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Effect of nutrient management practices on soil, yield and economics of rice-wheat system at farmer's fields of district Uttar Bastar Kanker, Chhattisgarh

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Abstract
On farm experiments were conducted under AICRP on IFS, On-Farm Research during *Kharif* and *Rabi* seasons of 2020-21 at 24 farmer's fields at 6 villages viz. Aaturgaon, Bevarti and Mohpur of Block-Kanker and Hatkondal, Gotulmunda and Damkasa villages of Block- Durgukondal, District-Uttar Bastar Kanker, situated in Chhattisgarh Plain Zone (CG-1) and Bastar Plateau Zone (CG-2) of Chhattisgarh. Experiment conducted at 4 farmer's field in each village. The soils of experimental site were sandy loam to loam with low in available nitrogen (182.32 kg ha^{-1}) and available phosphorus (10.02 kg ha^{-1}) and medium in available potassium (294.24 kg ha^{-1}) and organic carbon (0.60%) and neutral in reaction (7.23 pH). The rice- wheat cropping system experiments were conducted with seven treatments viz. control (T_1), N (T_2), NP (T_3), NK (T_4), NPK (T_5), NPK+ micro nutrient (T_6) and Farmers practice (T_7). For Zn micro nutrient $ZnSO_4$ applied in rice and Single Super Phosphate applied for both P and S in wheat under T_6 treatment. The recommended dose of nutrients were: 100:60:40 kg ha^{-1} N: P_2O_5: K_2O + 20 kg ha^{-1} $ZnSO_4$ for rice and 120:60:40:20 kg ha^{-1} N: P_2O_5: K_2O: S for wheat. Nutrients dose 60:40:30 kg ha^{-1} N: P_2O_5: K_2O and 80:40:20 kg ha^{-1} N: P_2O_5: K_2O were applied in rice and wheat crops respectively under farmer's practice. MTU-1010 variety of rice and HI-8759 variety of wheat grown with recommended package of practices under irrigated condition. The application of recommended dose of NPK + micro nutrient recorded significantly higher grain yield of rice (56.59 q ha^{-1}), wheat (33.0 q ha^{-1}) and RGEY (96.11 q ha^{-1}). Farmers practice treatment recorded highest nutrient response 9.78 kg grain/ kg nutrient and application of recommended dose of N in rice- wheat cropping system recorded highest nutrient response Rs/Re (7.05). Application of recommended dose of NPK+ micro nutrient recorded significantly higher nutrient uptake N (190.78 kg ha^{-1}), P (52.47 kg ha^{-1}) and K (209.41 kg ha^{-1}) by rice- wheat cropping system. Application of recommended dose of NPK + micro nutrient recorded significantly higher organic carbon (0.65%), available nitrogen (196.65 kg ha^{-1}), phosphorus (10.96 kg ha^{-1}) and potassium (313.97 kg ha^{-1}) at end of the cropping system. Highest positive balance of available nitrogen (205.11 kg ha^{-1}), phosphorus (53.41 kg ha^{-1}) and potassium (229.14 kg ha^{-1}) recorded in application of recommended dose of NPK + micronutrient. Highest gross return (172017 Rs ha^{-1}), net return (108637 Rs ha^{-1}) and B: C ratio (2.71) of rice- wheat cropping system recorded under application of recommended dose of NPK + micronutrient.

Keywords: On farm, nutrient management, rice, wheat, cropping system, yield, nutrient uptake, soil, economics

Introduction
Rice (*Oryza sativa* L.) wheat (*Trititicum aestivum* L.) gadget (RWS) is one of the pre-dominant agricultural production systems inside the United States of America. Chhattisgarh nation is popularly identified as "Rice Bowl" of the U.S., as rice is the most important crop of this nation and approximately eighty four.35 in step with cent of crop location is included beneath *Kharif* rice. Rice occupies a place of 3.899 million hectares with the production of 15.04 million tones and common productivity of 3857 kg ha^{-1} and wheat occupies an area of 0.245 million hectares with the manufacturing of zero.316 million tones and common productivity of 1293 kg ha^{-1} during 2022-23 (nameless, 2023) inside the country and location under RWS ranked 2nd after rice- chickpea. An intensive cropping which isn't always handiest exceptionally efficient and worthwhile but also strong over the years and maintains soil fertility has a brilliant significance in gift conditions.

