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Assessment of rice productivity variability in relation to nutrient management practices

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Abstract

Large variations in yield are a major impending problem for rice wheat sustainability in India. The growing concern about impaired soil health, declining / decelerating productivity growth and decreasing factor productivity or efficiency of the nutrients compelling to use increasing levels of fertilizers during the last two decades has raised apprehensions on the productive capacity of the agricultural system. This experiment was conducted in farmers' fields in few selected centres, viz., - Chinsurah, Titabar, Pantnagar, Kanpur, Kaul and Karaikal to assess the variability in soil nutrient supply, its relationship with rice yields at current recommended and farmers' fertilizer practices in some new farm sites and fine-tune the fertilizer nutrient requirement for specific target yields in a given environment and validation of fertilizer recommendations for targeted yields. Sharp 5.3 IIRR Annual Progress Report 2022 Vol.3 - Soil Science variations in mean grain yields recorded varied from 2.38 t /ha among low yielders to 4.73 t /ha among high yielders at Chinsurah, from 2.48 t /ha among low yielders to 3.43 t /ha among high yielders at Titabar, varied from 4.76 t /ha among low yielders to 6.59t /ha among high yielders at Kanpur, varied from 4.83 t /ha among low yielders to 5.84 t /ha among high yielders at Pantnagar, from 3.83 t /ha among low yielders to 4.36 t/ha among high yielders at Karaikal and from 1.44 t /ha among low yielders to 8.8 t /ha among high yielders at Kaul. Fertilizer prescriptions were worked out for all the farm sites. The soil quality index was much superior at Pantnagar and was at par for all other centres.

Keywords: Rice productivity, nutrient management, soil fertility, nutrient variability

1. Introduction

Yield and Technology gap is a major problem in increasing paddy production in the irrigated ecosystems of the states. Balanced nutrient application is must to meet the growth requirements of a genotype for realizing the yield potential of several contemporary genotypes. So far, not much systematic effort has been made to study the technological gap existing in various components of rice cultivation. With the available improved latest technologies, it is possible to bridge the yield gap and increase the existing production level up to certain extent. The growing concern about impaired soil health, declining / decelerating productivity growth and decreasing factor productivity or efficiency of the nutrients compelling to use increasing levels of fertilizers during the last two decades has raised apprehensions on the productive capacity of the agricultural system. Current fertilizer management practices, in general, are not tailored to site specific soil nutrient supply capacities and crop demand. Blanket fertilizer recommendations are still being followed in large domains with less importance being given to management induced site variations of soil nutrient supply capacities, and crop demand more so when new high yielding cultures with increasing yield potential are being regularly introduced. This has been the major reason for reported nutrient imbalances and un-sustainability in realizing yields. This trial was, therefore, conducted in farmers' fields around few selected centres - Chinsurah, Faizabad and Titabar to assess the variability in nutrient supply, its relationship with rice yields at current recommended and farmers' fertilizer practices in some new farm sites and fine-tune the fertilizer nutrient requirement for specific target yields in a given environment and validation of fertilizer recommendations for targeted yields. The *khariif* 2016 data received representing the irrigated and shallow lowland rice ecosystems are presented in Tables 5.2.1 to 5.2.11. The test varieties were

Sarjoo-52 at Faizabad, Ranjit, Bhadur, Gitesh, Swarna Mahsuri, Aghonibora at Titabar and Shatabdi (IET 4786) at Chinsurah. At Both Titabar and Faizabad 15 farmer sites each were selected for generating information on the field variability in soil fertility and current level of efficiency of farmers' practices. The treatments consisted of nutrient (NPK) omission plots, farmers' fertilizer practice (FFP) and recommended dose of fertilizer (RDF). The details of crop, soil and weather parameters of the experimental sites, presented in the Table 5.2.1, show variation in soil characteristics with reference to pH, organic carbon content, soil texture and available nutrient status.

