

Government recommended doses and Farmers' practice, while minimum sterile grains were found in Nutrient Expert software's recommended dose. Likewise, for Hardinath-3, statistically higher sterile grains were found in Government recommended dose, followed by 125% of the Government recommended dose, Farmers' practice, and Nutrient Expert

software recommended dose, respectively. Moreover, for Chaite-5, the sterility percentage of grains was found to be maximum on Nutrient Expert software recommended dose followed by Government recommended dose, 125% of Government recommended dose and Farmers' practice, respectively.

Table 7: Sterility percentage of rice as influenced by interaction of different fertilizer management practices of spring rice varieties at Chebetar, Gorkha, 2021

Fertilizer doses	Varieties		
	Hardinath-1	Hardinath-3	Chaite-5
Government recommended	28.27 ^{de}	55.44 ^a	41.09 ^{bc}
Farmers' practice	29.53 ^{de}	50.81 ^{ab}	35.11 ^{cde}
Nutrient Expert recommended	26.64 ^e	40.83 ^{bc}	49.53 ^{ab}
125% of Government recommended	29.99 ^{de}	52.27 ^a	37.30 ^{cd}
SEm (\pm)	3.54		
CV,%	15.46		
LSD (=0.05)	10.40		

3.3 Thousand grain weight (TGW)

Hardinath-3 was found superior in terms of thousand-grain weight (22.36g), which was statistically similar to Hardinath-1(21.88 g), while significantly lower thousand-grain weight was recorded in Chaite-5 (17.56 g), as depicted in Figure 3. However, the differences in thousand-grain

weight were not significantly influenced by various nutrient management practices. Nevertheless, the maximum thousand-grain weight was observed in 125% of Government recommended dose (20.98 g), whereas the minimum in Nutrient Expert software recommended the dose (20.18 g), as shown in Figure 4.

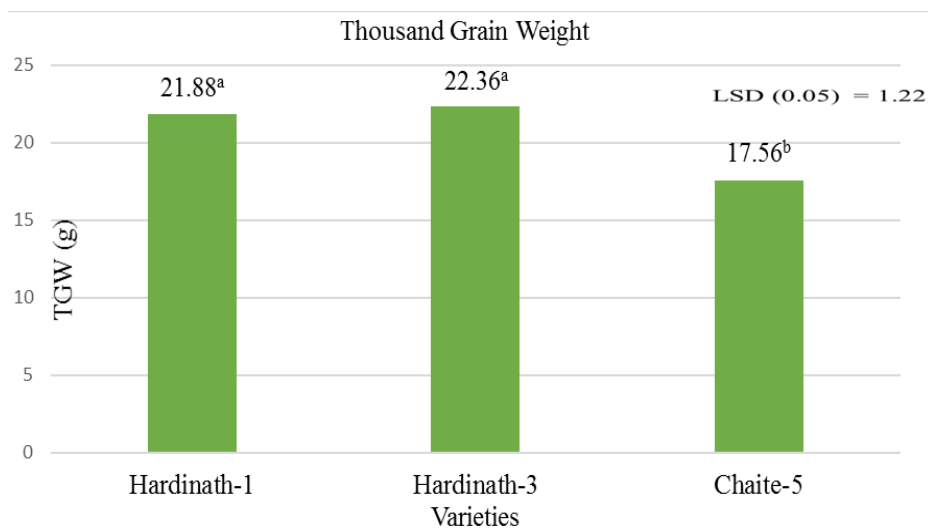


Figure 3: Thousand Grain Weight (g) as influenced by spring rice varieties at Chebetar, Gorkha, 2021