The achievement of any cropping system relies upon upon the proper management of sources inclusive of balanced crop nutrition. incidence of multi-nutrient deficiency due to imbalanced use of vitamins and decling soil organic matter are the element affecting the productivity of predominant meals vegetation at farmer's fields and those contribute the wider hole among on-station and on-farm situation. Fertilizer response in irrigated regions of united states of america has declined nearly three times from 13.four kg grain/kg NPK in 1970 to a few.7 kg grain/kg NPK in 2005 (Samra and Sharma, 2009) [12]. In 1970, handiest 54 kg NPK/ha become required for a yield of 20 q/ha, but about 218 kg NPK/ha is now being used to reap the identical yield (Biswas and Sharma, 2008) [3]. On a mean RWS gets rid of 650 kg of N + P2O5+ K2O ha^{-1} and micronutrients in the range of 0.5-1.zero kg ha^{-1} Zn, 2-3 kg ha^{-1} Fe and three-three. Five kg ha^{-1} Mn. For the prevailing level of production, the expected nitrogen-phosphorus-potassium elimination is set 28 metric tonne, ensuing in a negative stability of approximately 10 metric tones in India. Except principal vitamins, Zn and S are the maximum vital micro and secondary nutrient particularly in our country because maximum of Indian soils are poor. in the fields managed below RWS, the practicable yields of rice and wheat with farmers fertilizer practices (FFP) range inside a slender range due to variations in inherent soil fertility, crop residue control, ancient fertilizer use, natural materials input, fertilizer application approach and schedule, resources to be had with the farmer, and nutrient necessities for kinds of cultivars grown (Singh *et al*., 2013) [13]. It's far worthwhile to mention that although organic manures ameliorate the physical, chemical and organic homes of the soils, they cannot replacement chemical fertilizers due to the low amount of plant vitamins found in them.

The productiveness of rice and wheat of Chhattisgarh country are decrease than countrywide productivity is probably because of low and imbalance software of vitamins. software of imbalanced and immoderate nutrients ends in declining nutrient use efficiency making fertilizer intake uneconomic and generating unfavorable impact on ecosystem (Aulakh and Adhya, 2005) [1] and floor water first-rate inflicting fitness hazards and weather trade (Aulakh *et al*. 2009) [2]. Therefore, agronomic management has to be progressed for greater efficiency of carried out inputs to maintain yields of RWS. The role of plant nutrient management would be extremely vital from sustainability point of view. With the growing trend in charge of fertilizers and the reduction inside the use of imbalance chemical fertilizers it has become necessary to judiciously manipulate the influx of balanced nutrients and suitable fertilizers. therefore, to triumph over this hassle there may be want to broaden stability nutrient control for On-farm RWS, could provide sizeable economic advantage over existing practices, response of rice and wheat to N, P and okay utility, the interactive impact of N, P and ok fertilization on nutrient use performance below RWS that's technically appropriate, productive, economically possible and socially desirable.

Materials and Methods

On farm experiments were carried out beneath AICRP on IFS, On-Farm research at some point of Kharif and Rabi seasons of 2020-21 at 24 farmer's fields at 6 villages *viz*. Aaturgaon, Bevarti and Mohpur of Block- Kanker and Hatkondal, Gotulmunda and Damkasa villages of Block- Durgukondal, District-Uttar Bastar Kanker, located in Chhattisgarh plain quarter (CG-1) and Bastar Plateau region (CG-2) of Chhattisgarh. Test conducted at 4 farmer's field in every village. The soils of experimental web page had been sandy loam to loam; with low in available nitrogen (182.32 kg ha^{-1}) and available phosphorus (10.02 kg ha^{-1}) and medium in available potassium (294.24 kg ha^{-1}) and organic carbon (zero.60%) and neutral in reaction (7.23 pH). The rice- wheat cropping machine experiments have been performed with seven treatments *viz*. manipulate (T_1), N (T_2), NP (T_3), NK (T_4), NPK (T_5), NPK+ micro nutrient (T_6) and Farmers exercise (T_7). For Zn micro nutrient $ZnSO_4$ implemented in rice and single superb Phosphate carried out for both P and S in wheat beneath T_6 treatment. The endorsed dose of vitamins have been: one hundred: 60: forty kg ha^{-1}N: P2O5: K2O + 20 kg ha^{-1} ZnSO4 for rice and one hundred twenty: 60:40:20 kg ha^{-1} N: P2O5: K_2O: S for wheat. Nutrients dose 60:40:30 kg ha^{-1} N: P2O5: K_2O and eighty: 40: 20 kg ha^{-1} N: P_2O_5: K2O had been applied in rice and wheat plants respectively beneath farmer's exercise. Half of the nitrogen and full doses of P_2O_5, K2O and micronutrients have been implemented as basal in each plants and closing ¼ N applied at tillering and ¼ N implemented at panicle emergence stage in each vegetation. MTU-1010 variety of rice and hello-8759 kind of wheat grown with recommended package deal of practices below irrigated situation.

