

Effect of cropping system on grain and straw yield of rice and wheat crops in different blocks of Jaunpur district in Uttar Pradesh

UMESH SINGH, VEENA RANI SRIVASTAV¹, SANJAY SINGH², RASHMI PANWAR³ AND RASHMI CHOUBEY⁴

Krishi Vigyan Kendra, Amberpur, Sitapur (U.P.)

Abstract

The research was conducted in Jaunpur district during the year 2008-09 to 2009-10. The soil samples were taken from 21 blocks of Jaunpur district. Three villages were covered in each block and total 63 soil samples from surface soil were collected for analysis. The yields of rice and wheat crops were recorded. Grain yield of rice was recorded maximum (51 q ha^{-1}) in soils of Dobhi block of Kerakat tehsil followed by Sirkoni, Sikar, Dharampur, Mungara, Badshapur, Muftiganj and Rampur blocks respectively while lowest yield (50 q ha^{-1}) was obtained in Kuthan block of Shahganj tehsil. Wheat grain yield was recorded maximum (52 q ha^{-1}) in soils of Dobhi block of Kerakat tehsil followed by Jalapur (50 q ha^{-1}), Kerakat (47 q ha^{-1}), Sirkoni, (47 q ha^{-1}) and Karanjakalan (46 q ha^{-1}) blocks respectively. While lowest wheat yield (34 q ha^{-1}) was obtained in Kuthan and (35 q ha^{-1}) in Barasthi blocks.

Key words: Wheat, Grain, village,

Introduction

The prevailing crop rotations in this region which farmers adopted were rice-wheat/ mustard, rice-sugarcane, rice- pulses, rice- vegetables. In most of the field surveyed, weed infestation was found low to medium. Post-harvest losses were observed to be 10-15 %. The average grain yield of rice ranged from 35-40 q/ha for HYVs and 40-65 q/ha for hybrid. Rice root knot nematode problem is increasing day by day in the Jaunpur due to the most prevalent cropping system of rice and wheat. Farmers preferred rice varieties like Sarjoo 52, NDR 359 and MTU 7029. In the various blocks of Jaunpur district, farmer's preferred rice and wheat cropping pattern highly (> 25 % of GCA), pulses low (5 – 10 % of GCA) and barley, sorghum, pearl millet, maize, chick pea, pigeon pea, oil seeds, sugarcane, fruits and vegetable crops least (< 5 % of GCA). In Jaunpur from the point of view of area and production level wheat covered maximum followed by rice, other pulses, sugarcane, maize, pigeon pea, chick pea, pearl millet, potato, rape seed and mustard and sorghum etc.(Agricultural Statistics of Uttar Pradesh and ICRISAT Database

compiled by NCAP, 2010-11).

Materials and Methods

The present investigation was carried out at the experimental station, Jaunpur district of (U.P.) during 2009-2010 at Department of Agricultural Chemistry & Soil Science, T.D.P.G. College , Jaunpur under Veer Bahadur Singh Purvanchal University, Jaunpur. during Kharif & Rabi seasons. Rice crop was grown during Kharif season and wheat crop in Rabi season, respectively. During investigation soil samples will be collected from selected villages in each block and representative soil profiles will be exposed in various soils of the district for chemical investigations. There were 6 tehsils, 21 blocks with 3 villages in each blocks. The major cropping sequence is Rice – Wheat. After attained physiological maturity, the crops were harvested close to ground level from the each plot. The produce was bundled and tagged with levels of each plot. After complete drying, the weight of bundles from each plot was recorded and the produce was finally weighted. The straw yield was computed by subtracting the grain yield from the total biomass. After threshing and winnowing grain yield of each plot was recorded. Grain yield obtained from individual plots was subtracted from dry bundle weight of the particular plot to obtain straw yield per plot and was converted into straw kg ha^{-1} .

Results and Discussion

Grain and straw yield of rice

¹Krishi Vigyan Kendra, Chhatarpur, (JNKVV) M.P.

² Barren Land Reclamation, Project Manager, Lucknow (U.P.) e-mails: umeshsingh.1816@rediffmail.com and singhpp1977@yahoo.co.in

³Krishi Vigyan Kendra, JNNKV, Panna (M.P.)

⁴Directorate of Extension, JNKVV, Jabalpur (M.P.)