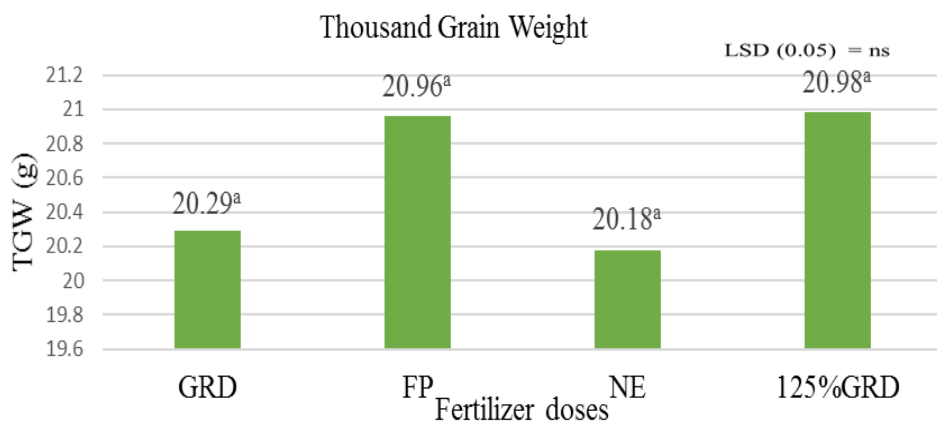


Figure 4: Thousand Grain Weight (g) of rice as influenced by different fertilizer management practices of spring rice varieties at Chebetar, Gorkha, 2021

3.4 Grain yield

The analyzed data (Figure 5) revealed that grain yield was significantly higher in Hardinath-1 (3929.28 kg ha⁻¹), and significantly lower grain yield was recorded in Hardinath-3 (3011.32 kg ha⁻¹), which was statistically at par with Chaite-5 (3237.59 kg ha⁻¹). Likewise, significantly

higher grain yield was found in 125% of the Government recommended dose (3889.02 kg ha⁻¹) than all other treatments, which were observed to be statistically similar with each other, i.e., grain yield on Nutrient expert recommendation dose was 3345.93 kg ha⁻¹ followed by Government recommended dose (3334.16 kg ha⁻¹) and Farmers' practice (2901.82 kg ha⁻¹) respectively (Figure 6).

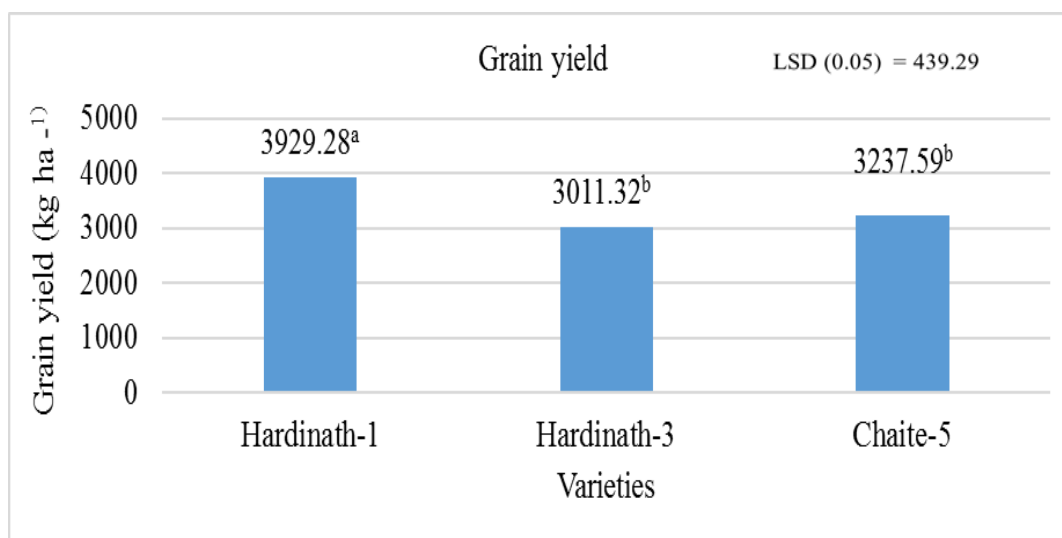


Figure 5: Grain Yield (kg ha⁻¹) as influenced by spring rice varieties at Chebetar, Gorkha, 2021