Both the crops were evaluated in phrases of total machine productiveness, gross go back, net return and advantage: fee ratio. On gadget foundation, wheat seed yield transformed into rice grain equal yield (RGEY). Soil samples had been analyzed for to be had N, P, and ok, OC, pH and electric conductivity at initial and stop of the cropping gadget. The plant samples had been analyzed for N, P and okay awareness in grain and straw and total N, P and okay uptake was calculated by using multiplying the respective nutrient concentrations with the yield. Stability sheet of nutrient in soil become calculated through the usage of the formulae as suggested by means of Raghuwanshi *et al*. (1991) [11].

Result and Discussion

Productivity of crops and cropping system

The grain and straw yield of rice and wheat considerably inspired due extraordinary nutrient management practices (desk 1). outcomes display that software of recommended dose of NPK+ micro nutrient recorded substantially higher grain yield of rice (fifty six.59 q ha^{-1}), wheat (33.0 q ha^{-1}) and RGEY (96.11 q ha^{-1}), observed by using encouraged dose of NPK i.e.,fifty five.67 q ha^{-1} of rice, 32.sixty five q ha^{-1} of wheat and 94.82 q ha^{-1} of RGEY. The boom in grain yield 36, 51, 44, 60, 62, forty six percent of rice and forty, 81, 70, one zero five, 108, sixty four percentage of wheat respectively with the software of endorsed dose of N, NP, NK, NPK, NPK + micro nutrient, Farmers exercise over manage. The utility of endorsed dose of NPK + micronutrient recorded extensively better straw yield of rice (70.50 q ha^{-1}) and wheat (44.25 q ha^{-1}), followed by way of encouraged dose of NPK i.e., 69.ninety five q ha^{-1} of rice and 32.sixty five q ha^{-1} of wheat. utility of NPK + micro nutrient in cropping device recorded significantly better Rice Grain equivalent Yield (ninety six.11 q ha^{-1}) fallowed through NPK (94.eighty two q ha^{-1}). Boom in grain and straw yield of rice and wheat may be because of best and stability deliver of plant vitamins which boom the growth and yields of vegetation. further (Singh *et al*. 2014) [14] pronounced that top-quality nutrient software price remedies improved common yield from

0.32- three.03 t ha^{-1} and 1.37- three. Sixty nine t ha^{-1} in rice and zero.49 - 1.17 t ha^{-1} and zero. Seventy one- 2.26 t ha^{-1} in wheat throughout the Indo-Gangetic simple (IGP) of India respectively as compared to state recommendation (SR) and farmers fertilizer practice (FFP).

Nutrient response in cropping system

In rice-wheat cropping machine, farmers exercise remedy recorded highest nutrient response 9.78 kg grain/ kg carried out nutrient followed via application of advocated dose of NP (nine.04). utility of advocated dose of N in rice- wheat cropping system resulted maximum nutrient reaction in terms of Rupees return in keeping with Rupee funding (7.05 Rs/Re) accompanied by using farmers practice (6.10 Rs/Re). Netam *et al*. (2020) [8] and Netam *et al*. (2024) [10] performed On-farm experiments at villages of district - Uttar Bastar, Kanker, Chhattisgarh and recorded maximum nutrient reaction 16.09 kg grain/ kg carried out nutrient below software of 60:40:30 kg NPK ha^{-1}(FP) and maximum Rupees go back according to Rupee investment (eight. Sixty two Rs/Re) recorded with application of encouraged dose of N underneath rice-chickpea cropping device.

