area of Maharashtra has generated copious inflows into the reservoirs in Upper Krishna reservoirs, filling the dams in record time. As a result, river Krishna and its tributaries in middle and lower Krishna basin were in spate causing flooding of low lying villages of Belagavi, Bagalkot, Dharwad, Haveri, Raichur, Yadgir, Vijayanagar, Vijayapura and Gadag districts. Subsequently, incessant heavy rains in Coastal and Malnad region caused flash floods in large parts of Uttara Kannada district and in parts of Shivamogga, Hassan, Chikkamagaluru and Kodagu districts. In total, 15 districts were affected.

Cumulative Rainfall (mm) Recorded during the peak rainfall period 21st to 26th July 2021:

On 23rd July 2021 Dongri Gp in Ankola Taluk of Uttara Kannada District received 541 mm highest rainfall in 24 hrs and 175 stations have recorded extreme rainfall events (more than 200 mm rainfall in 24 hrs). During the peak rainfall period 21st to 26th July 2021 Nitiru & Kairakunda stations in Shivamogga district and Itguli, Kasalrock, Manjaguni & Bandal stations in Uttara Kananda district have recorded more than 900 mm rainfall in just 6 days. These large amounts of daily rainfall would have anyway qualified as an extremely heavy rainfall event.

In the Major reservoirs Almatti and Narayanapura dams, anticipating heavy discharge considering incessant widespread heavy rainfall in the upper Krishna catchment region since third week of July 2021. The cumulative inflows form July 22nd to July 28th in 13 major reservoirs of Karnataka was about 339 TMC, which is 39% of the gross capacity of 13 reservoirs.

District wise No. of Stations Recorded >100 mm of Rainfall for the period 21st to 26th June 2021:

Sl.No.	District	Total Raingauge Stations	No. of Stations Recorded >100 mm	Highest rainfall (mm)	Highest Rainfall (mm) Location, Taluk
1	Shivamogga	275	246	986	Nitiru, Hosanagara
2	Uttara Kannada	243	240	962	Itguli, Sirsi
3	Belagavi	534	326	699	Jamboti, Khanapur
4	Chikkamagaluru	242	124	583	Kadabinabail , NR Pura
5	Hassan	278	53	578	Hettur, Sakleshpura
6	Kodagu	106	95	560	Dundalli , Somwarpet
7	Dakshina Kannada	241	239	459	Navooru, Beltangadi
8	Udupi	166	124	439	Hebri, Karkala
9	Haveri	215	70	362	Sammalagi, Hanagal
10	Dharwad	151	62	347	Benachi, Dharwad Taluk
11	Davanagere	211	72	287	Chinnikatte, Honnali

Preparedness and Response

Adequate cushion was maintained in the Major reservoirs (Almatti and Narayanapura dams), anticipating heavy discharge considering incessant widespread heavy rainfall in the upper Krishna catchment region since third week of July 2021. The cumulative inflows from July 22nd to July 28th in 13 major reservoirs of Karnataka was about 339 TMC, which is 39% of the gross capacity of 13 reservoirs. The effective coordination and planned dam water discharge have mitigated flooding in downstream to a great extent. However, record releases along with prolonged high intensity rain, had caused flooding in Krishna and its tributaries in Belagavi, Bagalkot, Gadag, Dharwad and Haveri districts. Subsequently, as the discharge from reservoirs in upper Krishna basin increased, the discharge from Almatti and Narayanapura dams were increased to 4 lakh cusecs, which lead to flooding of villages adjoining the river course in Vijayapura, Yadgir and Raichur districts.

The response of the State Government was proactive, rescue teams and search and rescue were pre-deployed for swift rescue and relief operations. Joint coordinated rescue operation involving 7 NDRF teams, 15 SDRF teams, Fire and Emergency services, Indian Coast Guard, Indian Navy and local rescue teams have evacuated 2.06 lakh people. As many as 476 relief camps have been opened which were sheltering about 135785 people ensuring strict compliance to COVID appropriate behaviour. The people in shelter were provided with food, clean drinking water, medical care and other necessary relief items. Apart from this 40 cattle camps were opened adjacent to the relief camps to shelter animals and were provided with fodder, water and medical care.

Monitoring and Command

The State Government has been proactive in taking flood preparedness. Despite second resurgence of COVID 19 cases in the State, Flood preparedness was accorded high priority. The preparation for South West monsoon started during April 2020. Series of review meetings were conducted by Hon'ble Chief Minister, Hon'ble Revenue Minister, Chief Secretary, Addl. Chief Secretary and Development Commissioner,

Principal Secretary, Revenue Department (DM) and Commissioner KSDMA with districts on flood preparedness.

Based on the lessons learnt in the past 3 years, Gram Panchayat Level Flood preparedness (micro level flood management plan) plans were formulated for around 1287 vulnerable GPs. The plans set-out Standard Operation Procedures to be followed by the concerned authorities in event of floods and responsibility matrix with accountability. The plans were activated during the flood situation.

Inter-state Coordination mechanism has been evolved with Maharashtra and Kerala Governments regarding exchange of real time inflow and outflows data from reservoirs and also forewarning downstream area prior to release of water from reservoir.

Exclusive WhatsApp groups have been created for Krishna and Cauvery basin to exchange real time information pertaining to reservoirs and decision making.

Loss and Damage Details

Around 18521 houses have been damaged; out of this about 9067 houses have been completely and or severely damaged. As per preliminary survey, agriculture and horticulture crops have been damaged in about 2.04 lakh ha and around 2444 ha fields along the river courses are heavily silted. Around 113 ha of agriculture land has been completely damaged due to landslides and change in river course. With respect to the critical infrastructure, 22725 km of various roads (SH/MDR, village roads, urban roads, etc), 1779 bridges/culverts, 3536 schools, 236 Primary Health Care Centers (PHCs), 99 Panchayat Ghars, 1331 other government buildings such as Anganwadis/community assets, 915 minor irrigation schemes, 554 minor irrigation/ZP tanks, 137 water supply and sanitation schemes, 36945 electrical poles, and 7796 transformers have been damaged. The Sector wise loss and damage report is set out in Chapter 4

The State Government has already released **Rs.100 Crore** from SDRF for immediate flood relief. To ensure the people construct structurally safe house, the State Government is providing financial assistance of Rs.5.00 lakh for reconstruction of completely damaged houses, which Rs.4.04 lakh is borne from State Fund; Rs.3.00 for houses with major damage, Rs.2.04 lakh is borne from the State Fund and Rs.50,000 per house for partially damaged house. The major portion of this is borne from the State Exchequer. **As an immediate relief Rs.10,000 in the form of Gratuitous relief is being paid to 104029 families whose clothing and utensils/household goods have been damaged due to floods/landslides, out of which Rs.6200 is borne from the State fund.** Ex-gratia of Rs.5.00 lakh has paid to the next of the kin of the victims, out of which Rs.1.00 lakh is paid for Chief Minister's Relief Fund.

The State Government vide order No. RD 336 TNR 2021, dated 11-08-2021 and 17-08-2021 has declared 86 taluks belonging to 15 districts as flood affected.