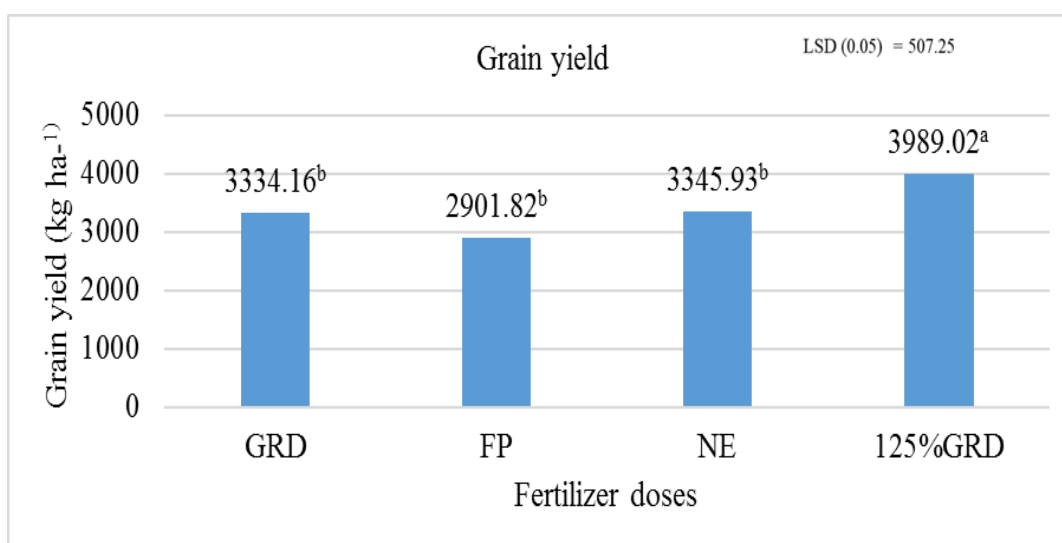


Figure 6: Grain Yield (kg ha⁻¹) of rice as influenced by different fertilizer management practices of spring rice at Chebetar, Gorkha, 2021

Besides, the interaction of various fertilizer management practices and spring rice varieties showed a significant interactive effect on grain yield, presented in Table 8. Grain yield was significantly superior to Government

recommended dose (4507.26 kg ha⁻¹), the Nutrient expert-recommended dose (4254.23 kg ha⁻¹), and 125% of the Government recommended dose (3828.17 kg ha⁻¹) than Farmers' practice (3127.43 kg ha⁻¹).

Table 8: Grain Yield (kg ha⁻¹) of rice as influenced by interaction of different fertilizer management practices of spring rice varieties at Chebetar, Gorkha, 2021

Fertilizer doses	Varieties		
	Hardinath-1	Hardinath-3	Chaite-5
GRD	4507.26 ^a	2491.43 ^d	3003.77 ^{cd}
Farmers' practice	3127.43 ^{bcd}	2799.62 ^d	2778.39 ^d
Nutrient Expert Software	4254.23 ^a	2768.25 ^d	3015.29 ^{cd}
125% of GRD	3828.17 ^{abc}	3985.98 ^{ab}	4152.90 ^a
SEm (±)	299.56		
CV,%	15.29		
LSD (=0.05)	878.58		

Grain yield was significantly higher in 125% of government-recommended doses than in other treatments. The increase in grain yield might be due to nitrogen application enhancing the dry matter production, improving rice growth rate, promoting elongation of internodes and activity of growth hormones like gibberellins (Gewaily et al., 2018). There were significant differences among various rice genotypes in grain yield produced. The highest grain yield was recorded in Hardinath-1. The highest grain yield might be due to its most filled grains panicle-1 (Roy et al., 2014).

3.5 Straw yield

Spring rice varieties significantly influenced variation in straw yield. It was significantly higher for Hardinath-3 (4029.1 kg ha⁻¹) than all other treatments (Figure 7). However, differences in straw yield were not significantly affected by various fertilizer doses. But, it was higher in farmers' practice (3431.39 kg ha⁻¹) followed by Nutrient expert recommendation dose (3352.58 kg ha⁻¹), Government recommend dose (3319.64 kg ha⁻¹) and 125% of Government recommended dose (3110.14 kg ha⁻¹) (Figure 8).

