



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(2): 700-704
© 2023 TPI
www.thepharmajournal.com

Received: 19-11-2022
Accepted: 23-12-2022

Omkar D Rajmane
Department of Agricultural
Meteorology, College of
Agriculture, Pune, MPKV,
Rahuri, Maharashtra, India

Sagar T Majik
Division of Soil Science and
Agricultural Chemistry, College
of Agriculture, Pune, MPKV,
Rahuri, Maharashtra, India

Pranay A Sondawale
Division of Agronomy, College of
Agriculture, Pune, Maharashtra,
India

Onset and withdrawal of the rainy season in the Sangli district (Maharashtra), India

Omkar D Rajmane, Sagar T Majik and Pranay A Sondawale

Abstract

It is critical to comprehend the probability that the monsoon will start or end during a specific week. The risks associated with the crops and whether they are appropriate for sowing or planting must be understood. In order to choose the sowing date, crop pattern, plan for protective irrigation, and conduct intercultural operations, it is also crucial to be aware of the onset and withdrawal of the rainy season. From the analysis of weekly rainfall data, it was observed that the mean week of onset of monsoon varies between 25 to 30 MW i.e., 26 MW (i.e., 25 Jun–01 Jul) for Khanapur, Tasgaon and Walwa tehsils of Sangli district, 28 MW (i.e., 09 Jul–15 Jul) for Jat, Kavathemahankal and Palus tehsils, 27 MW (i.e., 02 Jul–08 Jul) for Kadegaon and Miraj tehsils and for Shirala and Atpadi tehsils 25 (i.e., 18 Jun–24 Jun) and 30 MW (i.e., 23 Jul–29 Jul) respectively. The mean week of withdrawal of monsoon was observed to be 43 MW (i.e., 22 Oct–28 Oct) for Jat, Khanapur, Shirala, Tasgaon and Walwa tehsils. 42 MW (i.e., 15 Oct–21 Oct) for Atpadi, Kavathemahankal and Miraj tehsils and 41 MW (i.e., 08 Oct–14 Oct) for Kadegaon and Palus tehsils respectively. Hence, the present study entitled, “Onset and withdrawal of the rainy season in the Sangli District (Maharashtra), India”.

Keywords: Onset, withdrawal, monsoon, duration of rainy season

1. Introduction

Agricultural operations in a *rainfed* area start with the onset of the southwest monsoon. It is essential to forecast the calendar of onset of effective monsoon since a slight delay in sowing of *rainfed* crops may lead to a drastic reduction in grain yield and adversely affects the next crop too. The duration of the *Kharif* crops depends on the withdrawal of monsoon rainfall. It has been experienced that quite often the crops suffer from terminal drought due to the early cessation of rainfall. The knowledge of withdrawal of monsoon is also required for the planning of *Rabi* season crops based on residual moisture in the root zone. Therefore, it is necessary to know the onset and withdrawal of monsoon for appropriate crop planning and planning of water sources available for protective irrigation. There are enumerable criteria for deciding onset and withdrawal of monsoon Morris and Zandesta, (1979) ^[1] and Babu and Laxminarayana, (1997) ^[2].

2. Materials and Methods

2.1 Study Area

Sangli District is a district of Maharashtra state in west-central India. It is situated between the latitude 16°5'N and 17°33'N and longitudinal of 73°41' East to 75°41' East. It is bounded by Satara district to the North, Bijapur district to the East, Kolhapur district to the South, and Ratnagiri district to the West. There are 10 tehsils in Sangli district viz, (1) Atpadi (2) Walwa (3) Jat (4) Kadegaon (5) Kavathemahankal (6) Khanapur (7) Miraj (8) Palus (9) Shirala and (10) Tasgaon.

2.2 Data and methods

The daily rainfall data of all tahsils in Sangli district will be collected from Department of Agricultural Meteorology, College of Agriculture, Pune, State Agriculture Department, Pune, India Meteorological Department, Pune, Downloaded from www.maharain.gov.in (www.krishi.maharashtra.gov.in) from January to December.

