Analysis of Rainfall Data for Drought Investigation at Sangli District (MS)

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Abstract— Rainfall data of Sangli District were analyzed for drought investigation, which may be used for long term planning of irrigation system in the area. During 34 years period, three times drought was experienced which occurred in 1972, 2005 and 2015. Rainfall data is of great importance of any agricultural and non-agricultural programme. If proper and comprehensive study of various rainfall data was analyzed, the severity and reoccurrence of drought can be predicted and various measures can be taken to cope up with the problems arising due to drought.

Key words: Drought, Rainfall, Sangli District

I. INTRODUCTION

The Irrigation Commission 1972, has identified 67 drought prone districts comprising of 326 talukas located in 8 states. Commission on Agriculture, 1976, identified a few more drought prone areas with slightly different criteria. The Drought Area Study and Investigation Organization of C.W.C. set up in 1978 started with 99 districts after considering the list of districts identified by the Irrigation Commission and also by the National Commission on Agriculture for carrying out further studies. For the studies, C.W.C. adopted the same criteria as followed by the Irrigation commission 1972. The drought is occurring in an area: 1) when the annual rainfall is less than 75% of the normal in 20% of the years examined. 2) Less than 30% of the cultivated area is irrigated. CWC adopted a smaller unit viz. Talukas for drought identification studies instead of districts and therefore, number of drought affected Talukas were identified as 315 out of a total of 725 Talukas in 99 districts. Accordingly out of 108 M. ha. area of 99 districts, only 51.12 M.ha. spread over 74 districts have been considered as drought districts. Thus, in comparison to total geographical area of the country (329 M.ha) about 1/6th area is drought prone. Irrigation is the most effective drought proofing mechanism. The total geographical area of the drought districts is 108 M.ha, out of which 81 M.ha. is culturable (75%), gross sown area is 61.9 M.ha. (57.4%) and the gross irrigated area is 4.3 M.ha. About 23.23% of the total cropped area is irrigated in the drought districts as against in all India average of 30.15%.

Rainfall is the most important natural hydrologic event and is a unique phenomenon varying both in space and time. The rainfall distribution is very uneven and it not only varied considerably from place to place but also fluctuates from year to year. The rainfall play vital role in planning and operation strategies of any agricultural programme for any area. Indian subcontinent gets around 75% of the annual rainfall during monsoon period, which lasts from June to September i.e. four months. The major water requirement of the country is fulfilled by rainfall, which occurs in the monsoon period. There is large variation in distribution of rainfall from year to year. In present study, the rainfall data since 1983 is used to investigate drought prone talukas of Sangli district.

II. METHODOLOGY

The drought cannot be defined specifically due to varieties of needs of water changing from place to place. The irrigation project fulfills the need of water if there is no rainfall. The main cause of drought experienced in all places is the insufficient non-linear rainfall. It is not possible to estimate the worst possible drought condition which might develop in an area because of low groundwater recharge. Keeping the points in view the rainfall data for a period of 34 years has been analyzed in the presented paper so as to study the magnitude and drought frequency in terms of rainfall deficiency for Sangli district of Maharashtra state. The rainfall data for period of 34 years of Sangli district were collected from Irrigation Department. In this study the yearly rainfall data were analyzed. Depending upon the rainfall data since 1983, various drought prone talukas were anticipated in the study area.

III. RESULT AND DISCUSSION

The rainfall is the main constituents responsible for the drought conditions. For those constraints we analyze rainfall data of Sangli district since 1983 (Table No. 1 (a), (b) and (c)). The average rainfall data for last 10 year indicates the Palus (293mm), Atpadi (432mm), Kavte Mahankal (436mm), Kadegaon (482mm), Tasgaon (490mm), Jat (518mm), Sangli city (533mm), Vita – Khanapur (574mm), Islampur (615mm), Miraj (657mm) and Shirala (930mm). Based upon last 10 year average rainfall, Palus taluka has lowest rainfall and Shirala Taluka has highest rainfall.

Taluka	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Islampur	581	391	460	446	517	521	586	491	1032	514	525
Palus	---	---	---	---	---	---	---	---	---	---	---
Tasgaon	458	426	293	725	624	463	520	394	830	512	415
Sangli City	----										
Shirala	1048	714	782	718.5	710	863	798	935	1290	884	925
Miraj	417.2	317.7	369	321.2	445	439.2	486	331	949	455	483
Vita (Khanapur)	392.2	417.9	441.5	315.9	362.3	579.9	560	518	713	438	284
Atpadi	367.2	313	322	338.2	668.2	359	433	241	303	211	112
Kavte Mahankal	243.5	270.6	133.9	281.6	262.3	251.9	253	339	378	340	237
Jat	245	481.4	268.5	432	815.8	541.4	721	650	451	352	286

(a)

Taluka	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Islampur	842	822	881	678	696	814	699	687	487	211	606
Palus	---	---	---	---	---	---	---	314	138	176	313
Tasgaon	518	788	722	516	741	462	539	415	316	160	466
Sangli City	596	535	582	554	646	506	437	608	398	248	517
Shirala	1201	752	1044	1147	879	959	820	814	694	591	910
Miraj	791	486	550	513	521	363	587	669	459	240	546
Vita (Khanapur)	398	732	866	672	746	595	637	632	352	279	655
Atpadi	210	355	319	300	544	431	294	303	228	128	318
Kavte Mahankal	487	572	494	551	836	531	587	653	415	220	408
Jat	295	647	814	585	749	529	708	637	306	266	574

(b)

Taluka	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Islampur	1409	976	765	644	660	830	605	453	603	665	196	733
Palus	438	386	329	220	271	438	222	221	231	313	333	348
Tasgaon	532	618	649	395	436	798	323	208	581	605	364	537
Sangli City	973	688	654	503	557	552	364	372	620	631	355	721
Shirala	1758	1377	1091	933	894	932	1006	720	876	1132	554	1161
Miraj	768	619	607	320	590	576	470	456	992	985	624	946
Vita (Khanapur)	763	732	535	541	749	753	335	388	650	822	481	485
Atpadi	134	217	455	342	648	554	322	243	521	430	350	457
Kavte Mahankal	370	537	479	300	453	473	339	314	468	576	355	599
Jat	522	593	454	349	809	712	385	279	488	716	447	538
Kadegaon	----						385	413	488	614	468	525

(c)

Table 1: (a),(b),(c) Rainfall data of Sangli district since 1983 (in mm)

IV. CONCLUSION

The severity and reoccurrence of droughts can be predicted, if proper and detailed study of various rainfall data is analysed. The upcoming problems arising due drought can be overcome by taking various precautionary measures. Drought analysis of Sangli district based on rainfall data is included in the present study. The observed data shows that, Palus taluka has lowest rainfall (293mm) and Shirala Taluka has highest rainfall (930mm). Based on the last 10 year average rainfall data the Palus, Atpadi, Kavte Mahankal, Kadegaon, Tasgaon and Jat Talukas are coming under risk of drought. To overcome this difficulty, the water should be used carefully.

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