



P-ISSN: 2349-8528

E-ISSN: 2321-4902

[www.chemijournal.com](http://www.chemijournal.com)

IJCS 2020; 8(3): 239-242

© 2020 IJCS

Received: 04-03-2020

Accepted: 06-04-2020

**Syed SA**

Agricultural Development Trust,  
Baramati, Maharashtra, India

**Patil PR**

Agricultural Development Trust,  
Baramati, Maharashtra, India

**Karanje SV**

Agricultural Development Trust,  
Baramati, Maharashtra, India

**Karpe AH**

Agricultural Development Trust,  
Baramati, Maharashtra, India

**Gharge PV**

Agricultural Development Trust,  
Baramati, Maharashtra, India

## Effect of multinutrient fertilizer FAST (Ferrous, Ammonium, Sulphate) on growth, yield contributing characters and yield of rice

**Syed SA, Patil PR, Karanje SV, Karpe AH and Gharge PV**

**DOI:** <https://doi.org/10.22271/chemi.2020.v8.i3d.9233>

### Abstract

The field experiment on Rice was conducted at Research Farm of Agricultural Development Trust Farm, Baramati during kharif 2016, 2017 and 2018 to study the effect of FAST (Ferrous Ammonium Sulphate) multinutrient fertilizer on Rice. The occurrence of multi micronutrient deficiencies are the new deterrent in façade of the sustainability of the Rice as farmers are not aware to correct the deficiencies of these yield driven nutrients. One such product which is multinutrient fertilizer FAST claims to increase rice productivity so in this experiment it is tried to test effect of FAST on growth and yield of Rice along with recommended dose of fertilizer. The studies revealed that the broadcasting of FAST to transplanted Rice showed the significant increase in yield over the control. Application of FAST @ 25 kg/ha + RDF resulted in high yield with cost saving.

**Keywords:** Rice, FAST, multinutrient, broadcasting

### Introduction

India rice is grown in 43.86 million ha, the production level is 104.80 million tones and the productivity is about 2390 kg/ha (Agricultural Statistics at a glance- 2015). It is grown under diverse soil and climatic conditions the productivity level of rice is low compared to the productivity levels of many countries in the world. Also about 90 % of the cultivated land belongs to Marginal, Small and Medium farmers which is another constrain in increasing the productivity of rice in the country. It is, therefore, there is ample scope to increase the productivity of rice in the country. The highest productivity is 6710 kg per ha of China followed by Vietnam (5573 kg /ha), Indonesia (5152 kg/ha), Bangladesh (4375 kg/ha) etc. There are improved technologies and various interventions which could be adapted to increase the productivity in the country.

Most Indian soils are deficient in S, Zn, M, Cu, B, and Mo. Rice crops in a RWCS struggle with iron and zinc deficiency. Hence, the occurrence of multi micronutrient deficiencies are the new deterrent in façade of the sustainability of the Rice Wheat Cropping System, as farmers are not aware to correct the deficiencies of these yield driven nutrients. Therefore, at many locations resource poor farmers unknowingly started to use a higher amount of N fertilizer than the local recommendation to maintain the past yield level. Balanced nutrition increases a plant's ability to absorb requisite amounts of desired nutrients and thus, improve crop productivity and input use efficiency. One such product which is multinutrient fertilizer FAST claims to increase rice productivity so in this experiment it is tried to test effect of FAST on growth and yield of Rice along with recommended dose of fertilizer.

### Material and Methods

The experiment was conducted at research farm of Agricultural Development trust farm, Baramati. experiment was conducted during kharif 2016 and to get pooled data it was repeated in year 2017 and 2018. experiment was conducted on medium black soil and irrigation was given as and when required. experiment was conducted in Randomized block design with four treatments and five replications. T1 (Control):- Recommended dose of fertilizers (RDF) is N:P:K(100:50:50) Kg/ha, T2- FAST@20kg/ha for soil application + RDF, T3:- FAST @25kg/ha for soil application + RDF, T4 FAST@30Kg/ha for soil application + RDF.