Corresponding Author:
Omkar D Rajmane
Department of Agricultural
Meteorology, College of
Agriculture, Pune, MPKV,
Rahuri, Maharashtra, India

Table 1: The location of rain gauge station Geographical area location and availability of data

Sr. No	Name of tehsils	Area km ²	latitude	longitude	Period of year		No. of years
					From	To	
1	Atpadi	830.26	17.420°N	74.937°E	1982	2021	40
2	Jat	2196.05	17.059°N	75.212°E	1961	2021	61
3	Kavathemahankal	734.06	17.945°N	73.976°E	1982	2021	40
4	Kadegaon	575.68	17.296°N	74.331°E	1998	2021	24
5	Khanapur	727.25	17.264°N	74.708°E	1998	2021	24
6	Miraj	926.10	16.850°N	74.610°E	1982	2021	40
7	Palus	464.54	17.091°N	74.458°E	1998	2021	24
8	Shirala	639.09	17.015°N	74.116°E	1961	2021	61
9	Tasgaon	729.76	17.033°N	74.599°E	1961	2021	61
10	Walwa	772.83	16.494°N	74.230°E	1961	2021	61

**Fig 1:** location map of Sangli district

2.3 Determination of Onset and Withdrawal of Monsoon Season

Forward and backward accumulation methods were used for computation of onset and withdrawal of rainy season from weekly rainfall data. In this method weekly rainfall was summed by forward accumulation (20+21+...+52 weeks) until a certain amount of rainfall was accumulated. 75 mm of rainfall accumulation has been considered as the onset time for the growing season of dry seeded crops and land preparation. The withdrawal of rainy season was determined by backward accumulation of rainfall (48+47+46+...+30 weeks) data. 20 mm of rainfall accumulation was chosen for the end of rainy season, which is sufficient for ploughing of fields after harvesting the crops (Babu and Lakshminarayana, 1997) [2].

By considering prevailing rainfall condition of selected area 50 mm of rainfall accumulation has been considered as the onset time and 10 mm rainfall accumulation has been considered as the withdrawal time.

The STENDRF.EXE software was used for analysing start and end of monsoon.

3. Results and Discussion

3.1 Onset and Withdrawal of Monsoon

3.1.1 Onset and Withdrawal of Monsoon for Atpadi Tehsil

The analysis of 40 years of weekly rainfall data (1982–2021) shows that the mean week of monsoon onset was the 30 MW and the mean week of withdrawal was the 42 MW. As a

result, the average length of the rainy season was discovered to be 12 weeks (84 days), including rainfall from both the south-west and north-east monsoons. When 40 years of data is considered, the probability of the onset of the monsoon in 30 MW is 7.5 percent, which has been observed for 3 years. However, when we consider 26 to 32 MW the probability of monsoon onset is 50 percent, as observed in 20 out of 40 years. As a result, the onset of the monsoon is most likely between 25 June and 12 Aug in the Atpadi tehsil.

3.1.2 Onset and Withdrawal of Monsoon for Jat Tehsil

The analysis of 61 years of weekly rainfall data (1961–2021) shows that the mean week of monsoon onset was the 28 MW and the mean week of withdrawal was the 43 MW. As a result, the average length of the rainy season was discovered to be 15 weeks (105 days), including rainfall from both the south-west and north-east monsoons. When 61 years of data is considered, the probability of the onset of the monsoon in 28 MW is 18 percent, which has been observed for 11 years. However, when we consider 25 to 28 MW, the probability of monsoon onset is 51 percent, as observed in 31 out of 61 years. As a result, the onset of the monsoon is most likely between 18 June and 15 July in the Jat tehsil.

3.1.3 Onset and Withdrawal of Monsoon for Kadegaon Tehsil

The analysis of 24 years of weekly rainfall data (1998–2021) shows that the mean week of monsoon onset was the 27 MW

and the mean week of withdrawal was the 41 MW. As a result, the average length of the rainy season was discovered to be 14 weeks (98 days), including rainfall from both the south-west and north-east monsoons. When 24 years of data is considered, the probability of the onset of the monsoon in 27 MW is 8 percent, which has been observed for 02 years. However, when we consider 25 to 27 MW, the probability of monsoon onset is 58 percent, as observed in 14 out of 24 years. As a result, the onset of the monsoon is most likely between 18 June and 08 July in the Kadegaon tehsil.