The estimated loss due to floods and landslides are to the tune of Rs.5690.52 Crore. The abstract of losses and assistance sought is as follows:

STATEMENT SHOWING AMOUNT REQUIRED FOR RELIEF, RESCUE AND EMERGENT WORKS DUE TO FLOOD DURING JULY 2021

				Rs. Crores
Sl. No	Item	Quantity	Estimated Loss	As per SDRF Norms
1	Agriculture Crop loss	1,94,656 ha	1557.89	203.57
2	Horticulture crop loss	10076 ha	121.24	13.01
3	Desilting and Agriculture Land loss	2557 ha	23.52	3.40
4	Animal death	358	0.96	0.84
5	House damage	18719	367.18	90.76
6	Relief camps	476		13.49
7	Cattle Camps	40 camps		1.91
7	Other relief items		0.51	48.42
Total (A)			2071.30	375.40
	Damage to Infrastructure			
1	Damage to Roads (a+b+c) (Kms)	22725	2311.55	149.49
	a) State Highways and MDRs (Kms)	3283	1677.10	32.83
	b) Rural Roads (Village Roads) (Kms)	18312	431.72	109.88
	c) Urban Roads (Kms)	1130	202.85	6.78
2	Damage to bridges (Nos)	1779	527.32	10.67
3	Minor Irrigation (Schemes)	915	402.19	13.73
4	Restoration of Damaged electrical equipments		148.24	97.41
5	Tanks (MI and ZP) (Nos)	554	35.02	8.31
6	Damage to Govt. Building (Nos)	5202	182.21	104.04
7	Water supply and Sanitation (Nos)	137	5.98	2.06
8	Drinking water Supply Schemes (Nos)	316	6.70	4.74
Total (B)			3619.21	390.44
Grand Total (A+B)			5690.52	765.84

During the North-East monsoon, (1st October to 21st November 2021), simultaneous cyclonic circulation and low pressures over Bay of Bengal and Arabian sea resulted in untimely incessant widespread heavy rainfall over the State, especially in the South Interior Karnataka, Malnad and Coastal region.

From 1st October to 21st November 2021, the State received 307 mm as against its normal of 166 mm, recording 85 % more rainfall. 23 out of 31 districts have recorded excess to large excess rainfall. Due to depression over the Bay of Bengal and a trough over the Arabian sea during October, the State experienced two extreme events i.e. one during 6th to 13th recorded a 110% excess rainfall and the second event during 21st to 25th October recorded 123% more than the normal rainfall.

Rainfall Pattern during 1st October to 21st November 2021

The State received 307 mm of rainfall as against normal rainfall of 166 mm, with percentage departure from normal being 85% , which is considered under Large Excess Category. The analysis of region-wise rainfall distribution during the period (1st October to 21st November 2021), shows that the distribution of rainfall was about 145 % Excess Rainfall in South Interior Karnataka (SIK), 7 % Excess Rainfall in North Interior Karnataka (NIK), 111 % Excess rainfall in Malnad and 118 % Excess rainfall in Coastal region in the state.

Region-wise Rainfall Pattern for the period 1st October to 21st November 2021 is given below:

REGION	Normal (mm)	Actual (mm)	% Departure	Category
South Interior Karnataka	181	443	145	Large Excess
North Interior Karnataka	130	139	7	Normal
Malnad	205	432	111	Large excess
Coastal	240	524	118	Large Excess
State	166	307	85	Large Excess

During the period 1st October to 21st November 2021, 159 Taluks in 23 Districts received Excess to Large Excess Rainfall. The District-wise Rainfall Pattern is given below:

Sl.No.	District	Normal (mm)	Actual (mm)	% Departure	Rainfall Category
1	Chikkaballapura	187	562	201	Large Excess
2	Tumakuru	170	509	199	Large Excess
3	Bengaluru Rural	192	518	170	Large Excess
4	Kolar	187	490	162	Large Excess
5	Chitradurga	142	345	143	Large Excess
6	Udupi	284	680	140	Large Excess
7	Davanagere	145	345	137	Large Excess
8	Bengaluru Urban	196	449	129	Large Excess
9	Mandya	197	443	125	Large Excess
10	Mysuru	193	434	125	Large Excess
11	Chikkamagaluru	199	445	123	Large Excess
12	Dakshina Kannada	347	765	121	Large Excess
13	Shivamogga	188	403	115	Large Excess
14	Ramanagara	203	432	112	Large Excess
15	Uttara Kannada	174	355	103	Large Excess
16	Hassan	202	407	101	Large Excess
17	Kodagu	256	503	96	Large Excess
18	Haveri	150	291	95	Large Excess
19	Chamarajanagara	223	402	80	Large Excess
20	Dharwad	134	209	56	Large Excess
21	Vijayanagar	142	216	51	Large Excess

Sl.No.	District	Normal (mm)	Actual (mm)	% Departure	Rainfall Category
22	Ballari	148	219	48	Large Excess
23	Belagavi	123	163	33	Large Excess

Impact of heavy rains and floods:

The unprecedented incessant rainfall over the State led to over-saturation of soils and inundation of crop fields for more than a week to a month resulting in significant damages to standing crops nearing harvesting stage. Further, heavy rainfall during November 2021 also destroyed most of the late sown Kharif crops along with Rabi crops, such as Paddy, Ragi, Groundnut, Maize, Bengal gram, Cotton, Jowar, Chilli etc. Long duration cloudy situation led to pest and disease to Fruits, Vegetable and plantation crops like Tomato, Grapes, Coffee, Arecanut, Pepper etc., causing immense misery to farmers.

The record rainfall caused breaching of already full Minor Irrigation and Zilla panchayat tanks, especially in the districts of South Interior Karnataka, which further compounded the flood situation resulting in crop land being submerged for more than a week.

Further, persistent rainfall has also damaged a large number of houses and critical infrastructures such as roads, schools, and other government offices.

Preparedness:

The State Government has been proactive in taking flood preparedness. Despite COVID 19 situation, flood preparedness was also of high priority for the State. Preparation for the Southwest monsoon started during April 2021, Hon'ble Chief Minister has been periodically reviewing the operations and preparations in the State.

The Revenue Minister has regularly had flood preparedness meetings with the ACS and Development Commissioner, Principal Secretary (DM), Commissioner, KSDMA and Districts through Video Conferencing. The ACS & Development Commissioner has been conducting the Weekly Weather Watch Committee meeting, reviewing the flood preparation, and giving necessary guidance to officers concerned since May 2021. The district ministers were deputed to flood-affected districts to take stock of the situation.

The State has adopted an Integrated Dam management approach taking IMD, KSNDMC and CWC inflow forecasts, Coordination among the States in the Krishna Basin, taking carrying capacities of downstream into consideration and inputs from Districts administration, this has mitigated the adverse impact of floods to a larger extent.

For the first time, 2128 Gram Panchayats vulnerable to floods in 29 districts have been identified, and village level flood preparedness through the Grama Panchayat Disaster Management Plan has been developed. The plan comprises Grama Panchayat Profile, Hazard, Risk Vulnerability and Capacity Assessment, Mitigation and Preparedness Plan, Response Plan, Contact Numbers & SOPs, Guidelines etc. This initiative is to engage the community in flood preparedness and response.

Loss and damage details:

A comprehensive sector has been undertaken to assess loss and damages caused due to untimely heavy rains during October and November. During floods, 42 human lives were lost. While the people of the

affected districts have gone through immense hardship, the loss of shelter has a devastating effect on the affected people.

