

Phase VI Status Report

on

**Crop Coefficient, Water Requirement of *kharif* Sesame along
with Suitable Shading Factors with different Irrigation Practices**

in

**“Determination of Crop Coefficients for Major Crops by
Lysimetric Studies”**



at

Centre for Advanced Agricultural Science and Technology

for Climate Smart Agriculture and Water Management (CAAST - CSAWM)

Mahatma Phule Krishi Vidyapeeth, Rahuri

Title of the project : Determination of Crop Coefficients for Major Crops by Lysimetric Studies

Location : CAAST-CSAWM Climate Smart Research Block, Mahatma Phule Krishi Vidyapeeth, Rahuri

Duration : Four years (2020-2023 and 2023-2024)

Total Outlay : Rs. 31.43 Lakhs (Rs. Thirty-one lakhs forty-three thousand only)

Principal Investigator : Dr. A. A. Atre, Professor of SWCE, Dr. ASCAE&T and Member, CAAST-CSAWM, MPKV, Rahuri

Co-Principal Investigator : Dr. M. G. Shinde, Professor of SWCE and Co-PI CAAST- CSAWM, MPKV, Rahuri
: Dr. S. A. Kadam, Associate Professor of IDE, CAAST-CSAWM, MPKV, Rahuri

Coordinator for the project for three universities (MPKV, Rahuri; Dr. PDKV, Akola and VNMKV, Parbhani) : Dr. S. D. Gorantiwar, Head, Dept. of Agril. Engg. and PI CAAST-CSAWM and, MPKV, Rahuri

1. Modified FAO-56 K_c Values

In phase III report on “Crop Coefficient, District and Taluka wise Water and Irrigation Requirement of Western Maharashtra by Different Irrigation Practices for Sesame, Gram and Fodder Bajra based on FAO-56 Method from standard FAO Crop Coefficients”, modified K_c values of Sesame crop along with its crop water requirement and irrigation water requirement at various efficiency levels are submitted.

Stage wise modified FAO-K_c values for Sesame crop were computed using methodology given in FAO-56 paper. Averaged ET_r value for previous 47 years, soil type/ texture and wetting event for initial growth period were used to Modify K_c initial. Data on average crop height at mid and end growth stage, wind speed, minimum relative humidity to modify K_c mid- and end growth stage.

2. Experiment on Determination of crop coefficient values by using digital lysimeters for *kharif* Sesame

In the *kharif* season of 2022-2023 JLT-408 variety of Sesame was sown on 23rd August, 2022 in and around the lysimeter installed at CAAST- CSAWM Climate Smart block under PoCRA Lysimetric Studies Project, MPKV, Rahuri. Heavy rainfall events were observed on 9th day after sowing i.e., 1st September 2022 (23.2 mm rainfall), then on 8th and 9th September, 2022 (rainfall 32.4 mm and 71.0 mm respectively). Amount of rainfall received in 15 days i.e. from 1st September, 2022 to 15th September, 2022 is given in Table 2. Due to these heavy rainfall events, water level raised in the field and load cells under the inner tank of lysimeter were submerged in water. Due subsequent rains, load cells remained submerged for entire season and became dysfunctional. Due to these unprecedented conditions experiment was vitiated. The photographs showing field condition are shown in figure 1(a) and 1(b).

Table 1. Rainfall received in 1st fortnight of September, 2022 during Sesame growing season

Date	DAS*	Rainfall (mm)
01-09-2022	9	23.2
02-09-2022	10	0.6
03-09-2022	11	0
04-09-2022	12	0
05-09-2022	13	19.2
06-09-2022	14	18.8
07-09-2022	15	8.6
08-09-2022	16	32.4
09-09-2022	17	71.0
10-09-2022	18	23.2
11-09-2022	19	2.4
12-09-2022	20	0.8
13-09-2022	21	43.6
14-09-2022	22	0.4
15-09-2022	23	0.2
Total Rainfall in 15 Days		244.4

*DAS: Days After Sowing



(a)



(b)

Figure 1. (a) and (b) Waterlogged conditions in and around lysimeter

Considering the failure of experiment in *kharif* season, it was decided to conduct the experiment for determination of local K_c values of Sesame in summer season of 2023. Accordingly, the experiment is ongoing and photograph of summer season Sesame field is shown in Figure 2.

3. Status of Experiment on ‘Determination of crop coefficient values by using digital lysimeter for summer Sesame’

- Date of sowing: 18th March, 2023
- Variety: JLT-408
- Number of plots: 02
- Data required for determination of E_{Tc} and E_{Tr} is being recorded on daily basis

It is also planned to conduct experiment on ‘Determination of crop coefficient values by using digital lysimeter for Sesame’ in *kharif* season of 2023 in four plots.



Figure 2. Crop Condition of Summer Sesame

4. Expenditure statement till 30th April, 2023**Table 3: Expenditure statement till 30th April, 2023**

Sr. No.	Head wise Expenditure	Amount, Rs.
1.	Human Resources	
a)	SRF	309210.00
b)	Field Assistant	135277.00
	Subtotal	444487.00
2.	Recurrent Expenditure	
a)	Farm input	21481.00
b)	Travelling	0.00
c)	Stationery and other contingencies	14129.00
d)	Contractual labours	103009.00
	Subtotal	138619.00
	Total expenditure till February, 2023	583106.00
	Released Grant	1420070.00
	Balance	836964.00