The data related to grain and straw yield of rice and wheat are presented in Table 1. It was clearly indicated that the grain yield of rice was recorded maximum (51 q ha^{-1}) in soils of Dobhi block of Kerakat tehsil followed by Sirkoni, Sikar, Dharampur, Mungara, Badshapur, Muftiganj and Rampur blocks respectively. While lowest yield (50 q ha^{-1}) was obtained in Kuthan block of Shahganj tehsil. It was noted by the inspection of overall data only few blocks (Dhobi, Sirkoni, Sikar Dharampur, Mungara, Badshapur, Muftiganj and Rampur) receiving the good yield of rice as compare to rest of the blocks. Similar pattern were recorded in case of straw yields of paddy that was also maximum in Dhabhi blocks while minimum were found with again Kuthan block of Shahganj tehsil. The crop growth and yield parameters are significantly altered by the application of different input resources. The inputs which individually improve the crop production may be additive or may not be additive. Many times it could be antagonistic also. Therefore, to obtain maximum benefit of the applied resources, nature of their impact must be known. Further, the production economics will depends on the nature and magnitude of benefit in relation to the cost of inputs. It is well recognized that inorganic fertilizer is not a complete substitute for organic manures and vice versa, and their role is complementary. In the past, fertilizer recommendation was made considering the nutrient requirement of individual crop, ignoring the residual effect of the previous crop on the succeeding crop.

With the development of improved varieties and increasing cost of inputs it has become imperative to develop a suitable fertilizer-management schedule including the type of sources that need to be used. The nutrient which are highly mobile such as nitrogen and chlorine, made available to the plant roots even from the distances by the process of mass flow and diffusion. However, the partially mobile and immobile nutrients became available to the plant roots mainly through the process of diffusion, which is mainly governed by the differential concentrations of that nutrient. Therefore, the moisture content of the soil plays an important role in the process of nutrients absorption and utilization by the growing plants, its development and finally the production potential of any cropping sequence. Considering same the present investigation was planned. It was noted that the overall data related to rice grain yield only few blocks (Dhobi, Sirkoni, Sikar Dharampur, Mungara, Badshapur, Muftiganj and Rampur) receiving the good yield of rice as compare to rest of the blocks of Jaunpur district. While most of the blocks did not receive good yield of rice crop due to inadequate nutrient supply and inferior water management system (Timsina and Connor, 2001; Ali *et al.*, 2012). Similar pattern were recorded in case of straw yields of paddy that was also maximum in Dhabhi blocks while minimum were found with again Kuthan block of Shahganj tehsil. Similarly Jana and Ghosh (1996) reported that grain yield of rainy season rice was higher under 100% recommended dose of NPK

Table 1: Effect of cropping system on grain and straw yield of rice and wheat (Pooled mean of two years)

Tehsils	Blocks	Rice Grain Yield (q ha^{-1})	Wheat Grain Yield (q ha^{-1})	Rice Straw Yield (q ha^{-1})	Wheat Straw Yield (q ha^{-1})
Jaunpur	Sikrara	46	42	52	52
	Buxa	36	44	43	57
	Sirkoni	48	47	52	56
	Karanja Kalan	35	46	41	59
	Dharampur	46	43	47	54
Badalpur	Badalpur	35	42	39	49
	Maharajganj	37	45	44	52
Shahganj	Suitha Kalan	34	39	39	47
	Shahganj	33	41	38	52
Kerakat	Kuthan	30	34	35	47
	Kerakat	42	47	46	56
	Muftiganj	44	44	48	55
	Dobhi	51	52	56	61
Machlishahar	Jalalpur	39	50	43	61
	Machlishahar	43	44	46	57
	Mungra	45	41	47	56
Marihaun	Badshapur	45	38	47	51
	Sujanganj	43	44	46	59
	Marihaun	37	40	40	53
	Rampur	44	37	46	54
	Barasthi	41	35	47	49

fertilizer applied through either inorganic source alone or 75% through inorganic and 25% through organic source or following farmer's practice reduced the grain yield significantly. Reddy and Surekha (1999) studied the influence of cropping system on upland rice yield and observed significantly higher grain yields of *kharif* upland rice. Singh *et al.* (2002) also reported that increment in rice grain and straw yields. Findings of Khanam *et al.* (1995) also state that the nitrogen content and uptake were significantly increased with application of inorganic. Omarhattab *et al.* (2000) in their field experiment and also recorded the highest grain yield of rice. However Shrivastava and Pathak (1970) also reported better yield response of rice in chickpea-paddy rotation. Raju *et al.* (1994) also reported significant increase in rice grain yield with the application of zinc sulphate.