Around 20083 houses have been damaged; out of this, about 7795 houses have been completely and or severely damaged. About 7.9 lakh ha of agriculture crops, 1.25 lakh ha of horticulture crops, 0.75 lakh ha of plantation crops and 243 ha of Sericulture crops have been damaged due to heavy rainfall. In total, crop damage of around 9.9 lakh ha of crops has been reported. Besides, 417 ha of agricultural land are heavily silted, with some areas suffering significant land loss. The crop loss due to flood is estimated at Rs. 8962.02 Crore. The crop loss reported are mutually exclusive from that reported in the Memorandum submitted in August 2021, hence, there is no duplication of crop loss whatsoever. Critical infrastructure, such as roads, bridges/culverts, electrical infrastructure, schools, hospitals and Anganwadis/Government buildings, has been affected. 19366 km of State Highway, Major district, village & urban roads; 1258 bridges/culverts, 7204 poles, 1008 Power supply Transformers upto 11KV, 446 Kms Power supply Lines, 439 Minor Irrigation and Tanks, 977 water Supply Schemes and 7711 Government buildings. The overall estimated damage of Rs. 11916.30 crore and as per SDRF norms stands at Rs. 1281.92 Crore. The quantum of loss and damages in the prescribed formats are set out in Chapter III.

Relief:

The State Government is committed to constructing disaster-resilient houses and reconstructing damaged critical infrastructure under the principle of "build back better". The State Government will take up medium and long term structural measures, using State Disaster Mitigation Fund and National Disaster Mitigation Fund to mitigate the adverse effects of floods. The State Government has immediately started disbursement of input subsidy for the crop loss directly to the farmers' bank account through Aadhar enable payment system. For house damage, the State Government is providing financial assistance of Rs.5.00 lakh for the reconstruction of completely damaged houses, out of which Rs.4.04 lakh is borne from State Fund; Rs. 3 lakh for houses with major damage, Rs. 2.04 lakh is borne from the State Fund and Rs. 50,000 per house for partially damaged house ensuring the construction of disaster-resilient houses. As an immediate relief, Rs. 10,000 in the form of Gratuitous relief is being paid to families whose clothing and utensils/household goods have been damaged due to rains, out of which Rs.6200 is borne from the State fund. To this effect, the State Government has released Rs. 418 Crore from SDRF and State fund vide order No. RD 335 TNR 2021, dated 23-11-2021.

The State has already made significant expenditure towards COVID 19 containment measures and payments of ex-gratia to the kith and kin of Covid-19 victims. The State has released Rs. 200 Crore for payment of ex-gratia for COVID 19 victims.

The abstract of losses and assistance sought from NDRF is as follows:

**STATEMENT SHOWING AMOUNT REQUIRED FOR RELIEF, RESCUE AND
EMERGENT WORKS DUE TO FLOOD DURING OCTOBER & NOVEMBER 2021**

Rs. Crores

Sl. No.	Item	Quantity	Estimated Loss	As per SDRF Norms
1	Agriculture Crop loss (in Ha)	789563	6207.25	619.22
2	Horticulture crop loss (in Ha)	125442	1348.01	143.69
3	Plantation Crop loss (in Ha)	74530	1401.90	89.53
4	Desilting and Agriculture Land loss (in Ha)	417	3.75	0.51
5	Sericulture Crops (in Ha)	243	4.86	0.12
6	Animal death	376	2.63	0.51
7	House damage	20083	316.71	79.36
8	Relief camps	20		0.11
9	Other relief items		0.19	2.80
	Total (A)		9285.31	935.87
	Damage to Infrastructure			
1	Damage to Roads (a+b+c) (Kms)	19366	1785.54	147.23
	a) State Highways and MDRs (Kms)	7757	1450.12	77.57
	b) Rural Roads (Village Roads) (Kms)	9820	218.69	58.92
	c) Urban Roads (Kms)	1789	116.73	10.74
2	Damage to bridges (Nos)	1258	282.64	7.55
3	Minor Irrigation (Schemes)	685	221.13	10.28
4	Restoration of Damaged electrical equipments		17.06	15.19
5	Tanks (MI and ZP) (Nos)	439	18.81	6.59
6	Damage to Govt Building (nos)	7711	280.58	154.22
7	Water supply and Sanitation (nos)	42	3.14	0.63
8	Drinking water Supply Schemes (nos)	292	22.09	4.38
	Total (B)		2630.99	346.06
	Grand Total (A+B)		11916.30	1281.92

9. ASSESSMENT OF DROUGHT DURING THE YEAR 2021

- Karnataka State has been subjected to drought condition during successive years in the past. During **Kharif** season 2021 rainfall was normal by **(-8%)** and **Rabi** season was **Large Excess** by 88% subsequently, **70** Taluks were being identified as **≥ 3 consecutive weeks** of dry spells in both seasons.
- During 2021, the rainfall was normal in the pre-monsoon season and subsequently the onset of monsoon over Karnataka got delayed by 3 days.
- During **June 2021**, the State as a whole received **198** mm of rainfall against the normal rainfall of **199** mm with **(-) 1 %** departure from Normal.
- During **July 2021**, the State received **290** mm of rainfall against the normal rainfall of **271** mm with **(+) 7 %** departure from Normal.
- During **August 2021**, the State received **150** mm of rainfall against the normal rainfall of **220** mm with **(-) 32 %** departure from Normal.
- During **September 2021**, the State received **149** mm of rainfall against the normal rainfall of **161** mm with **(-) 7 %** departure from Normal.
- Overall, from **1st June to 30th September 2020**, the state as a whole received **787** mm of rainfall against the normal rainfall of **852** mm with **(-) 7%** departure from Normal.
- Following the Guidelines prescribed in the Drought Management Manual 2016 and amendments thereafter by GoI, the State has been assessed for the drought condition at taluka level.

***Though, None of the taluks are not qualified has drought affected in the year 2021.**

10. GROUND WATER STATUS

Introduction:

Monitoring of ground water levels was carried out at 1479 ground water monitoring wells in the State of Karnataka during the month of November 2021. Among the wells monitored, 1317 are dug wells and 215 are piezometers/tube wells. The district-wise status of number of wells monitored, added/rejuvenated and deleted is presented in **Annexure-I**. The depth to water level data and piezometric surface of ground water monitoring wells for November 2021 is given in **Annexure-II**.

The district-wise frequency of water level in different depth ranges for dug wells are given in **Annexure-III**. The data indicated that the water level in the major part of the State is within 10 m bgl, whereas the deepest levels are around 30 m bgl. The district wise frequency of piezometric surface for different depth range for piezometers is given in **Annexure-IV**. The district-wise rise and fall of water level between November 2020 and November 2021 is analysed and is given in **Annexure-V**. The long-term changes in levels between decadal mean (2011-2020) and November 2021 are given in **Annexure-VI**.

DEPTH TO WATER LEVEL:

The statement showing the distribution of ground water monitoring wells along with depth to water level of phreatic aquifer in different depth ranges is presented in **Annexure-III** and **Plate-I** depict the ground water scenario in November 2021. Salient features of the depth to water level scenario during November 2020 are given below.

1. A perusal of the water level data reveals that the depth to water level ranged from 0.01 m bgl (Belgaum and Davanagere districts) to 26.58 m bgl (Bagalkot district).
2. The salient feature of the analysis is that the depth to water level over major part of the State lies within 10 m bgl in 96% of wells analysed, while 4 % of wells show depth to water level more than 10 m bgl. Depth to water level of less than 2 m bgl has been recorded in 39 % of wells analysed and noted all over the State.
3. Depth to water level in the range of 2 to 5 m bgl has been recorded in 35% of wells analysed and noted in all the districts.
4. Depth to water level in the range of 5 to 10 m bgl has been recorded in 22 % of wells analysed and noted in all the districts.
5. Depth to water level in the range of 10 to 20 mbgl has been recorded in 3.9% of the wells analysed and observed in Bangalore Rural, Bangalore Urban, Belgaum, Bellary, Bidar, Chamarajanagar,

Chikmagalur, Chitradurga, Dakshin Kannada, Davanagere, Dharwad, Gadag, Hassan, Kodagu, Koppal, Mysore, Tumkur and Uttara Kannada districts.