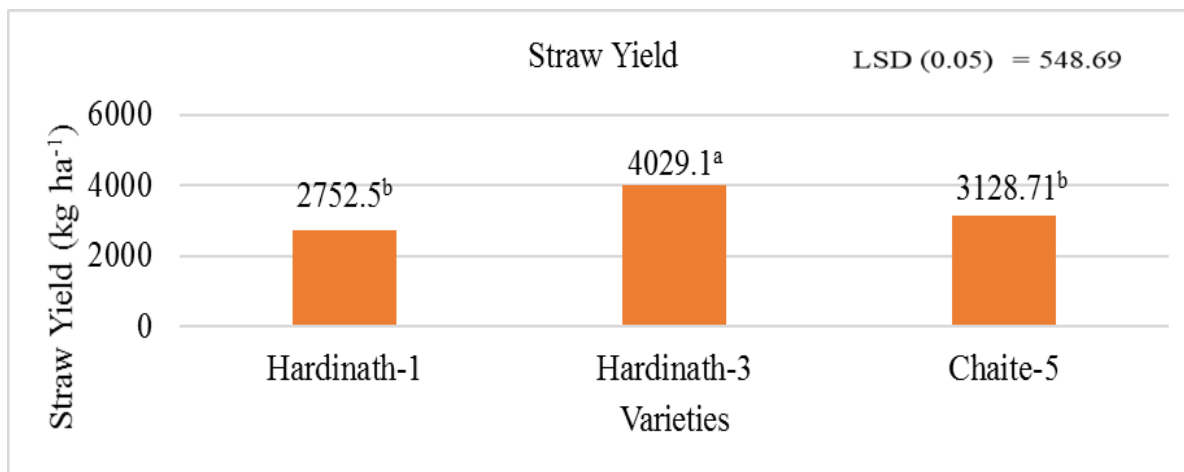


Figure 7: Straw Yield (kg ha⁻¹) as influenced by spring rice varieties at Chebetar, Gorkha, 2021

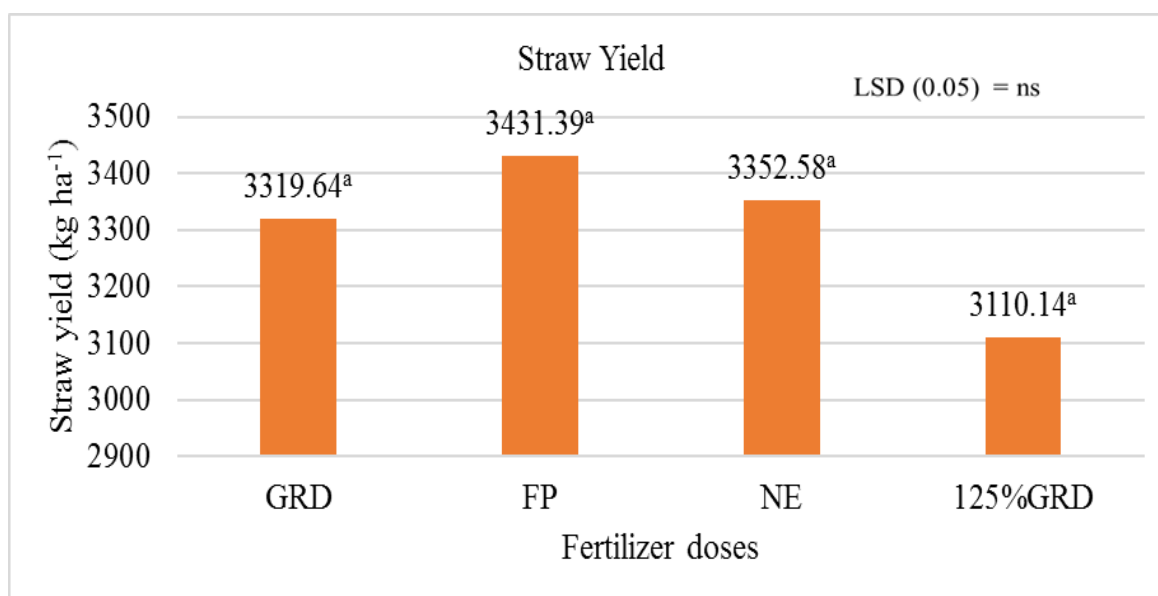


Figure 8: Straw Yield (kg ha⁻¹) of rice as influenced by different fertilizer management practices of spring rice at Chebetar, Gorkha, 2021

The straw yield was highest in Hardinath-3, consistent with the finding of Niraula et al. (2020).