2. Methodology

This experiment was, conducted in farmers' fields around few selected centres-Chinsurah, Faizabad and Titabar to assess the variability in nutrient supply, its relationship with rice yields at current recommended and farmers' fertilizer practices in some new farm sites and fine-tune the fertilizer nutrient requirement for specific target yields in a given environment and validation of fertilizer recommendations for targeted yields. The *kharif* 2016 data received representing the irrigated and shallow lowland rice ecosystems are presented in Tables. Table1 gives information collected in the new farm sites on yields obtained, nutrient uptake and soil test values in nutrient omission plots (-N, -P, -K). Grain yields at Titabar, Faizabad and Chinsurah, soil test values and nutrient uptake showed considerable variation among the farm sites. The test varieties were Sarjoo-52 at Faizabad, Ranjit, Bhadur, Gitesh, Swarna Mahsuri, Aghonibora at Titabar and Shatabdi (IET 4786) at Chinsurah. At Both Titabar and Faizabad 15 farmer sites each were selected for generating information on the field variability in soil fertility and current level of efficiency of farmers' practices. The treatments consisted of nutrient (NPK)

omission plots, farmers' fertilizer practice (FFP) and recommended dose of fertilizer (RDF). The details of crop, soil and weather parameters of the experimental sites, presented in the Table 5.2.1, show variation in soil characteristics with reference to pH, organic carbon content, soil texture and available nutrient status.

Experimental details

Identification / selection of farmers were done before the season starts about 25 - 50 farm holdings including FLD sites around each location/district/rice growing region covering major rice ecosystem/soil types and representing all strata of farmers (Small, marginal and large) and also on the basis of the farmers applying 90-100%, 70-90%, <70%, >100%, Recommended level of Fertilizer or recommended SSINM practice and on farmers own practice, were carried out. They were grouped on the basis of the quantity of each fertilizer/manure/any other nutrient practices applied, as into Recommended (90%-110%), Less (70%-90% and <70% of recommended) and High (110, 130 and >130% of recommended) for each nutrient management practices. grain and straw yield data under each category were recorded. Collection of grain and soil samples from all the farmers fields were ascertained in at least NPK status in soil samples and grain and straw NPK content. All package of practices followed by the farmer particularly with regard to manures applied (quantity/ha), nutrient (NPK) contents in the manures, fertilizer practices, timing, and plant protection measures followed by each farmer were recorded. Collected information regarding the variety planted/sown, date of sowing nursery, nursery management, date of planting, age of seedlings at transplanting, 50% flowering, harvest date and duration of the crop in each farmer's field.

Farmers Group, No.	Classification of farmers details
1	90-100% Recommended level of Fertilizer or recommended SSINM practice
2	70-90% Recommended level of Fertilizer or recommended SSINM practice
3	<70% Recommended level of Fertilizer or recommended SSINM practice
4	>100% recommended fertilizer package (RFD) or recommended SSINM practice
5	FFP (Farmers' fertilizer practice)

Methods of available nutrient analysis: Available N: Alkaline permanganate distillation (Subbaiah and Asija) ^[24], Waring and Bremner (Incubation method), Available P: Olsen's P 0.5 N

NaHCO₃ extractable/ Bray 1, Available K: 1 N neutral Ammonium acetate extractable K, pH: 1:2 soil and water, Organic C: Walkley and Black method.

Table 1: Rice productivity in relation to internal supply capacity of nutrients in farmers' fields, *kharif* 2022, Soil, crop and weather data

Parameter	Chinsurah	Kanpur	Kaul	Pantnagar
Variety	Swarna, Khitish, Shatabdi	Pioneer 3727 Kaveri 9090 Arize 6449 Arize 6450 JK Sudha Arize 6444 Pioneer 273037 Pioneer 203031 Pioneer 203067	CSR 30 PB 1847 Vnr 2222 PR 114 PB 1718 PB 1509 PB 1121	Pusa 150 PD 10 PD18 PD 12 Hybrid Local HR47 Sarbat
Crop growth	Good	Good	Good	good
RFD (kg NPK/ha)	Varying- 48-24-24, 50-25-25, 60-30-30, 70-35-35, 80-40-40	Varying 120,60,60 150,60,60 120,60,40 150,60,40 120,60,60 120,60,40	-	190:60:40 150:60:40 150:50:30 150:60:50 200:60:40 200:70:45
% Clay	-	-	-	-
% Silt	-	-	-	-
% Sand	-	-	-	-
Soil Texture	-	-	-	-

pH	6.49-7.20	7.98-8.82	7.84-8.98	7.0-8.0
EC (mmhos/cm)	0.18-0.44	0.85-1.41	0.19-0.66	0.17-0.54
Org. carbon (%)	0.85-1.28	0.43-0.78	0.44-0.67	0.28-0.72
Avail. N (kg/ha)	378-507	220-289	145-194	118-215
Avail. P ₂ O ₅ (kg/ha)	85-103	14-25	26-44	6.9-17.3
Avail. K ₂ O (kg/ha)	265-320	185-274	323-398	138-219