6. Depth to water level more than 20 m bgl has been noted in 0.1 % of wells analysed and noted as isolated pockets in Bagalkot district.

DEPTH TO PIEZOMETRIC SURFACE

Depth to piezometric surface has been recorded from piezometers spread all over the State in hard rock areas. The statement showing depth to piezometric surface is given in **Annexure-IV**. Salient features of the depth to piezometric surface during November 2021 are given below;

1. The depth to piezometric surface ranged from 0.2 m bgl (Raichur district) to 79.89 m bgl (Kolar District) in Karnataka.
2. 61 % of wells have recorded depth to piezometric surface within 10 m bgl and 39 % of wells show depth to piezometric surface more than 10 m bgl.
3. Depth to piezometric surface of less than 2 m bgl has been recorded in 13 % of wells analysed and this has been noted in the districts of Bangalore Urban, Bangalore Rural, Belgaum, Bijapur, Chikmagalur, Davanagere, Gulbarga, Mandya, Mysore, Raichur, Shimoga, Tumkur and Uttara Kannada districts.
4. Depth to piezometric surface in the range of 2 to 5 m bgl has been recorded in 24 % of wells analysed and noted in Bangalore Rural, Bangalore Urban, Belgaum, Bellary, Bidar, Bijapur, Chikmagalur, Chitradurga, Dakshin Kannada, Davanagere, Gulbarga, Kodagu, Kolar, Koppal, Mysore, Raichur, Shimoga and Uttara Kannada districts.
5. Depth to piezometric surface in the range of 5 to 10 m bgl has been recorded in 23 % of wells analysed and noted in Bangalore Rural, Bangalore Urban, Belgaum, Bellary, Bijapur, Chikmagalur, Chitradurga, Dakshin Kannada, Davanagere, Gulbarga, Kodagu, Kolar, Koppal, Mysore, Raichur and Uttara Kannada districts.
6. Depth to piezometric surface in the range of 10 to 20 m bgl has been observed in 26 % of wells analysed and noted in Bagalkote, Bangalore Rural, Bangalore Urban, Belgaum, Bidar, Bijapur, Chamarajanagar, Chitradurga, Dakshin Kannada, Davanagere, Dharwad, Gulbarga, Hassan, Kodagu, Kolar, Mandya, Mysore, Udupi and Uttara Kannada districts.
7. Depth to piezometric surface in the range of 20 to 40 m bgl has been noted in 12 % of wells analysed and noticed in the districts viz. Bangalore Rural, Bangalore Urban, Bellary, Chamarajanagar, Kolar, Mandya and Tumkur districts.
8. Depth to piezometric surface in the range of more than 40 m bgl has been noted in 2 % of wells analysed and is observed as isolated patches in Kolar and Tumkur districts.

CHANGE IN WATER LEVEL (NOVEMBER 2020 TO NOVEMBER 2021)

The statement showing the distribution of ground water monitoring wells falling in different ranges of fluctuation is presented in **Annexure-V**. A comparison of water level shows that a rise in the water level is recorded in 67 % of wells analysed, while 33 % recorded fall. The fluctuation in water level has been plotted in **Plate II**. A perusal of the plate shows that a general rise in the range of 0 – 2 m is noticed in major part of the area.

1. Rise in the water level in the range of 0-2 m has been observed in 53 % of wells analysed and observed in all over the State.
2. Rise in the water level in the range of 2-4 m has been observed in 10 % of wells analysed and noted in all districts except in Bagalkote, Belgaum, Bellary and Dharwad districts.
3. Rise in water level more than 4 m has been observed in 5 % of wells analysed and noted in all districts except Bellary, Bidar, Bijapur, Davanagere, Gulbarga, Kolar and Raichur districts.
4. The fall in water level in the range of 0-2 m has been observed in 26 % of wells analysed and noted in all the districts.
5. The fall in water level in the range of 2-4 m has been observed in 4 % of wells analysed and noted as isolated pockets in Bagalkote, Belgaum, Bijapur, Chitradurga, Davanagere, Gadag, Gulbarga, Hassan, Kodagu, Koppal, Mandya, Mysore, Raichur, Shimoga and Udupi.
6. The fall in water level more than 4 m has been observed in 2 % of wells analysed and noted as isolated pockets in Bangalore Rural, Bangalore Urban, Belgaum, Bijapur, Chamrajnagar, Chikmagalur, Dakshin Kannada, Davanagere, Dharwad, Gadag, Gulbarga, Hassan, Koppal, Mysore and Uttara Kannada.

MEAN WATER LEVELS FOR THE PERIOD NOV. 2011 - 2020 & NOV. 2021:

The statement showing the distribution of ground water monitoring wells falling in different ranges of fluctuation is presented in **Annexure-VI**. The fluctuation in water level has been plotted in **Plate III**. A comparison of water level shows that a rise in the water level is recorded in 85 % of wells analysed, while 15 % recorded fall. Salient features of the comparison of water levels are given below.

1. Rise in the water level in the range of 0-2 m has been observed in 56 % of wells analysed, noted all over the State.
2. Rise in the water level more than 2-4 m has been observed in 20 % of wells analysed and noted in all over the State.
3. Rise in the water level more than 4 m has been observed in 9 % of wells analysed and noted in all over the State except Chamrajnagar, Dakshina Kannada and Udupi districts.
4. The fall in water level in the range of 0-2 m has been observed in 12 % of wells analysed and noted in all over the State except Bidar, Gadag and Kolar districts.