Nutrient Uptake

information presented in desk 4, screen that software of advocated dose of NPK + ZnSO4 recorded considerably better nutrient uptake N (58.sixty six kg ha^{-1}), P (17.sixty four kg ha^{-1}), okay (14.33 kg ha^{-1}) through rice grain and N (46.sixty four kg ha^{-1}) P (12.10 kg ha^{-1}) and ok (122.ninety kg ha^{-1}) via rice straw accompanied by using endorsed dose of NPK. application of encouraged dose of NPK + S recorded considerably higher nutrient uptake N (56.19 kg ha^{-1}), P (14.25 kg ha^{-1}) and ok (14.95 kg ha^{-1}) via wheat grain and N (29.28 kg ha^{-1}), P (8.48 kg ha^{-1}) and k (fifty seven. 23 kg ha^{-1}) via wheat straw followed by means of advocated dose of NPK. utility of recommended dose of NPK + micro nutrient recorded appreciably higher nutrient uptake N (190.seventy eight kg ha^{-1}), P (52.47 kg ha^{-1}) and ok (209.forty one kg ha^{-1}) via rice- wheat cropping machine observed with the aid of application of advocated dose of NPK. further (Navrang *et al*., 1990) [7] mentioned that at 9.5 t rice grain yield tiers N, P and ok uptake turned into 198, 31 and 230 kg/ha, resp., and 132, 25 and 97 kg/ha resp. with 5.9 t wheat grain below RWS. in addition (Singh *et al*., 2014) [14] reported that the once a year elimination of native P and ok in the respective omission plots ranged from 21.eight to 46.1 kg P ha^{-1} and from 158.four to 349.1 kg okay ha^{-1} under RWS in throughout the IGP of India. C.K. Chandrakar *et al*. (2017) [4], Netam *et al*. (2023) [9] and Netam *et al*. (2024) [10] conducted On-farm experiments at villages of district - Kabirdham, Uttar Bastar, Kanker and Uttar Bastar, Kanker, Chhattisgarh respectively and recorded that N, P and okay uptake of rice-chickpea cropping device considerably better with application of recommended dose of NPK + micronutrients in addition, Mansuri, R.N. (2016) [6] recorded considerably higher N, P and k uptake of rice and chickpea with application of 100% RDN thru inorganic fertilizers at Navsari, Gujarat.

Fertility status of soil

Fertility reputation of soil at end of the cropping machine provided in desk 3 and reveal that software of NPK+ micro nutrient recorded substantially higher to be had nitrogen (196.65 kg ha^{-1}), available phosphorus (10. Ninety six kg ha^{-1}) and to be had potassium (313.97 kg ha^{-1}) followed with the aid of the utility of NPK. Natural carbon, pH and electric powered conductivity not prompted drastically. Similarly (Navrang *et al*. 1990) [7] reported that soil to be had P and k had been both equal to or higher than initial values on the give up of the two-12 months rice-wheat cropping sequence. similarly, C.k. Chandrakar *et al*. (2017) [4], Netam *et al*. (2023) [9] and Netam *et al*. (2024) [10] conducted On-farm experiments at villages of district Kabirdham, Uttar Bastar, Kanker and Uttar Bastar, Kanker, Chhattisgarh respectively and recorded appreciably better available nitrogen, phosphorus and potassium with application of encouraged dose of NPK + micronutrients attend of the rice-chickpea cropping system.

Nutrient balance

Records on balance sheet of to be had nitrogen, phosphorus and potassium in soil indicated that there has been a effective stability of available nitrogen, potassium and potassium within the soil below all remedies (desk five). all the treatments confirmed tremendous stability of to be had nitrogen and highest fantastic balance of available nitrogen (205.11 kg ha^{-1}), phosphorus (53.41 kg ha^{-1}) and potassium (229.14 kg ha^{-1}) recorded in software of recommended dose of NPK + micronutrient observed via software of encouraged dose of NPK. Lowest balance of to be had nitrogen (67. Fifty four kg ha^{-1}), phosphorus (25.04 kg ha^{-1}) and potassium (102.forty eight kg ha^{-1}) recorded on top of things in addition, R.N. Mansuri (2016) [6] carried out an experiment at Navsari, Gujarat and recorded wonderful stability of available nitrogen, phosphorus and potassium with software of a hundred% RDN via inorganic fertilizers. similarly, Netam *et al*. (2023) [9] and Netam *et al*. (2024) [10] conducted On-farm experiments at villages of district-Uttar Bastar, Kanker, Chhattisgarh and recorded maximum positive balance of available nitrogen and potassium with utility of encouraged dose of NPK + micronutrient in rice-chickpea cropping device.