Results and Discussions

In the absence of applied N, the yields ranged from 0.36-0.81 t/ha at Titabar, 4.9 - 6.1 t/ha at Faizabad, 3.87-5.11t/ha at Chinsurah. Similarly, in P omitted plots, the grain yields varied considerably from the yields ranged from 0.55-0.91 t/ha at Titabar, 4.3 - 5.8 t/ha at Faizabad, 4.49-5.16/ha at Chinsurah and for K omitted plots the grain yields varied from the yields ranged from 0.47-0.91 t/ha at Titabar, 4.1 - 5.65 t/ha at Faizabad, 3.96-4.5t/ha at Chinsurah. Soil nutrient uptake varied between the sites matching with the dry matter yields. On an average each ton of grain accumulated 5.89,0.82 and 3.2 kg N, P₂O₅ and K₂O at Titabar, 10.61,7.68 and 11.59 at Faizabad and 34.86, 34.65 and 5.09 at Chinsurah. At all these locations grain yields and nutrient uptake in nutrient omitted plots correlated significantly (Table-3), while soil test values did not match the yields recorded in the nutrient omission plots except for soil P status showing moderate level of relationship ($r \sim 0.43$) with rice yield and nutrient uptake at both the locations, suggesting perhaps less suitability of current soil testing methods for flooded soils. Linear equations fitted to relate the recorded yields in nutrient omission plots with the uptake of respective nutrients indicated very poor relations to N uptake, P uptake and K uptake. These results are in conformity with earlier reported by Bharamappanavara *et al.* (2020) [1], Kale *et al.* (2021), [8] Gorlapalli *et al.* (2022) [6], Sahoo *et al.* (2022) [22] and Gobinath *et al.* (2026) [5]. Table 4 and Table 7 show site variations in rice productivity, nutrient uptake and their efficiency of utilization under farmers' fertilizer practices and recommended fertilizer management (RDF) at the test locations. Rice productivity with recommended fertilizer practice varied from 2.12 -3.5 t/ha at Titabar ,5.05-6.56t/ha at Faizabad,3.91-4.65t/ha at Chinsurah whereas,0.5 - 1.4 t/ha in the farmers' fields at Titabar, 4.35-6.05t/ha in the farmers' fields at Faizabad and 4.1-5.2t/ha in the farmers' fields at Chinsurah. While the yields were having considerable variation with the farmers' fertilizer practices, respectively with corresponding variation in nutrient yield, soil test values, uptake and nutrient utilization efficiencies. Strong

correlation between yields and nutrient uptake was also recorded for all the nutrients and moderate correlation for P uptake under recommended fertilizer practices and with all the nutrients under farmers practice indicating mismatch of the fertilizer doses. These results are in conformity with earlier reported by Srilatha *et al.* (2019) [23], Kale *et al.* (2021) [8], Rathod *et al.* (2021) [18], Parmar *et al.* (2022) [16] and Patel *et al.* (2025) [14]. Fertilizer prescriptions were worked out for Titabar for all the farm sites for yield target of 6.1 t/ha at both the locations (being the highest yield recorded at the test sites) with reference to grain yields and average uptake of nutrients per ton of grain in nutrient omission plots, and average recovery efficiency and nutrient requirement recorded at the test sites. The target yields were the maximum recorded at the test sites under recommended fertilizer practice (RDF). These results are in conformity with earlier reported by Sharma *et al.* (2022) [21], Patel *et al.* (2025) [14] and Kumar *et al.* (2025) [10], Brajendra *et al.* (2025) [3] and Zoureen *et al.* (2025) [27]. The fertilizer recommendations presented in Tables 8 and 10 show a range of fertilizer doses of major nutrients to achieve the targeted productivity which has already been harvested. High estimates of P and K fertilizer requirements are due to lower recovery efficiency of applied P and higher accumulation of potassium per ton of grain. The study, thus indicated ample scope for improvement in nutrient use efficiency, and an attempt has been made to refine the current blanket recommended dose of fertilizer based on site specific nutrient supply, nutrient use efficiency and crop demand. These results are in conformity with earlier reported by Sharma *et al.* (2020) [20], Sharma *et al.* (2022) [21], Patel *et al.* (2025) [14] and Kumar *et al.* (2025) [10], Tuli *et al.* (2022) [25] and Brajendra *et al.* (2025) [3]. Fertilizer recommendations estimated for specific yield targets in the previous years in the farmers' fields around Titabar were validated in comparison with the current recommended and farmers' fertilizer practices. SSNM was superior to the currently recommended blanket fertilizer dose or the farmers' fertilizer practice at Mandya with corresponding improvement in crop nutrition and nutrient use efficiency.