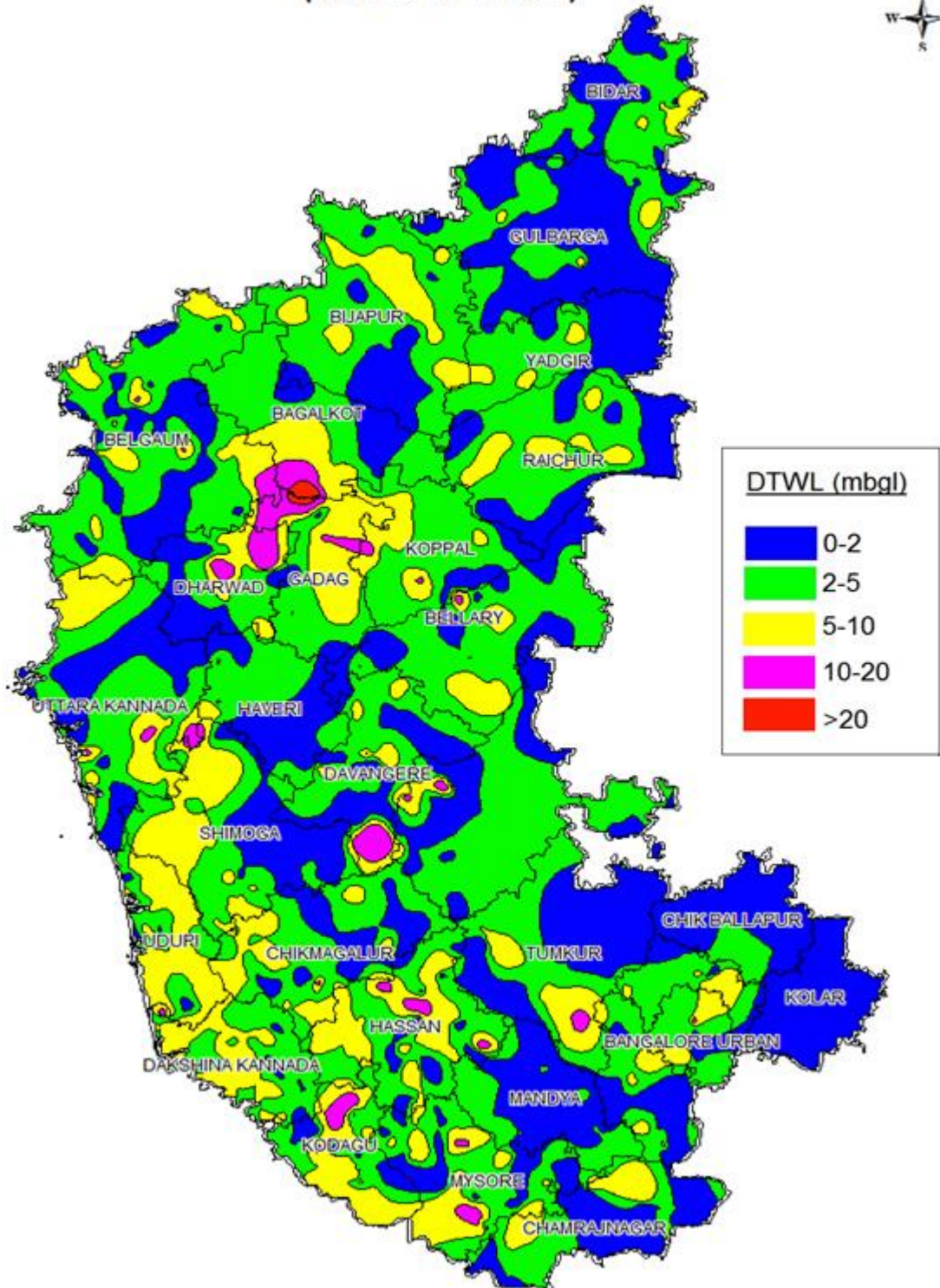
5. The fall in water level in the range of 2-4 m has been observed in 2 % of wells analysed and noted in Bangalore Urban, Belgaum, Bidar, Chamrajnagar, Chitradurga, Dharwad, Gadag, Haveri, Kolar, Udupi and Uttara Kannada districts.
6. The fall in water level more than 4 m has been observed in 1 % of wells analysed and noted in Bangalore Rural, Bangalore Urban, Belgaum, Bellary, Chamrajnagar, Chikmagalur, Davanagere, Gadag, Mysore and Raichur districts.

CONCLUSIONS

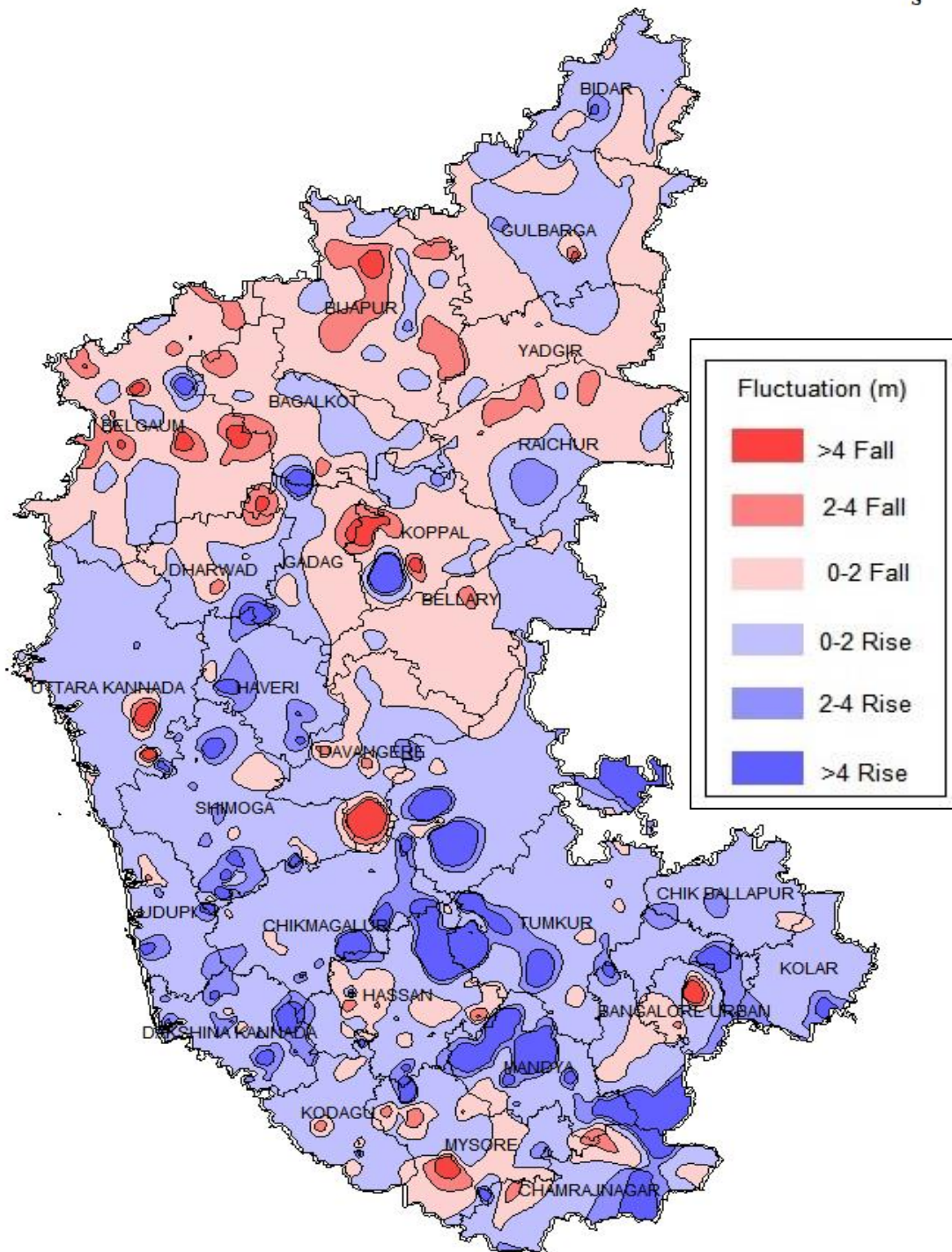
The behavior of ground water table during November 2021 in karnataka state has been studied by monitoring the dug wells and bore/tube wells. The data on water levels was analysed in detail and salient features are as under.

1. Depth to water level over major part of the State covering is within 10 m bgl in nearly 96% of wells analysed, while 3.9 % of wells show depth to water level between 10 to 20 m bgl and 0.1% of wells analysed show depth to water level more than 20 m bgl.
2. 61% of wells have recorded depth to piezometric surface within 10 m bgl, while 26 % of wells show depth to piezometric surface between 10 to 20 m bgl, 12 % of wells show depth to piezometric surface between 20 to 40 m bgl and 2 % more than 40 m bgl.
3. 67 % of wells have recorded rise in water levels and 33 % of wells have recorded fall in water levels during November 2021 in comparison to November 2020.
4. 85 % of wells have recorded rise in water levels and 15 % of wells recorded fall in water levels during November 2021 in comparison to decadal mean.