3.1.4 Onset and Withdrawal of Monsoon for Kavathemahankal Tehsil

The examination of 39 years of weekly rainfall data (1983–2021) shows that the mean week of monsoon onset was the 28 MW and the mean week of withdrawal was the 42 MW. As a result, the average length of the rainy season was discovered to be 14 weeks (98 days), including rainfall from both the south-west and north-east monsoons. When 39 years of data is considered, the probability of the onset of the monsoon in 28th MW is 10 percent, which has been observed for 04 years. However, when we consider 25 to 28 MW, the probability of monsoon onset is 56 percent, as observed in 22 out of 39 years. As a result, the onset of the monsoon is most likely between 18 June and 15 July in the Kavathemahankal tehsil.

3.1.5 Onset and Withdrawal of Monsoon for Khanapur Tehsil

The analysis of 24 years of weekly rainfall data (1998–2021) shows that the mean week of monsoon onset was the 26 MW and the mean week of withdrawal was the 43 MW. As a result, the average length of the rainy season was discovered to be 14 weeks (119 days), including rainfall from both the south-west and north-east monsoons. When 24 years of data is considered, the probability of the onset of the monsoon in 26 MW is 17 percent, which has been observed for 04 years. However, when we consider 24 to 26 MW, the probability of monsoon onset is 58 percent, as observed in 14 out of 24 years. As a result, the onset of the monsoon is most likely between 11 June and 15 July in the Khanapur tehsil.

3.1.6 Onset and Withdrawal of Monsoon for Miraj Tehsil

The analysis of 40 years of weekly rainfall data (1982–2021) shows that the mean week of monsoon onset was the 27 MW and the mean week of withdrawal was the 42 MW. As a result, the average length of the rainy season was discovered to be 15 weeks (105 days), including rainfall from both the south-west and north-east monsoons. When 40 years of data is considered, the probability of the onset of the monsoon in 27 MW is 10 percent, which has been observed for 3 years. However, when we consider 24 to 27 MW the probability of monsoon onset is 60 percent, as observed in 24 out of 40 years. As a result, the onset of the monsoon is most likely between 11 June and 08 Jul in the Miraj tehsil.

3.1.7 Onset and Withdrawal of Monsoon for Palus Tehsil

The analysis of 24 years of weekly rainfall data (1998–2021) shows that the mean week of monsoon onset was the 28 MW and the mean week of withdrawal was the 41 MW. As a result, the average length of the rainy season was discovered to be 13 weeks (91 days), including rainfall from both the south-west and north-east monsoons. When 24 years of data is considered, the probability of the onset of the monsoon in 28

MW is 04 percent, which has been observed for 01 years. However, when we consider 24 to 28 MW, the probability of monsoon onset is 58 percent, as observed in 14 out of 24 years. As a result, the onset of the monsoon is most likely between 11 June and 15 July in the Palus tehsil.

3.1.8 Onset and Withdrawal of Monsoon for Shirala Tehsil

The analysis of 61 years of weekly rainfall data (1961–2021) shows that the mean week of monsoon onset was the 25 MW and the mean week of withdrawal was the 43 MW. As a result, the average length of the rainy season was discovered to be 18 weeks (126 days), including rainfall from both the south-west and north-east monsoons. When 61 years of data is considered, the probability of the onset of the monsoon in 25 MW is 27 percent, which has been observed for 17 years. However, when we consider 24 and 25 MW, the probability of monsoon onset is 56 percent, as observed in 34 out of 61 years. As a result, the onset of the monsoon is most likely between 11 June and 24 June in the Shirala tehsil.