3.6 Harvest index (HI)

Different spring rice varieties exerted a significant influence on the harvest index. It was significantly higher for Hardinath-1 (0.61) and significantly

lowest for Hardinath-3 (0.42). (Figure 9) However, different nutrient management practices did not significantly affect variation in Harvest Index. The highest harvest index was found in Farmers' practice 0.54, while it was lowest in Government recommended dose (0.49), as shown in Figure 10.

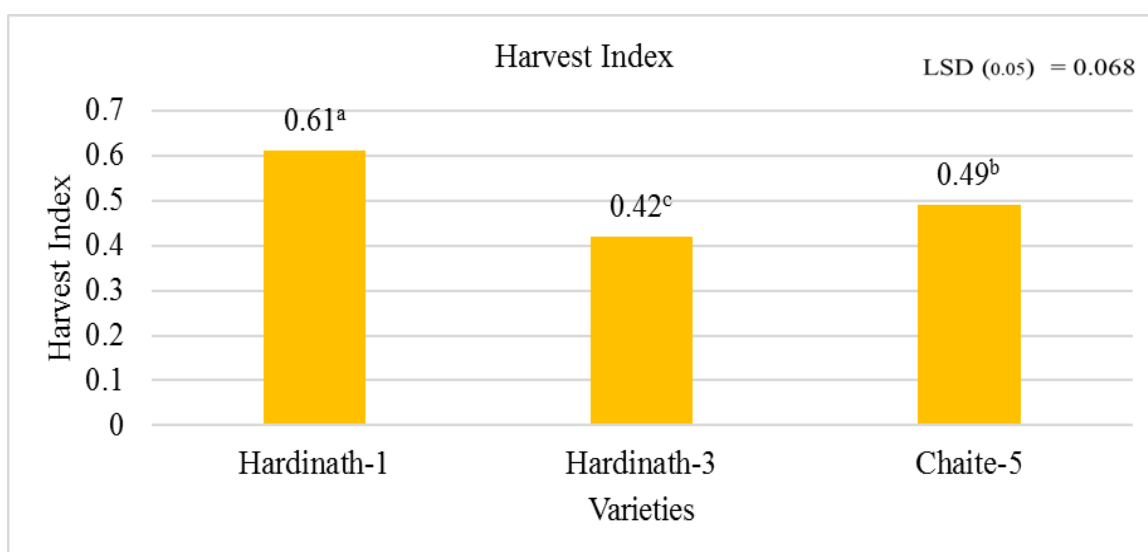


Figure 9: Harvest Index as influenced by spring rice varieties at Chebetar, Gorkha, 2021

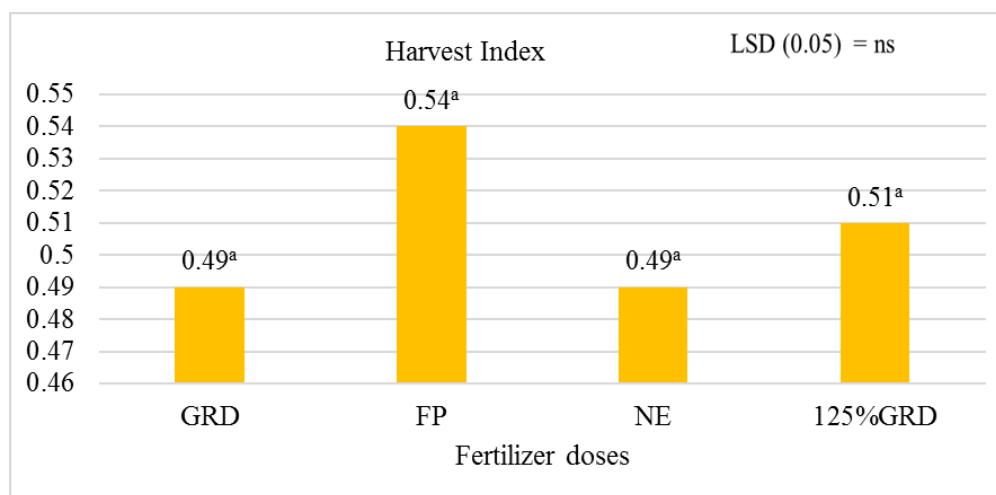


Figure 10: Harvest Index of rice as influenced by different fertilizer management practices of spring rice at Chebetar, Gorkha, 2021

Likewise, the Grain yield and harvest index of Hardinath-1 were superior to other treatments, which corroborates with the findings of Puri et al. (2021).

