01.	Experiment No. and Title (As per CJA)	:	Application of CSM-CERES-Rice model for assessment of plant density and nitrogen management of transplanted rice for tropical environment
02.	Budget Head	:	B.H.- 12936/12135
03.	Collaborative department, if any	:	Dept. of Agricultural Engineering, NMCA, NAU, Navsari
04.	Location and Agro-climatic sub-region	:	Department of Agricultural Engineering Farm, NMCA, NAU,Navsari, AES-III of South Gujarat Heavy Rainfall Zone I
05.	Background information	:	India is the second largest producer of rice in the world after china. It has an area of 43 million hectares with production of 99 million tones and 3.45 t/ha productivity. Crop simulation models are principal tools needed to brining agronomic science into information science. CERES-rice model is a process based management-oriented model that can simulate the growth and development of crop, with these crop model it possible to simulate a living plant through the mathematical and conceptual relationship which governs its growth in the soil-water-plant-atmosphere. Crop simulation model explain much of the interaction between the environment and the crop. These model predicted the performance of a particular cultivars, sown at any climate and would lead to information on transfer of agro-technology. CERES-rice model is a process based management oriented model that can simulated the growth and development of rice crop also provides validation of crop outputs and thus users can compare simulated outcome with observed results. Such validated model can also take the information generated through site specific experiment and trial to other sites years (Ritchie et al. 1988). Model is also helpful for advance simulation of crop performance under different environment and it is essential for planning of crop practices. In this study the (CSM)-CERES-Rice model is used to simulate of the phenology and yield of Gurjari variety in south Gujarat under different plant density's and nitrogen application levels.

06. Objectives : 1. To study the morpho-physiological parameters at different nitrogen does along with plant density of rice crop.
2. The performance evaluation of the model for rice for tropical circumstance.
3. To determine the best management practices to increase the productivity of rice crop for local condition.

07. Principal investigator and associates : Dr. Ajay V Narwade, Professor, N.M.C.A., NAU Navsari (PI)
Dr. B. M. Mote, Assistant Professor, Directorate of Research, NAU, Navsari
Dr. Manjushree Singh, Assistant Professor, N.M.C.A., NAU Navsari
Dr. Vipul Shinde, Assistant Professor, N.M.C.A., NAU Navsari
Dr. L. K. Arvadia, Professor, N.M.C.A., NAU Navsari
Dr. Nitin Varshney, Assistant Professor, N.M.C.A., NAU Navsari

08. Experimental period : From 2021 to 2022

09. Season of experiment : *Kharif*

10. Crop and Variety : Rice and Gurjari

11. Experimental details : The model was run by using of two years of field experimental data.

(a) Treatments : 9

(b) Experimental Design : Factorial experiments under randomized block design

(c) Replications : 3

(d) Plot size (if applicable) : Gross - 4.2 m x 4.0 m
Net - 3.6 m x 3.4 m

(e) Spacing : 20 cm x 15 cm
30 cm between lines for Aerobic

(f) Seed rate (kg/ha) : -

(g) Manuring

(i) FYM (t/ha) : 10

(ii) N, P and K (kg/ha) : 100:30:00

12. Year-wise cultural details

(a) Date of

(i) Sowing : 10-07-2021/22

(ii) Harvesting : 04-10-2021/22

(b) Number of irrigations (Year-wise) : Need based irrigation

(c) Number of weedings : 3

(d) Number of inter culturing : 1

(e) Previous crop and fertilizer applied (year-wise) : Rice

13. Soil analysis (if applicable) Depth-wise : 0-15 cm

Parameters		Initial	After
(a) pH	:	7.3	7.3
(b) EC	:	0.153	0.161
(c) Organic carbon	:	0.86	0.78
(d) Available N	:	231	218
(e) Available P_2O_5	:	50.1	48.21
(f) Available K_2O	:	337	328

	(g) Any other		-
14.	Input analysis		-
15.	Year-wise general conditions		Satisfactory
	(a) Pest and diseases	:	Low to moderate
	(b) Plant stand	:	Satisfactory
	(c) Seasonal conditions	:	Satisfactory
	(d) Rainfall distribution	:	Normal
16.	Results (Table/s with statistical analysis and Interpretation)	:	Given below
17.	Economics	:	-
18.	Conclusion	:	Calibrated genetic coefficients of rice cultivar Gujari is furnished in the following table can be used to run CERES-Rice model to simulate the rice yield and phenology under different plant density and nitrogen level in South Gujarat condition.
19.	~~General recommendation for the farmers (English and Gujarati)~~/Information for scientific community (English)	:	Calibrated genetic coefficients of rice cultivar Gujari is furnished in the following table can be used to run CERES-Rice model to simulate the rice yield and phenology under different plant density and nitrogen level in South Gujarat condition.