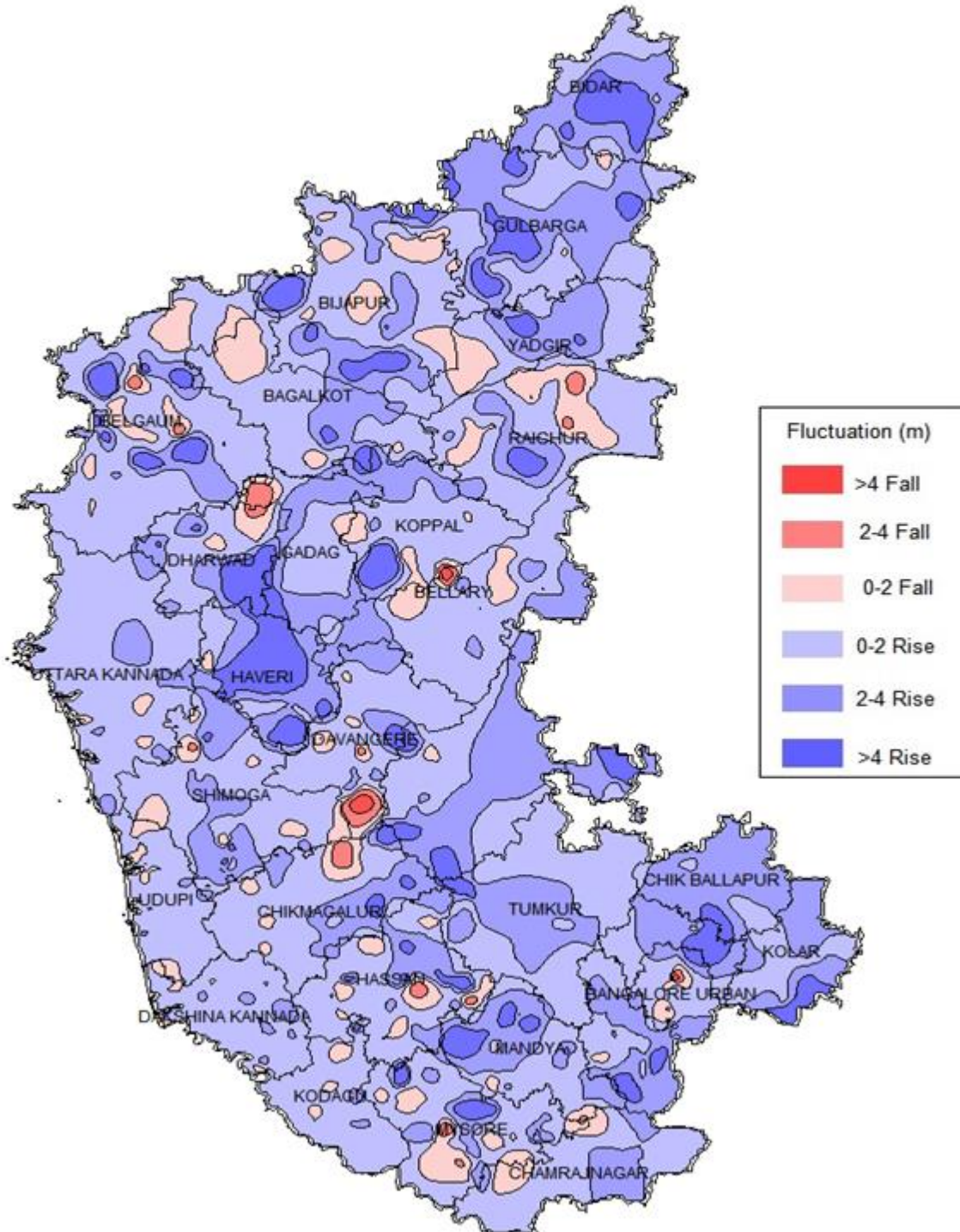
CENTRAL GROUND WATER BOARD, SWR, BANGALORE
DEPTH TO WATER LEVEL
(NOVEMBER 2021)



CENTRAL GROUND WATER BOARD, SWR, BANGALORE
WATER LEVEL FLUCTUTATION
(November 2020 to November 2021)



CENTRAL GROUND WATER BOARD, SWR, BANGALORE
WATER LEVEL FLUCTUTATION
(DECADAL MEAN 2011-2020 to NOVEMEBER 2021)



ANNEXURE-III DEPTH TO WATER LEVEL (NOVEMEBER 2021)

2.1

**Depth to Water Table
Distribution of Percentage of Observation Wells
2021/Nov**

State : Karnataka

District	No. of Wells Analysed	Depth to Water Table (mbgl)		No. / Percentage of Wells Showing Depth to Water Table (mbgl) in the Range of						
		Min	Max	0.0 - 2.0	2.0 - 5.0	5.0 - 10.0	10.0 - 20.0	20.0 - 40.0	> 40.0	
Bagalkot	24	0.65	26.58	3 12.50%	17 70.83%	3 12.50%	0	1 4.17%	0	
Bangalore Rural	36	0.31	14.44	16 44.44%	12 33.33%	7 19.44%	1 2.78 %	0	0	
Bangalore Urban	20	0.05	13.60	9 45.00%	9 45.00%	1 5.00%	1 5.00 %	0	0	
Belgaum	80	0.01	10.91	26 32.50%	35 43.75%	15 18.75%	4 5.00 %	0	0	
Bellary	31	0.70	11.30	12 38.71%	13 41.94%	5 16.13%	1 3.23 %	0	0	
Bidar	36	0.02	10.75	19 52.78%	10 27.78%	6 16.67%	1 2.78 %	0	0	
Bijapur	59	0.75	9.05	17 28.81%	25 42.37%	17 28.81%	0	0	0	
Chamarajanagar	20	0.01	18.20	10 50.00%	5 25.00%	3 15.00%	2 10.00 %	0	0	
Chikmagalur	70	0.25	12.40	24 34.29%	25 35.71%	20 28.57%	1 1.43 %	0	0	
Chitradurga	32	0.02	14.65	16 50.00%	10 31.25%	3 9.38%	3 9.38 %	0	0	
Dakshin Kannada	91	0.55	12.18	12 13.19%	40 43.96%	36 39.56%	3 3.30 %	0	0	