Economics of cropping machine

Effect of various treatments can not be assessed without the gross and net go back from those treatments. The economics of various treatments supplied in desk 2. highest gross go back (106842 Rs ha^{-1}) and internet go back (70136 Rs ha-) of rice, gross return (65175 Rs ha^{-1}) and net return (38501 Rs ha^{-1}) of wheat and gross go back (172017 Rs ha^{-1}), internet return (108637 Rs ha^{-1}) and B: C ratio (2.seventy one) of rice- wheat cropping gadget recorded beneath utility of endorsed dose of NPK + micronutrient accompanied via utility of endorsed dose of NPK. Similarly (Singh *et al*. 2014) [14] reported that internet return (in US $) from ideal nutrient software fee remedy over FFP and SR underneath RWS ranged from 219.6 to 804.nine and from 104.three to 599 ha^{-1} respectively. As compared to greatest nutrient utility rate remedies, PFP N below SR and FFP were decrease by way of 18.nine and 38.three% in rice, and 18.5 and 39.five% in wheat, respectively. Omission of P and ok from premiere nutrient utility rate remedy resulted in yield loss of zero.6-2.8 t ha^{-1} in rice and zero.43-1.84 t ha^{-1} in wheat respectively across the IGP of India.

Table 1: Yield parameters and nutrient response of rice-wheat cropping system as influenced by nutrient management practices

Treatment	Yield of rice (q ha^{-1})		RGEY (q ha^{-1})	Yield of wheat (q ha^{-1})		Nutrient response	
	Grain	Straw		Grain	Straw	Kg grain/kg nutrient	Rs/Re
Control	34.90	41.31	56.52	15.89	22.37	-	-
N	47.53	49.45	77.74	22.19	31.17	8.60	7.05
NP	52.68	65.23	87.84	28.83	41.36	9.04	4.30
NK	50.42	62.55	85.58	27.05	39.70	8.89	6.0
NPK	55.67	69.95	94.82	32.65	43.38	8.94	4.68
NPK + $ZnSO_4$/S	56.59	70.50	96.11	33.0	44.25	8.43	4.49
Farmers practice	51.09	63.88	83.40	26.11	38.85	9.78	6.10
SEm±	0.30	0.36	0.68	0.25	1.40	-	-
CD (P = 0.05)	0.88	1.03	2.01	0.72	4.05	-	-

Table 2: Economics of rice-wheat cropping system as influenced by nutrient management practices

Treatment	Rice (Rs. ha^{-1})			Wheat (Rs. ha^{-1})			Cropping system (Rs. ha^{-1})			
	Cost of cultivation	Gross return	Net return	Cost of cultivation	Gross return	Net return	Cost of cultivation	Gross return	Net return	B:C ratio
Control	27185	65891	38706	22575	31383	8808	49760	97274	47514	1.95
N	31953	89737	57784	23427	43825	20398	55380	133562	78182	2.41
NP	35011	99460	64449	25902	56939	31037	60913	156399	95486	2.57
NK	32891	95193	62302	24199	53424	29225	57090	148617	91527	2.60
NPK	35906	105105	69199	26674	64484	37810	62580	169589	107009	2.71
NPK + $ZnSO_4$/S	36706	106842	70136	26674	65175	38501	63380	172017	108637	2.71
Farmers practice	32666	96458	63792	25233	51567	26334	57899	148025	90126	2.56

Table 3: Final soil nutrient status of rice-wheat cropping system as influenced by nutrient management practices

Treatment	pH	EC (ds/m)	Organic carbon (%)	Available N (kg ha^{-1})	Available P (kg ha^{-1})	Available K (kg ha^{-1})
Control	7.01	0.150	0.59	157.67	9.00	290.59
N	6.88	0.162	0.61	170.64	9.42	295.87
NP	6.97	0.170	0.63	173.64	10.62	296.60
NK	7.00	0.171	0.62	175.15	9.38	306.74
NPK	7.03	0.155	0.64	194.62	10.64	313.31
NPK + $ZnSO_4$/S	7.06	0.155	0.65	196.65	10.96	313.97
Farmers practice	7.03	0.161	0.62	172.21	10.15	298.27
SEm±	0.11	0.005	0.02	2.82	0.30	2.92
CD (P = 0.05)	NS	NS	NS	8.14	0.86	8.44