3.1.9 Onset and Withdrawal of Monsoon for Tasgaon Tehsil

The analysis of 61 years of weekly rainfall data (1961–2021) shows that the mean week of monsoon onset was the 26 MW and the mean week of withdrawal was the 43 MW. As a result, the average length of the rainy season was discovered to be 17 weeks (119 days), including rainfall from both the south-west and north-east monsoons. When 61 years of data is considered, the probability of the onset of the monsoon in 26 MW is 16 percent, which has been observed for 10 years. However, when we consider 24 to 26 MW, the probability of monsoon onset is 51 percent, as observed in 31 out of 61 years. As a result, the onset of the monsoon is most likely between 11 June and 24 June in the Tasgaon tehsil.

3.1.10 Onset and Withdrawal of Monsoon for Walwa Tehsil

The analysis of 61 years of weekly rainfall data (1961–2021) shows that the mean week of monsoon onset was the 26 MW and the mean week of withdrawal was the 43 MW. As a result, the average length of the rainy season was discovered to be 18 weeks (126 days), including rainfall from both the south-west and north-east monsoons. When 61 years of data is considered, the probability of the onset of the monsoon in 26 MW is 15 percent, which has been observed for 17 years. However, when we consider 25 to 27 MW, the probability of monsoon onset is 56 percent, as observed in 34 out of 61 years. As a result, the onset of the monsoon is most likely between 18 June and 08 July in the Walwa tehsil.

Therefore, advise for sowing *Kharif* crops such as pearl millet and groundnut in the 26 to 32 MW could be given. Long-season crops such as red gram can also be planted during the monsoon season, which lasts 130 days. Short-duration crops like Chick pea should be sown during this time to make the most of the maximum moisture for optimal germination along with Wheat crop in order to benefit from *rabi* season sowing. Pre monsoon showers should be used to prepare the land during the summer. During the monsoon, you can use a variety of *in-situ* soil moisture conservation measures to store excess moisture that you can use to grow *rabi* crops and to protect field crops during important growth stages.

Table 2: Mean Week Onset and withdrawal of rainfall in Sangli District

Tehsil	Mean week of start of rainfall	Mean week of end of rainfall
Atpadi	30	42
Jat	28	43
Kadegaon	27	41
Kavathemahankal	28	42
Khanapur	26	43
Miraj	27	42
Palus	28	41
Shirala	25	43
Tasgaon	26	43
Walwa	26	43

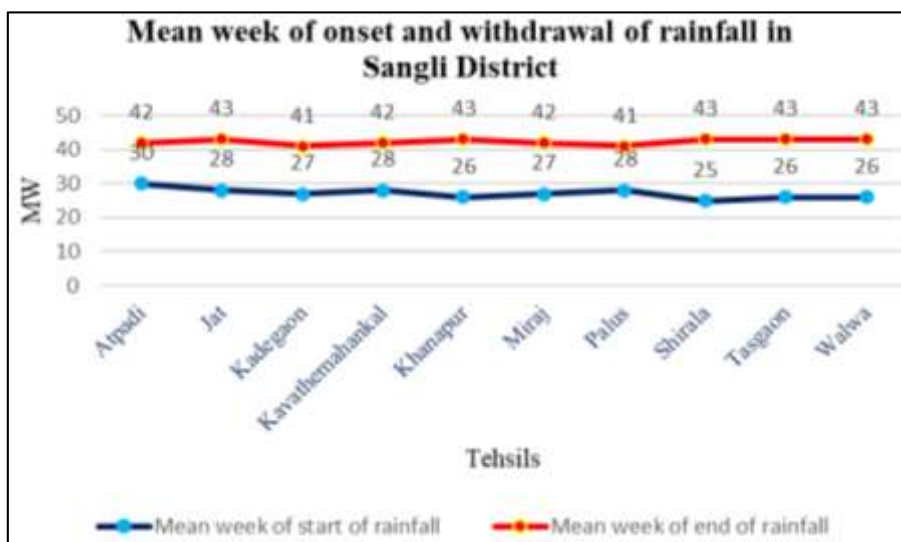


Fig 2: Mean week of onset and withdrawal of rainfall in Sangli District

Table 3: Mean duration of rainy season (Weeks) in different tehsils of Sangli District