Central Ground Water Board

Page 1 of 3

18-March-2022

Davanagere	52	0.01	19.93	34	9	6	3	0	0
				65.38%	17.31%	11.54%	5.77 %		
Dharwad	24	0.45	16.15	9	6	7	2	0	0
				37.50%	25.00%	29.17%	8.33 %		
Gadag	19	1.42	15.17	3	9	4	3	0	0
				15.79%	47.37%	21.05%	15.79 %		
Gulbarga	82	0.03	7.10	44	32	6	0	0	0
				53.66%	39.02%	7.32%			
Hassan	68	0.32	12.25	24	16	25	3	0	0
				35.29%	23.53%	36.76%	4.41 %		
Haveri	25	0.26	6.84	16	6	3	0	0	0
				64.00%	24.00%	12.00%			
Kodagu	65	0.76	13.70	12	19	27	7	0	0
				18.46%	29.23%	41.54%	10.77 %		
Kolar	32	0.03	6.67	29	2	1	0	0	0
				90.63%	6.25%	3.13%			
Koppal	29	1.00	10.65	6	16	5	2	0	0
				20.69%	55.17%	17.24%	6.90 %		
Mandya	48	0.05	4.94	35	13	0	0	0	0
				72.92%	27.08%				
Mysore	57	0.05	12.95	25	19	10	3	0	0
				43.86%	33.33%	17.54%	5.26 %		
Raichur	46	0.45	7.90	16	19	11	0	0	0
				34.78%	41.30%	23.91%			
Shimoga	74	0.33	9.90	27	28	19	0	0	0
				36.49%	37.84%	25.68%			
Tumkur	41	0.07	10.68	27	9	4	1	0	0
				65.85%	21.95%	9.76%	2.44 %		
Udupi	60	0.22	9.65	9	24	27	0	0	0
				15.00%	40.00%	45.00%			

Uttara Kannada	69	0.41	15.63	22	26	16	5	0	0
				31.88%	37.68%	23.19%	7.25 %		
Total	1290	0.01	26.58	502	454	287	46	1	0

ANNEXURE-IV DEPTH TO PIEZOMETRIC SURFACE (NOVEMBER 2021)

Depth to Water Table Distribution of Percentage of Observation Wells 2021/Nov

State : Karnataka

District	No. of Wells Analysed	Depth to Water Table (mbgl)		No. / Percentage of Wells Showing Depth to Water Table (mbgl) in the Range of					
		Min	Max	0.0 - 2.0	2.0 - 5.0	5.0 - 10.0	10.0 - 20.0	20.0 - 40.0	> 40.0
Bagalkot	1	13.40	13.40	0	0	0	1	0	0
							100.00 %		
Bangalore Rural	11	1.54	28.06	1	3	2	2	3	0
				9.09%	27.27%	18.18%	18.18 %	27.27%	
Bangalore Urban	17	1.10	29.50	3	1	4	7	2	0
				17.65%	5.88%	23.53%	41.18 %	11.76%	
Belgaum	13	0.46	7.64	1	11	1	0	0	0
				7.69%	84.62%	7.69%			
Bellary	9	0.30	37.54	2	1	3	0	3	0
				22.22%	11.11%	33.33%		33.33%	
Bidar	3	12.36	14.50	0	0	0	3	0	0
							100.00 %		
Bijapur	10	1.65	15.22	1	6	2	1	0	0
				10.00%	60.00%	20.00%	10.00 %		
Chamarajanagar	5	5.46	39.23	0	0	2	2	1	0
						40.00%	40.00 %	20.00%	
Chikmagalur	5	1.45	7.33	2	1	2	0	0	0
				40.00%	20.00%	40.00%			
Chitradurga	9	4.30	18.90	0	1	4	4	0	0
					11.11%	44.44%	44.44 %		
Dakshin Kannada	8	2.75	14.25	0	3	1	4	0	0
					37.50%	12.50%	50.00 %		

Davanagere	7	0.79	11.27	2 28.57%	4 57.14%	0	1 14.29 %	0	0
Dharwad	1	10.10	10.10	0	0	0	1 100.00 %	0	0
Gulbarga	11	0.23	14.76	4 36.36%	3 27.27%	3 27.27%	1 9.09 %	0	0
Hassan	4	9.73	15.50	0	0	2 50.00%	2 50.00 %	0	0
Haveri	2	5.36	8.72	0	0	2 100.00%	0	0	0
Kodagu	4	4.04	19.90	0	1 25.00%	0	3 75.00 %	0	0
Kolar	15	2.38	79.89	0	4 26.67%	2 13.33%	5 33.33 %	3 20.00%	1 6.67%
Koppal	3	4.07	4.37	0	3 100.00%	0	0	0	0
Mandya	5	0.85	39.41	2 40.00%	0	1 20.00%	1 20.00 %	1 20.00%	0
Mysore	10	1.33	17.19	2 20.00%	1 10.00%	4 40.00%	3 30.00 %	0	0
Raichur	6	0.20	5.02	2 33.33%	3 50.00%	1 16.67%	0	0	0
Shimoga	2	1.70	8.48	1 50.00%	0	1 50.00%	0	0	0
Tumkur	27	0.50	49.55	1 3.70%	0	5 18.52%	8 29.63 %	10 37.04%	3 11.18%
Udupi	2	6.44	10.30	0	0	1 50.00%	1 50.00 %	0	0
Uttara Kannada	5	1.73	8.15	2 40.00%	2 40.00%	1 20.00%	0	0	0

2.1									
Karnataka / Uttara Kannada									
Total	195	0.20	79.89	26	48	44	50	23	4

ANNEXURE-5 DISTRICT WISE CATEGORISATION OF WATER LEVEL FLUCTUATION (NOV 2020-NOV 2021)

2.1													
District Wise - Fluctuation and Frequency Distribution From Different Ranges from One Period to Other													
From Year: 2020/Nov - To Year: 2021/Nov													
State : Karnataka													
District Name	No. of Wells	Range of Fluctuation (m)				No. of Wells/Percentage Showing Fluctuation						Total No. of Wells	
		Rise		Fall		Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 to 2	2 to 4	>4	0 to 2	2 to 4	>4		
Bagalkot	24	0.01	5.92	0.24	3.45	9 37.50%	0	1 4.17%	11 45.83%	3 12.50%	0	10	14
Bangalore Rural	32	0.15	15.00	0.04	6.16	18 56.25%	3 9.38 %	5 15.63%	5 15.63%	0	1 3.13%	26	6
Bangalore Urban	19	0.19	6.25	0.20	11.82	9 47.37%	3 15.79 %	1 5.26%	5 26.32%	0	1 5.26%	13	6
Belgaum	74	0.02	4.09	0.02	6.65	16 21.62%	0	1 1.35%	43 58.11%	7 9.46%	6 8.11%	17	56
Bellary	27	0.10	1.20	0.05	1.58	13 48.15%	0	0	14 51.85%	0	0	13	14
Bidar	30	0.06	3.23	0.05	1.90	17 56.67%	2 6.67 %	0	10 33.33%	0	0	19	10
Bijapur	56	0.15	2.67	0.05	6.33	10 17.86%	1 1.79 %	0	30 53.57%	13 23.21%	1 1.79%	11	44
Chamarajanagar	19	0.02	4.07	0.17	9.73	7 36.84%	3 15.79 %	1 5.26%	6 31.58%	0	1 5.26%	11	7
Chikmagalur	69	0.02	10.10	0.10	4.40	49 71.01%	9 13.04 %	5 7.25%	5 7.25%	0	1 1.45%	63	6