Table 2: Rice productivity in relation to internal supply capacity of nutrients in farmers' fields, *kharif* 2016 Soil nutrient supply potential assessed in nutrient omission plots

Nutrient	Titabar			Faizabad		
	Minimum	Maximum	Mean*	Minimum	Maximum	Mean**
Grain yield (t/ha)						
(-) N	0.36	0.81	0.55	4.9	6.1	5.54
(-) P	0.55	0.91	0.69	4.3	5.8	5.13
(-) K	0.47	0.91	0.64	4.1	5.65	4.86
Soil test values (kg/ha)						
N	188	297	231	180	220	197
P ₂ O ₅	19.8	32	24	18	7	5
K ₂ O	16.5	274	203	200	234	218
Nutrient uptake (kg/ha)						
N	78	172	125	91.4	129.09	111.68
P ₂ O ₅	18.4	48.6	32.6	84.26	127.17	105.94
K ₂ O	149.2	307.7	232.2	73.74	118.2	93.26
Nutrient	Chinsurah					
	Minimum	Maximum	Mean			
Grain yield (kg/ha) soil test values						
	Min	Max	Mean	N	P ₂ O ₅	K ₂ O
(-) N	4.5	5.1	4.8	183	241	209
(-) P	3.6	4.5	4.0	74	102	89
(-) K	3.9	4.7	4.1	583	628	607

Table 3: Soil nutrient uptake

Nutrient	Titabar			Faizabad		
	Mean yield (t/ha)	Mean uptake (kg/ha)	SNA (kg/t grain)	Mean yield (t/ha)	Mean uptake (kg/ha)	SNA (kg/t grain)
N	0.55	3.3	5.89	5.54	58.8	10.61
P ₂ O ₅	0.67	0.8	0.82	5.13	39.44	7.68
K ₂ O	0.61	3.1	3.2	4.86	56.34	11.59
Nutrient	Chinsurah					
	Mean yield (t/ha)	Mean uptake (kg/ha)	SNA (kg/t grain)			
N	4.79	167	34.86	-	-	-
P ₂ O ₅	4.04	140	34.65	-	-	-
K ₂ O	4.12	21	5.09	-	-	-

Table 4: Interrelationship between yield, nutrient uptake and soil test value in nutrient omission plots

Nutrient	Correlation (r)	Regression (R ²)	Intercept (kg/ha)	Slope (q/ha)	Correlation (r)	Regression (R ²)	Intercept (kg/ha)	Slope (kg/ha)
	Titabar				Faizabad			
Soil test value Vs. Yield								
(-) N	0.35	0.12	0.9	0.003	0.25	0.062	-464.1	18.4
(-) P	0.31	0.09	1.91	0.001	0.29	0.084	2437.1	65.8
(-) K	0.36	0.12	1.93	0.003	0.12	0.014	-924.1	31.2
Yield Vs. Nutrient uptake								
(-) N	0.93	0.86	2.1	0.008	0.94	0.88	-104.1	23.9
(-) P	0.98	0.96	2.4	0.009	0.97	0.94	159.2	46.3
(-) K	0.99	0.98	2.6	0.008	0.96	0.92	934.2	1.92
Soil test value vs. Nutrient uptake								
(-) N	0.38	0.14	213.5	1.13	0.43	0.18	189.5	1.16
(-) P	0.43	0.18	1.9	1.9	0.35	0.04	19.06	3.18
(-) K	0.34	0.11	102.7	0.16	0.24	0.05	239.6	1.01
	Chinsurah							
Soil test value Vs. Yield								
(-) N	0.80	0.64	0.006	0.54	-	-	-	-
(-) P	0.13	0.02	0.0009	0.57	-	-	-	----
(-) K	0.72	0.32	0.008	0.86	-	-	-	-
Yield Vs. Nutrient uptake								
(-) N	0.78	0.61	0.001	0.25	-	-	-	-
(-) P	0.61	0.38	0.003	0.42	-	-	-	----
(-) K	0.64	0.41	0.0032	0.32	-	-	-	-
Soil test value vs. Nutrient uptake								
(-) N	0.68	0.47	0.0002	0.15	-	-	-	-
(-) P	0.38	0.15	0.0001	0.22	-	-	-	----
(-) K	0.61	0.38	0.0002	0.12	-	-	-	-