**Corresponding Author:**

**Syed SA**

Agricultural Development Trust,  
Baramati, Maharashtra, India

Details of product FAST used for study are Iron-11%, Nitrogen-5%, Sulphur-14%, Potassium – 1.2%, Filler- 68.8%. Plot size selected for study was 3.75m x 2.6m. Soil type in the experimental area is Medium Black soil with properties such as as pH-7.95, Organic carbon- 0.951% EC-0.648 ds/m, available nitrogen- 252kg, available phosphorus 77.5kg, available potassium-277.8kg. irrigation was given as and when required. Recommended fertilizer dose was given to rice was 125: 65:65 kg N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O kg/ha) Popular Rice variety (Ankur Sonam) was selected for the experiment with a spacing of 20 × 15 cm. Product was delivered to Rice as broadcast soil application first application at transplanting as per treatment and second application of half dose at panical initiation as per treatment.

Following observations of three years pooled analysis of growth and yield parameters of Rice like Plant height (cm), Numbers of Panicle per Meter square, Panicle length (cm), Phenotypic- Leaf colour of Rice, No. of grain per panicle, 1000 grain weight, Yield per plant (qt/ha), Seed cotton yield (q/ha) were recorded.

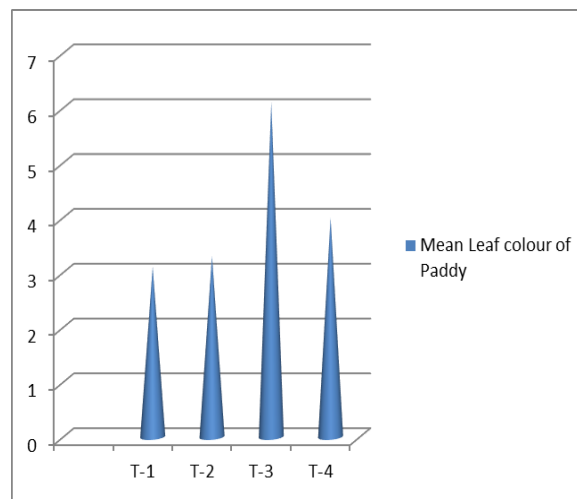
### Result and Discussion

The experiment was conducted to study the effect of FAST on yield and yield contributing traits of Rice under irrigated ecology. The results include the effect of various treatments of FAST on plant height, number of panicles per meter square, panicle length, number of grains per panicle, 1000 grain weight, grain and straw yield as under.

As per the physiological observations, measure the plant leaf greenery with the reference of Leaf Colour Chart (LCC). As per the LCC, T-3 leaf colour is significantly influenced by the FAST @ 25 kg/ha over the all treatment and control.

**Table 1:** Observation of Leaf Colour with reference of LCC (Leaf Colour Chart)

Treatment	Leaf colour of Rice			
	Kharif-16	Kharif-17	Kharif-18	Mean
T-1	3	3.5	3	3.1
T-2	3	3	4	3.3
T-3	5	7	6.5	6.1
T-4	5	3	4	4
C.D.				1.59
S.Er.				0.72



**Yield contributing traits:** The growth parameters of Rice were significantly influenced by FAST.

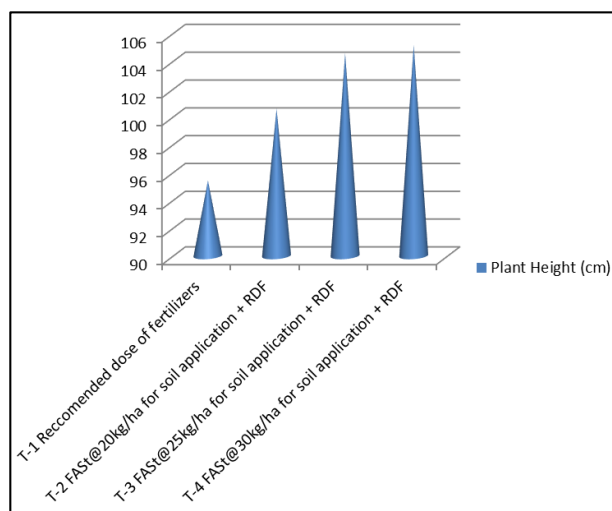
**Table 1:** Effects of FAST on yield contributing parameters of transplanted Rice. (Pooled data)