Tehsil	Duration (Weeks)
Atpadi	12
Jat	15
Kadegaon	14
Kavathemahankal	14
Khanapur	17
Miraj	15
Palus	13
Shirala	18
Tasgaon	17
Walwa	18

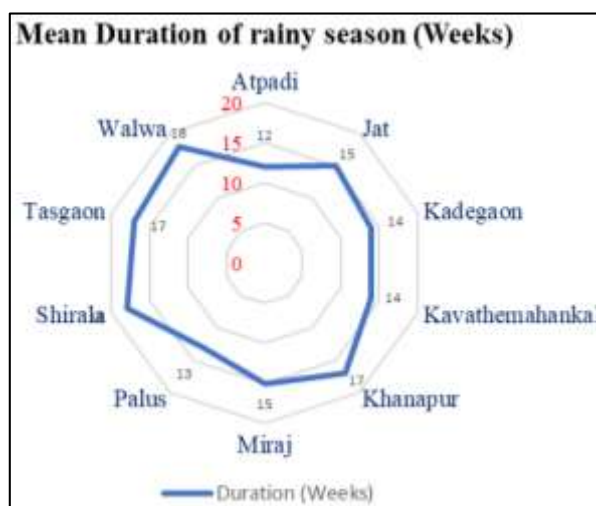


Fig 3: Mean duration of rainy season (Weeks) in different tehsils of Sangli District

4. Conclusions

From the analysis of weekly rainfall data, it was observed that the mean week of onset of monsoon varies between 25 to 30 MW *i.e.*, 26 MW (*i.e.*, 25 Jun–01 Jul) for Khanapur, Tasgaon and Walwa tehsils of Sangli district, 28 MW (*i.e.*, 09 Jul–15 Jul) for Jat, Kavathemahankal and Palus tehsils, 27 MW (*i.e.*, 02 Jul–08 Jul) for Kadegaon and Miraj tehsils and for Shirala and Atpadi tehsils 25 (*i.e.*, 18 Jun–24 Jun) and 30 MW (*i.e.*, 23 Jul–29 Jul) respectively. The mean week of withdrawal of monsoon was observed to be 43 MW (*i.e.*, 22 Oct–28 Oct) for Jat, Khanapur, Shirala, Tasgaon and Walwa tehsils. 42 MW (*i.e.*, 15 Oct–21 Oct) for Atpadi, Kavathemahankal and Miraj tehsils and 41 MW (*i.e.*, 08 Oct–14 Oct) for Kadegaon and Palus tehsils respectively. The mean length of rainy season was found to be in between 12 to 18 weeks (126 days) which include rainfall of both south west and north east monsoon. Maximum mean length of rainy season was observed at Shirala and Walwa tehsils *i.e.*, 18 weeks (126 days) and at Tasgaon and Khanapur *i.e.*, 17 weeks (119 days). Minimum length of rainy season was observed at Atpadi *i.e.*, 12 weeks (84 days). Different operations can be carried out in the field depending on the onset and end of the rainy season.

5. Acknowledgments

I appreciate the timely assistance and the facilities provided by the Department of Agricultural Meteorology at the College of Agriculture, Pune, which helped me to carry out the research.

6. References

1. Morris RA, Zandestra HG. Land and climate in relation to cropping patterns, in rainfed lowland rice. Selected papers from 1978, International Rice Research Conference, IRRI, Los banos, Philippines; c1979. p. 255-274.
2. Babu PN, Lakshminarayana P. Rainfall analysis of a dry land watershed- Polkepad: A case study. Journal of Indian Water Resources Society. 1997;17(3):34- 38.
3. Website: www.maharain.gov.in
4. Anonymous. STENDRF.EXE Software developed by CRIDA, Hyderabad; c2013.
5. Shrivastava D, Chaudhary JL. Effect of monsoon onset and withdrawal on rice production in Chhattisgarh. Int. J Chemical Studies. 2020;8(6):418-423.