4. ECONOMIC ANALYSIS

Table 9 depicts that cost of cultivation did not vary significantly in the case of variety because of the exact cost of cultivation among all the varieties due to similar agronomic practices and the cost of seeds. Moreover, as there are different doses of fertilizers in different nutrient management practices, there was a significant difference in the cost of cultivation due to the difference in the cost of Urea, DAP, and MOP in different treatments. The maximum cost was incurred in 125% of the Government recommended dose (NRs. 83607), while the minimum cost was observed

in Farmers' practice (NRs. 70880). Likewise, the Gross return was recorded significantly higher in Hardinath-1 (NRs. 123004.5) than in the rest of the treatments. Furthermore, 125% of Government recommended doses (NRs. 127716.7) had significantly higher gross returns than all other treatments. Moreover, the Net return was observed to be statistically higher in Hardinath-1 (NRs. 43827.47) than in other varieties. However, the Net return was not significantly influenced by fertilizer management practices. Numerically, the highest net return was obtained from 125% of Government recommended dose (NRs. 44109.74). Besides, the B/C ratio was obtained significantly higher in Hardinath-1 (1.55) and Hardinath-3 (1.47) than in Chaite-5 (1.37). In the case of nutrient levels, 125% of Government recommended doses recorded a maximum B/C ratio (1.53), and the statistically lowest B/C ratio was observed in Government recommended doses (1.41).

Table 9: Economics as influenced by of rice as influenced by interaction of different fertilizer management practices of spring rice varieties at Chebetar, Gorkha, 2021

Treatments	Cost of cultivation	Gross Return	Net Return	Benefit: Cost
Varieties				
Hardinath-1	67300	123004.5 ^a	43827.47 ^a	1.55 ^a
Hardinath-3	67300	111545.0 ^b	32368.00 ^b	1.47 ^a
Chaite-5	67300	109098.2 ^b	29921.17 ^b	1.37 ^b
LSD (=0.05)	ns	11222.9	11222.9	0.1004634
SEm (±)		3826.55	3826.55	0.03425395
F probability		<0.05	<0.05	<0.01
Fertilizer doses				
Government recommended	80321 ^c	113230.8 ^b	32909.76 ^a	1.41 ^b
Farmers' practice	70880 ^d	103427.9 ^b	32547.92 ^a	1.45 ^{ab}
Nutrient Expert recommended	81900 ^b	113821.4 ^b	31921.43 ^a	1.47 ^{ab}
125% of Government recommended	83607 ^a	127716.7 ^a	44109.74 ^a	1.53 ^a
LSD (=0.05)		12959.09	12959.09	0.1160051
SEm (±)		4418.53	4418.53	0.03955306
F probability		<0.01	0.18	0.24
CV, %		11.57	37.47	8.08
Grand Mean	79177	114549.2	35372.21	1.47

5. CONCLUSION

Plant height and straw yield were higher for Hardinath-3 and other growth parameters, and yield attributes and yield were higher for the Hardinath-1 variety. Likewise, 125 % of Government recommended dose is required for Hardinath-3 and Chaite-5, while Hardinath-1 is superior in all other nutrient management practices except in farmers' doses. Moreover, few growth parameters and yield attributes were better for Nutrient Expert. In contrast, most of the yield attributes along with yield were superior while increasing the government recommendation by 25%. Thus, the newer high-yielding varieties need higher nutrients for good yield. Hence,

site-specific nutrient management should be considered before recommending the fertilizer dose to attain better growth and yield performance of each released rice variety. Regarding economic analysis from the study, Gross return, net return and B/C ratio were obtained higher in Hardinath-1 and 125% of the Government recommended dose. Thus, Hardinath-1 with 125% of government recommendations, can be used to boost the growth and yield of rice in Gorkha, Nepal.

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