Treatment	Plant Height (cm)	No. of Panicle/Meter square	Panicle Length (cm)
T-1 Recommended dose of fertilizers	95.42	236.67	21.63
T-2 FAST@20kg/ha for soil application + RDF	100.58	269.17	23.50
T-3 FAST@25kg/ha for soil application + RDF	104.58	318.58	24.77
T-4 FAST@30kg/ha for soil application + RDF	105.17	330.50	25.08
SE (M)	1.50	14.57	0.52
CD	4.67	45.34	1.63

### Effect on plant height

Plant height was found to increase with increase the levels of FAST. The highest height (105.17 cm) was noticed in the T4

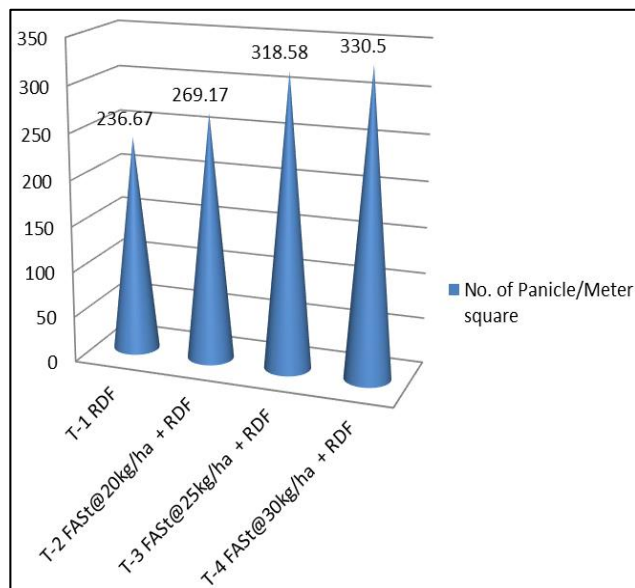
treatment however it was on par with T3 and T2. Lowest plant height (95.42cm) was found in T1.



Plant Height (cm)

**Effect on panicle number**

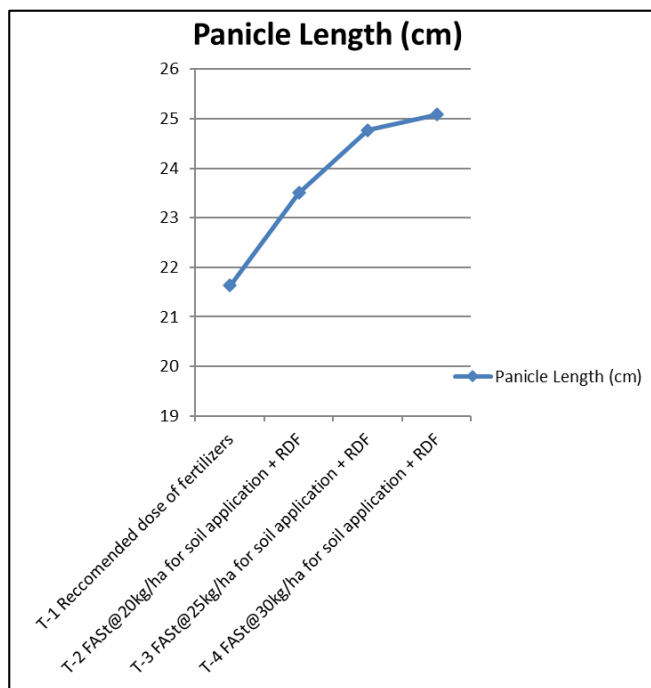
Number of panicles per meter square was found to increase with increase the levels of FAST. The highest panicle number (330.50) was noticed in the T4 treatment however it was on par with T3. Lowest panicle number (236.67) was found in T1