Grain and straw yield of wheat

The data related to grain and straw yield of wheat are presented in table. It was clearly indicated that the grain yield were recorded maximum (52 q ha^{-1}) in soils of Dobhi block of Kerakat tehsil followed by Jalapur (50 q ha^{-1}), Kerakat (47 q ha^{-1}), Sirkoni, (47 q ha^{-1}) and Karanjakalan (46 q ha^{-1}) blocks respectively. While lowest wheat yield (34 q ha^{-1}) were obtained in Kuthan and (35 q ha^{-1}) in Barasti blocks. It was noted by the inspection of overall data only few blocks (Dhobi, Jalapur, Kerakat, Sirkoni, and Karanjakalan) receiving the good yield of wheat as compare to rest of the blocks. Similar pattern were recorded in case of straw yields of wheat that was also maximum in Dhobhi blocks while minimum were found with again Kuthan block of Shahganj tehsil. The data was clearly indicated that the grain yield were maximum (52 q ha^{-1}) in soils of Dobhi block of Kerakat tehsil followed by Jalapur (50 q ha^{-1}), Kerakat (47 q ha^{-1}), Sirkoni, (47 q ha^{-1}) and Karanjakalan (46 q ha^{-1}) blocks respectively. While lowest wheat yield (34 q ha^{-1}) were obtained in Kuthan and (35 q ha^{-1}) in Barasti blocks. It was noted by the inspection of overall data only few blocks (Dhobi, Jalapur, Kerakat, Sirkoni, and Karanjakalan) receiving the good yield of wheat as compare to rest of the blocks. These observations are in agreement with the findings of Naphade *et al.*, 1993 and Singh *et al.*, 1999. While the lowest yield was recorded in most of the block due to more and more nutrient were exhausted by rice-wheat

cropping system. This is in the conformity with the observations of Naser and Aslam (2000) & Yadav and Verma (1995). Similar pattern were recorded in case of straw yields of wheat that was also maximum in Dhobhi blocks while minimum were found with again Kuthan block of Shahganj tehsil of Jaunpur district.

References

- Khanam, Rabeya, Sahu, S.K. and Mitra, G.N. (1995). Yield maximization of rice through integrated nutrient management on Aeris Ustochrept, *J. Indian Soc. Soil Sci.*, 45(2) : 396-397.
- Omarhattab, K. Natarajan, K. and Gopalswamy, A. (2000). Effect of organic and inorganic nitrogen combination on rice yield and N uptake. *J. Indian Soc. Soil Sci.*, 48(2) : 398-400.
- Reddy, M. Narayana and Surekha, K. (1999). Role of chickpea in Enhancing available P in chickpea-upland Rice-system I Vertisol. *J. Indian Soc. Soil Sci.*, 47(4) : 805-808.
- Shrivastava, O.P. and Pathak, A.N. (1970). In Symposium on fertilizer use. *Bull. No. 8 Indian Soc. Soil Sci.*, New Delhi, 155.
- Singh Rajendra (2002). Impact of continuous Application of Nutrients on Soil Physical Environment and Nutrient status. M.Sc.(Ag.) Thesis Submitted to the J.N.K.V.V., Jabalpur, M.P.
- Singh, D. and Rana, D.S. (1998). Phosphorus removal and available P balance in a Typic Ustochrepet under intensive cropping and long-term fertilizer use. *J. Indian Soc. Soil Sci.*, 46(3) : 398-401.
- Singh, M., Barman, K.K., Kundu, S., Tripathi, A.K. (1999). Transformation of soil organic pools of N as influenced nitrogen under soybean wheat system in vertisol. *J. Indian Soc. Soil Sci.* 47 (3): 483-487.
- Yadav, B.S. and Verma, B.L. (1995). Irrigation requirement of wheat undr shallow water table condition. *J. Indian Soc. Soil Sci.* 43 (2): 259-261.
- Timsina, J and Connor, DJ (2001). Productivity and management of rice-wheat cropping systems: issues and challenges. *Field Crops Res* 69:93–132
- R. I. Ali, Awan, T. H. Ahmad, M. Saleem M. U. and Akhtar, M. (2012). Diversification of rice-based cropping systems to improve soil fertility, sustainable productivity and economics. *The Journal of Animal & Plant Sciences*, 22(1) : 108-11.