Table 4: Nutrient uptake by rice-wheat cropping system as influenced by nutrient management practices

Treatment	Nutrient uptake (kg ha^{-1}) by rice						Nutrient uptake (kg ha^{-1}) by wheat						Total uptake (kg ha^{-1}) by rice wheat system		
	N		P		K		N		P		K				
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	N	P	K
Control	34.38	23.90	9.60	6.33	8.15	65.76	21.08	12.83	6.28	3.85	6.89	25.33	92.19	26.06	106.13
N	48.16	30.99	13.93	7.91	12.20	81.60	33.02	19.53	9.18	5.61	10.14	37.40	131.70	36.64	141.34
NP	53.55	40.55	15.53	10.44	12.73	108.28	43.09	25.71	11.96	7.44	12.73	50.05	162.90	45.37	183.79
NK	51.68	39.94	15.13	10.21	12.18	105.19	43.15	25.34	11.37	7.29	11.94	48.89	160.11	44.00	178.21
NPK	57.06	45.35	17.35	12.00	13.82	121.25	55.60	28.13	14.09	8.31	14.63	55.68	186.14	51.76	205.38
NPK + $ZnSO_4$/S	58.66	46.64	17.64	12.10	14.33	122.90	56.19	29.28	14.25	8.48	14.95	57.23	190.78	52.47	209.41
Farmers practice	50.92	39.18	15.41	9.90	12.17	107.54	41.67	23.83	11.01	6.80	11.44	47.92	155.59	43.13	179.07
SEm±	0.36	0.35	0.40	0.24	0.28	0.77	0.76	0.27	0.26	0.17	0.19	0.37	0.87	0.80	1.09
CD (P = 0.05)	1.05	1.03	1.15	0.70	0.81	2.23	2.19	0.76	0.75	0.49	0.54	1.08	2.51	2.32	3.14

Table 5: Balance sheet of Nitrogen, Phosphorus and Potassium at end of cropping system as influenced by nutrient management practices

Treatment	Nitrogen (kg ha^{-1})						Phosphorus (kg ha^{-1})						Potassium (kg ha^{-1})					
	Initial status	Applied	Uptake by crop	Expected balance	Final status	Balance	Initial status	Applied	Uptake by crop	Expected balance	Final status	Balance	Initial status	Applied	Uptake by crop	Expected balance	Final status	Balance
Control	182.32	0	92.19	90.13	157.67	67.54	10.02	0	26.06	-16.04	9.00	25.04	294.24	0	106.13	188.11	290.59	102.48
N	182.32	220	131.70	50.62	170.64	120.02	10.02	0	36.64	-26.62	9.42	36.04	294.24	0	141.34	152.9	295.87	142.97
NP	182.32	220	162.90	19.42	173.64	154.22	10.02	120	45.37	-35.35	10.62	45.97	294.24	0	183.79	110.45	296.60	186.15
NK	182.32	220	160.11	22.21	175.15	152.94	10.02	0	44.00	-33.98	9.38	43.36	294.24	80	178.21	116.03	306.74	190.71
NPK	182.32	220	186.14	-3.82	194.62	198.44	10.02	120	51.76	-41.74	10.64	52.38	294.24	80	205.38	88.86	313.31	224.45
NPK + $ZnSO_4$/S	182.32	220	190.78	-8.46	196.65	205.11	10.02	120	52.47	-42.45	10.96	53.41	294.24	80	209.41	84.83	313.97	229.14
Farmers practice	182.32	140	155.59	26.73	172.21	145.48	10.02	80	43.13	-33.11	10.15	43.26	294.24	50	179.07	115.17	298.27	183.1

Conclusion

On the idea of experimental findings, it's far concluded that the utility of a hundred: 60:40 kg ha^{-1} N: P2O5: K2O + 20 kg ha^{-1} ZnSO4 in rice and 120:60:40:20 kg ha^{-1} N: P2O5: K2O: S in wheat can be endorsed for better productivity, soil nutrient repute and profitability of rice- wheat cropping system for the district of Uttar Bastar, Kanker of Chhattisgarh country.

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