Table 5: Yield and nutrient use efficiency (Location: Titabar)

Parameter / Nutrients	Rec. dose of fertilizer (RDF)			Farmer's fert. practice (FFP)		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Grain yield (t/ha)	2.12	3.5	2.74	0.5	1.4	0.84
Nutrient uptake (kg/ha)						
N	28.55	55.80	40.09	9.6	87.30	48.5
P ₂ O ₅	6.31	56.41	38.72	2.1	43.2	5.5
K ₂ O	40.09	76.25	57.96	16.4	76.74	55.8
Nutrient utilization efficiency (kg grain/kg uptake)						
	MIN	MAX	MEAN	MIN	MAX	MEAN
N	74.25	62.70	68.31	52.08	16.03	17.32
P ₂ O ₅	335.9	62.04	70.76	238.09	32.41	152.72
K ₂ O	52.88	45.91	47.27	30.48	18.25	15.05

Table 6: Yield and nutrient use efficiency (Location: Faizabad)

Parameter / Nutrients	Rec. dose of fertilizer (RDF)			Farmer's fert. practice (FFP)		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Grain yield (t/ha)	5.05	6.56	5.98	4.35	6.05	5.41
Nutrient uptake (kg/ha)						
N	98.03	144.3	123.4	81.6	131.6	108.5
P ₂ O ₅	37.92	151.1	124.2	87.6	137.07	114.5
K ₂ O	45.80	145.3	119.3	82.3	132.2	109.0
Nutrient utilization efficiency (kg grain/kg uptake)						
	MIN	MAX	MEAN	MIN	MAX	MEAN
N	51.53	45.46	48.46	53.31	45.97	49.86
P ₂ O ₅	133.1	43.4	48.14	49.65	44.13	47.24
K ₂ O	110.2	45.1	50.16	52.85	45.72	49.63

Table 7: Yield and nutrient use efficiency (Location: Chinsurah)

Parameter / Nutrients	Rec. dose of fertilizer (RDF)			Farmer's fert. practice (FFP)		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Grain yield (t/ha)	3.91	4.65	4.28	4.1	5.2	4.4
Nutrient uptake (kg/ha)						
N	122	17.5	149	115	186	145
P ₂ O ₅	16.2	31.9	21.9	17.9	27.2	128
K ₂ O	78.7	105.4	91	145	20.6	98
Nutrient utilization efficiency (kg grain/kg uptake)						
	MIN	MAX	MEAN	MIN	MAX	MEAN
N	32.1	265.7	28.7	35.65	27.9	30.3
P ₂ O ₅	241.3	14.7	195.4	22.9	191.1	34.3
K ₂ O	49.69	44.12	47	28.2	252.4	44.9

Table 8: Site-specific fertilizer recommendation (kg/ha) for a target yield (Location: Titabar)

Site No.	Current yield with RDF (kg/ha)	Current yield with FFP (kg/ha)	Per cent increase in yield over FFP	Fertilizer recommendation for the target yield (8.1 t/ha)		
				N (Urea)	P ₂ O ₅ (SSP)	K ₂ O (Potash)
1	6.6	3.2	106	78	34	42
2	7.8	3.4	129	92	40	50
3	7.8	4.5	73	92	40	50
4	8.0	4.4	82	94	41	51
5	8.1	4.8	69	95	42	52
6	5.7	3.7	54	67	29	36
7	7.1	3.8	87	84	36	45
8	7.3	2.7	170	86	37	47
9	5.8	2.2	164	68	30	37
10	5.1	1.9	168	60	26	33
11	5.7	2.5	128	67	29	36
12	5.3	2.5	112	62	27	34
13	5.2	2.2	136	61	27	33
14	5.8	2.3	152	68	30	37
15	5.6	2.5	124	66	29	36

Table 9: Site-specific fertilizer recommendation (kg/ha) for a target yield (Location: Faizabad)