Chitradurga	30	0.09	9.10	0.19	2.60	18 60.00%	4 13.33 %	2 6.67%	4 13.33%	1 3.33%	0	24	5
Dakshin Kannada	90	0.04	5.30	0.35	7.10	64 71.11%	17 18.89 %	3 3.33%	5 5.56%	0	1 1.1%	84	6
Davanagere	49	0.05	2.10	0.10	11.95	31 63.27%	1 2.04 %	0	13 26.53%	2 4.08%	2 4.08%	32	17
Dharwad	21	0.31	4.93	0.02	5.95	9 42.86%	0	1 4.76%	10 47.62%	0	1 4.76%	10	11
Gadag	16	0.10	8.30	0.16	4.49	7 43.75%	1 6.25 %	1 6.25%	5 31.25%	1 6.25%	1 6.25%	9	7
Gulbarga	65	0.02	3.59	0.01	5.95	21 32.31%	2 3.08 %	0	39 60.00%	1 1.54%	1 1.54%	23	41
Hassan	66	0.02	8.21	0.05	4.28	31 46.97%	6 9.09 %	5 7.58%	19 28.79%	2 3.03%	1 1.52%	42	22
Haveri	20	0.84	5.55	1.60	1.60	13 65.00%	5 25.00 %	1 5.00%	1 5.00%	0	0	19	1
Kodagu	61	0.05	5.34	0.01	3.62	45 73.77%	4 6.56 %	1 1.64%	9 14.75%	2 3.28%	0	50	11
Kolar	32	0.10	3.39	0.01	0.47	21 65.63%	4 12.50 %	0	7 21.88%	0	0	25	7
Koppal	28	0.06	12.38	0.04	6.30	6 21.43%	1 3.57 %	1 3.57%	12 42.86%	1 3.57%	3 10.71%	8	16
Mandya	45	0.08	12.40	0.02	3.12	25 55.56%	7 15.56 %	9 20.00%	3 6.67%	1 2.22%	0	41	4

Mysore	56	0.03	14.77	0.11	6.68	32 57.14%	9 16.07 %	3 5.30%	7 12.50%	4 7.14%	1 1.7%	44	12
Raichur	45	0.05	3.00	0.05	3.40	15 33.33%	1 2.22 %	0	20 44.44%	8 17.78%	0	16	28
Shimoga	67	0.09	5.20	0.02	2.15	37 55.22%	17 25.37 %	5 7.40%	5 7.46%	1 1.49%	0	59	6
Turnkur	36	0.03	23.02	0.06	0.60	19 52.78%	6 16.67 %	3 8.33%	8 22.22%	0	0	28	8
Udupi	54	0.23	4.40	0.41	2.30	41 75.93%	6 11.11 %	1 1.83%	5 9.26%	1 1.85%	0	48	6
Uttara Kannada	64	0.07	7.04	0.06	9.90	49 76.56%	5 7.81 %	1 1.50%	5 7.81%	0	2 3.13%	55	7
Total	1195	0.84	1.20	0.01	11.95	632	117	51	306	48	24	800	378

ANNEXURE-6 DISTRICT WISE CATEGORISATION OF WATER LEVEL FLUCTUATION (DECADAL MEAN 2011-2020 & NOV 2021)

2.1

District Wise - Fluctuation of Water Level with Mean and Selected Period

10 Years Mean (2011 Nov - 2020 Nov) - 2021/Nov

State : Karnataka

District Name	No. of Wells	Range of Fluctuation				No. of Wells/Percentage Showing Fluctuation						Total No. of Wells	
		Rise (m)		Fall (m)		Rise (m)			Fall (m)			Rise	Fall
		Min	Max	Min	Max	0 to 2	2 to 4	>4	0 to 2	2 to 4	>4		
Bagalkot	24	0.36	5.74	0.01	2.27	13 54.17 %	1 4.17%	3 12.50%	6 25.00%	1 4.17 %	0	17	7
Bangalore Rural	36	0.32	8.42	0.53	6.59	12 33.33 %	14 38.89%	7 19.44%	1 2.78%	1 2.78 %	1 2.78%	33	3
Bangalore Urban	20	0.42	4.52	0.07	11.72	13 65.00 %	2 10.00%	1 5.00%	3 15.00%	0	1 5.00%	16	4
Belgaum	80	0.01	14.05	0.02	5.43	44 55.00 %	8 10.00%	10 12.50%	16 20.00%	0	2 2.50%	62	18
Bellary	31	0.02	5.99	0.01	9.60	16 51.61 %	6 19.35%	2 6.45%	4 12.90%	1 3.23 %	2 6.45%	24	7
Bidar	34	0.30	6.39	-	-	12 35.29 %	14 41.18%	8 23.53%	0	0	0	34	0
Bijapur	59	0.03	7.52	0.06	2.29	27 45.76 %	11 18.64%	7 11.86%	13 22.03%	1 1.69 %	0	45	14
Chamarajanagar	20	0.02	3.37	1.42	5.40	14 70.00 %	4 20.00%	0	1 5.00%	0	1 5.00%	18	2

Chikmagalur	70	0.04	8.18	0.01	4.51	47 67.14 %	13 18.57%	5 7.14%	3 4.29%	1 1.43 %	1 1.43%	65	5
Chitradurga	32	0.12	7.30	1.02	1.81	14 43.75 %	8 25.00%	6 18.75%	4 12.50%	0	0	28	4
Dakshin Kannada	91	0.02	3.38	0.05	3.29	58 63.74 %	13 14.29%	0	19 20.88%	1 1.10 %	0	71	20
Davanagere	52	0.07	4.51	0.00	9.12	33 63.46 %	8 15.38%	1 1.92%	7 13.46%	1 1.92 %	2 3.85%	42	10
Dharwad	24	0.11	14.78	0.02	0.72	11 45.83 %	6 25.00%	5 20.83%	2 8.33%	0	0	22	2
Gadag	19	0.45	9.48	4.88	4.88	7 36.84 %	8 42.11%	3 15.79%	0	0	1 5.26%	18	1
Gulbarga	79	0.03	7.96	0.19	2.18	30 37.97 %	24 30.38%	17 21.52%	7 8.86%	1 1.27 %	0	71	8
Hassan	69	0.01	11.54	0.26	3.79	39 56.52 %	9 13.04%	9 13.04%	8 11.59%	4 5.80 %	0	57	12
Haveri	25	0.42	10.02	1.64	1.64	11 44.00 %	7 28.00%	6 24.00%	1 4.00%	0	0	24	1
Kodagu	65	0.01	7.09	0.17	2.33	47 72.31 %	5 7.69%	3 4.62%	9 13.85%	1 1.54 %	0	55	10

Kolar	32	0.18	5.69	-	-	17 53.13 %	12 37.50%	3 9.38%	0	0	0	32	0
Koppal	29	.00	13.07	0.02	2.18	16 55.17 %	5 17.24%	2 6.90%	5 17.24%	1 3.45 %	0	23	6
Mandya	49	0.19	11.41	0.46	2.65	28 57.14 %	12 24.49%	7 14.29%	1 2.04%	1 2.04 %	0	47	2
Mysore	57	0.07	14.22	0.12	4.38	29 50.88 %	10 17.54%	7 12.28%	9 15.79%	1 1.75 %	1 1.75%	46	11
Raichur	46	0.02	5.69	0.09	4.22	26 56.52 %	7 15.22%	1 2.17%	9 19.57%	2 4.35 %	1 2.17%	34	12
Shimoga	74	0.01	4.94	0.09	2.83	38 51.35 %	24 32.43%	5 6.76%	5 6.76%	2 2.70 %	0	67	7
Tumkur	41	0.07	6.36	0.11	3.40	25 60.98 %	12 29.27%	2 4.88%	1 2.44%	1 2.44 %	0	39	2
Udupi	60	0.04	3.97	0.04	0.86	44 73.33 %	4 6.67%	0	12 20.00%	0	0	48	12
Uttara Kannada	69	0.01	7.85	0.09	1.78	47 68.12 %	10 14.49%	1 1.45%	11 15.94%	0	0	58	11
Total	1287	3.37	0.45	0.00	11.72	718	257	121	157	21	13	1096	191