No. of Panicle/Meter square

**Effect on panicle length**

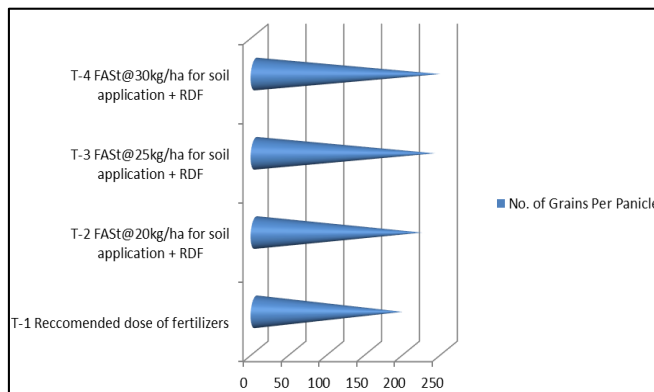
Panicle length(cm) was found to increase with increase the levels of FAST. The highest panicle number (25.08cm) was noticed in the T4 treatment however it was on par with T3. Lowest panicle number (21.63cm) was found in T1.



Panicle Length (cm)

**Effect on number of grains per panicle of Rice**

Number of grains per panicle of Rice was found to increase with increase the levels of FAST. The highest Number of grains per panicle (244) was noticed in the T4 treatment however it was on par with T3 (237). Lowest number of grains per panicle of Rice (194) was found in T1.



No. of Grains per Panicle

**Yield Parameters**

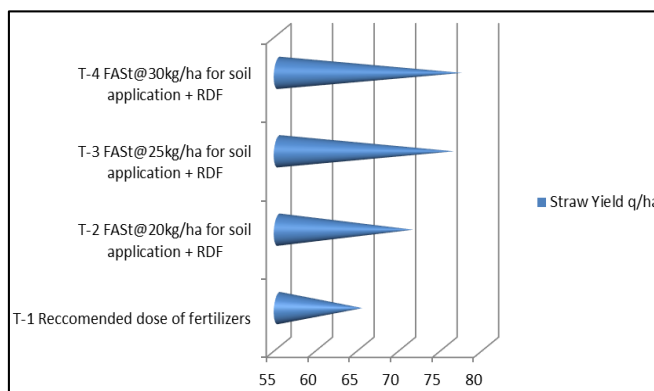
**Table 2:** Effects of various treatments on Grains per panicle, 1000 grain weight, grain yield and straw yield of Rice. (Pooled data)

Treatment	No. of Grains Per Panicle	1000 Grain Weight (g)	Grain yield q/ha	Straw Yield q/ha
T-1 Recommended dose of fertilizers	194	14.33	59.73	65.11
T-2 FAST@20kg/ha for soil application + RDF	220	14.43	66.95	71.18
T-3 FAST@25kg/ha for soil application + RDF	237	14.38	75.28	76.11
T-4 FAST@30kg/ha for soil application + RDF	244	14.44	76.03	77.06
SE (M)	7.42	0.02	2.57	1.83
CD	23.08	0.05	7.99	5.69

1000 grain weight: There was no significant difference in 1000 grain weight due to different levels of FAST.

Grain yield of Rice:

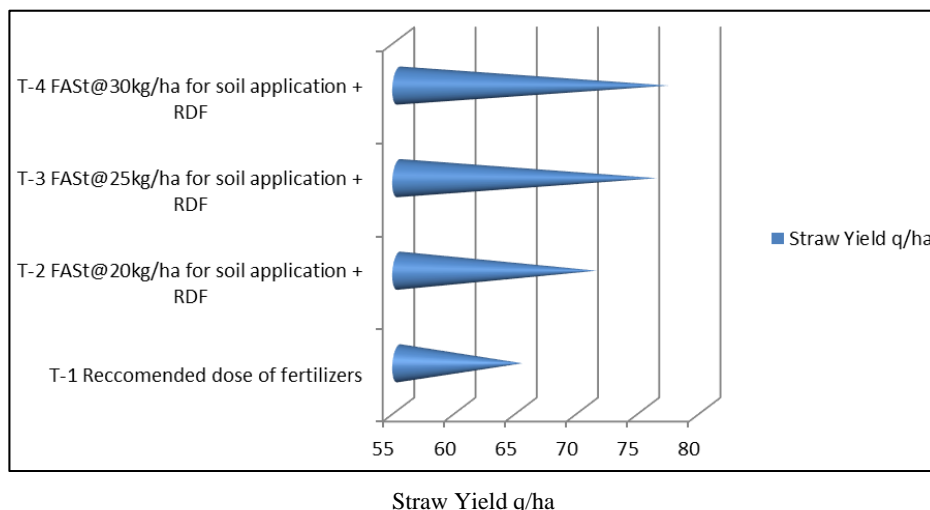
There was positive response in attaining increased grain of Rice with FAST graded levels. The maximum grain yield was noticed with the treatment T4 receiving FAST @ 30 kg/ha soil application (76.03 q/ha) followed by Treatment T3, the FAST @ 25 kg/ha soil application (75.28 q/ha). The lowest grain yield of Rice was recorded in T1 (59.73q/ha)



Grain Yield q/ha

**Straw yield**

The straw yield was found significantly increase with the FAST soil application and highest straw yield was recorded in T4 FAST @ 30 kg/ha (77.06 q/ha). However, it was on par with T3 soil application of FAST @ 25kg/ha (76.11q/ha). The lowest straw yield of Rice was recorded in T1(65.11q/ha)



### Conclusion

The broadcasting of FAST to transplanted Rice were showing the significant increase in yield over the control. By comparing the all treatments, FAST showing higher yield by increasing the dosage respectively. Application of FAST @ 25 kg/ha and 30 kg/ha has more or less same results. Hence, we are recommending to use FAST as a soil applicant T3 @ 25 kg/ha along with major nutrient like NPK for obtaining good yield.

### References

1. Yadav RL. Assessing on-farm efficiency and economics of fertilizers N, P and K in rice-wheat system of India. *Field Crops Res.* 2003; 81:39-51.
2. Hegde DM, Dwivedi, B.S. Nutrient management in rice-wheat cropping system in India. *Fertil. News.* 1992; 37:27-41.
3. Ravisankar N, Gangwar B, Prasad K. Influence of balanced fertilization on productivity and nutrient use efficiency of cereal based cropping systems. *Indian J Agric. Sci.* 2014; 84:248-254.
4. Bhatt R, Kukal SS, Busari MA, Arora S, Yadav M. Sustainability issues on rice-Wheat cropping system. *Int. Soil Water Conserv. Res.* 2016; 4:64-74.
5. Aggarwal GC, Sidhu AS, Sekhon NK, Sandhu KS, Sur HS. Puddling and N management effects on crop response in a rice-wheat cropping system. *Soil Till. Res.* 1995; 36:129-139.
6. Dwivedi BS, Singh VK, Meena MC, Dey A, Datta SP. Integrated nutrient management for enhancing nitrogen use efficiency. *Indian J Fertil.* 2016; 12:62-71.
7. Rekhi RS, Benbi DK, Singh B. Effect of fertilizers and organic manures on crop yields and soil properties in rice-Wheat cropping system. In *Long-Term Soil Fertility Experiments in Rice-Wheat Cropping Systems; Rice-Wheat Consortium Paper Series*, 6.
8. Abrol IP, Bronson KF, Duxbury JM, Gupta RK. Eds. *Rice-Wheat Consortium for the Indo-Gangetic Plains*: New Delhi, India, 2000, 1-6.
9. Rao AS, Reddy KS. Integrated nutrient management vis-à-vis crop production/productivity, nutrient balance, farmer livelihood and environment: India. In *Proceedings of the Regional Workshop, Beijing, China, 2005*.