Site No.	Current yield with RDF (kg/ha)	Current yield with FFP (kg/ha)	Per cent increase in yield over FFP	Fertilizer recommendation for the target yield (8.2 t/ha)		
				N (Urea)	P ₂ O ₅ (SSP)	K ₂ O (Potash)
1	7.5	6.5	15	123	360	174
2	8.1	6.8	19	133	389	188
3	7.2	5.5	31	118	346	167
4	8.2	7.0	17	134	394	190
5	7.7	7.3	5	126	370	178
6	7.2	6.8	6	118	346	167
7	7.5	7.4	1	123	360	174
8	7.2	6.6	9	118	346	167
9	7.8	6.5	20	128	374	181
10	7.5	6.8	10	123	360	174
11	7.5	6.9	9	123	360	174
12	6.3	5.7	11	103	302	146
13	6.8	6.1	11	112	326	158
14	7.6	7.1	7	125	365	176
15	6.8	7.0	-3	112	326	158

Table 10: Yield gap in the Farmer's Fields

Site	Yield of rice as paddy (t ha ⁻¹)			Yield Gap 1(%)	Yield Gap 2(%)
	Recommended as per SSINM	on-Station*as per RDF	on-farmer's field's**	[(B-C)/B] x100	[(A-C)/A] x100
	(A)	(B)	(C)		
Titabar					
1	6.2	6.6	3.2	51.5	48.4
2	6.2	7.8	3.4	56.4	45.2
3	6.2	7.8	4.5	42.3	27.4
4	6.4	8.0	4.4	45.0	31.3
5	6.4	8.1	4.8	40.7	25.0
6	6.4	5.7	3.7	35.1	42.2
7	6.5	7.1	3.8	46.5	41.5
8	6.5	7.3	2.7	63.0	58.5
9	6.5	5.8	2.2	62.1	66.2
10	6.5	5.1	1.9	62.7	70.8
11	6.5	5.7	2.5	56.1	61.5
12	6.5	5.3	2.5	52.8	61.5
13	6.6	5.2	2.2	57.7	66.7
14	6.6	5.8	2.3	60.3	65.2
15	6.6	5.6	2.5	55.4	62.1
			Min	35.1	25.0
			Max	63.0	70.8
			Average	52.5	51.6
Faizabad					
1	8.2	7.5	6.5	13.3	20.7
2	8.2	8.1	6.8	16.0	17.1
3	8.2	7.2	5.5	23.6	32.9
4	8.2	8.2	7	14.6	14.6
5	8.2	7.7	7.3	5.2	11.0
6	8.2	7.2	6.8	5.6	17.1
7	8.2	7.5	7.4	1.3	9.8
8	8.2	7.2	6.6	8.3	19.5
9	8.2	7.8	6.5	16.7	20.7
10	8.2	7.5	6.8	9.3	17.1
11	8.2	7.5	6.9	8.0	15.9
12	8.2	6.3	5.7	9.5	30.5
13	8.2	6.8	6.1	10.3	25.6
14	8.2	7.6	7.1	6.6	13.4
15	8.2	6.8	7	-2.9	14.6
			Min	-2.9	9.8
			Max	23.6	32.9
			Average	9.7	18.7

Conclusion

Yield and Technology gap is a major problem in increasing paddy production in the irrigated ecosystems of the states. This trial was conducted in farmers' fields around few selected centres - Chinsurah, Faizabad, Maruteru, Kanpur and Mandya to assess the variability in nutrient supply, its relationship with rice yields at current recommended and farmers' fertilizer practices in some new farm sites and fine-tune the fertilizer nutrient requirement for specific target yields in a given environment and validation of fertilizer recommendations for targeted yields. Rice productivity with recommended fertilizer practices varied from 4.5 -5.9 t/ha at titabar, 3.25-6.87 t/ha at Faizabad, 9.6-.10.8t/ha at Kanpur and 4.05-5.35 t/ha at chinsurah. However, at Farmers' s filed sites a large variations were recorded which varied as 1.4-2.6t/ha at Titabar , 4.06-5.87 t/ha in the farmers' fields at Faizabad, 4.8-5.4t/ha at Kanpur and 4.18-4.59 t/ha in the farmers' fields at Chinsurah. While the yields were having considerable variation with the farmers' fertilizer practices, respectively with corresponding variation in nutrient yield, soil test values, uptake and nutrient utilization efficiencies. Yield gap analysis for all the centres were carried out both for Yield Gap 1 and Yield Gap2. In most of the centres, steep yield gaps were recorded between what is being the RDF and the prevailing FFP. Except at Chinsurah

centre, where it was very narrow and, in some locations, even FFP surpassed the current RDF, all the centres need to bridge this gap which is prevailing right now to further boost up rice productivity.

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