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Assessment of Rice Seed Production and Seed Replacement Rate (SSR) Status in Geruwa and Rajapur, Bardiya

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ABSTRACT

Seed is a vital input for agriculture production and is the major limiting factor to productivity. To assess the production status and Seed Replacement Rate (SRR) this study was carried out in two municipalities viz., Geruwa and Rajapur of Bardiya district which were purposively selected. The study used randomly selected 50 rice seed producers and 50 grain producers (25 from each municipality). The MS-Excel and STATA (Version 15.0) software were used for data analysis. The study investigates the local production and demand for rice seed in two municipalities of Bardiya, aiming to identify rice seed varieties, assess production and demand, determine seed replacement rates (SRR), and understand challenges faced by rice seed producers. The finding revealed that the average rice seed production is 44.64 quintals, and Rajapur had higher production than Geruwa. Accordingly, the average demand for rice seed among farmers is 34.4 kg, indicating that local production sufficiently meets the area's demand. The area has a considerably high SRR compared to the national average because of favorable agricultural infrastructure concerning improved irrigation facilities; more assured availability and utilization of better varieties of seeds; effective agricultural extension services; more favorable climatic conditions; and better access to agricultural equipment. From study findings, Makwanpur is the dominant rice variety (26%) used for seed production in the study area. However, seed production has remained challenging, with the respondents pointing out that insect pests, diseases, and the timely unavailability of fertilizers were some of the major setbacks. This research provides valuable information on the local rice seed production dynamics and hence contributes to strategies for enhancing agricultural productivity, besides addressing the challenges faced by the seed producers.

Keywords: Rice seed production, Seed Replacement Rate (SRR), agricultural productivity.

INTRODUCTION

Agriculture is the mainstay of Nepalese economy contributing 23.95% in national GDP (MOALD, 2022). Agro-ecological variations even within a small geographical area of the country leads to diversification of agricultural opportunities (Sapkota et al., 2013). Rice is by far the most important crop in Nepal cultivated in an area 1,458,915 ha with the production of 5,550,878 Mt and an average productivity of 3.47mt/ha (MOALD, 2022). However, unavailability of quality

seeds at right time limits crop productivity and the quality of production.

Seed is one of the most critical inputs of agriculture production. Use of quality seed alone can contribute 20-25% more increase in the productivity of crops (Mondal & Goswami, 2020). Understanding the importance of quality seed different policies were formulated. The formal seed sector development began with seed act 1998 and the national seed policy (1999) followed by National seed vision (2013-2025).These formulated policies must be updated periodically to strengthen the sector (Timsina et al., 2023). The Ministry of Agricultural Development (MoAD) developed the 10-year Prime-Minister Agriculture Modernization Project (PMAMP), an agriculture development strategy (ADS) that was designed with the nation's vision, investment, and internal organizational manpower in mind. It provides a clear and detailed road plan for increasing agricultural output and productivity so that the nation can become self-sufficient in less than 10 years, especially in terms of agricultural production. This initiative developed clusters in the form of super zones, zones, blocks, and pockets based on the area in different parts of the country. The project focuses on modernization of agriculture through mechanization. In addition to this it also provides subsidy regarding seeds and machineries. According to (Timsina et al., 2023) despite policies and projects the execution is not so successful the majority of the institutional framework and legal prerequisites have not yet been established at the provincial and local levels.

Rajapur municipality and Geruwa rural municipality in Bardiya district under Lumbini province of Nepal are promising municipalities in agriculture as agriculture has the largest share in the average family income. Assessing rice seed production in the area ensures the quality and steady supply of seeds leading to yield enhancement. In addition, allows policymakers to evaluate its economic impact, identify areas for improvement which overall contributes to food security and better productivity

MATERIALS AND METHODS

Selection of study area

The proposed study will be conducted in the Bardiya district of Nepal. Bardiya has maximum altitude 1279 meters and minimum altitude 138 meters. It lies at latitude of 28°18’36.84” N and longitude of $81^0$25’40.43” E with total coverage of 2025 sq km. This district has tropical climate condition with maximum temperature reaching to 40^0C and minimum temperature reaching to 4^0C. PMAMP has recognized and acknowledged Bardiya as a Promising rice sub-sector with ultimate goal of achieving self-sufficiency in rice production. The study will be conducted in Rajapur municipality and Geruwa rural municipality. The areas are selected because they are the command areas of PMAMP, Rajapur.

Population, Sampling and Sampling technique

The target population of this study were both farmers engaged in rice seed production and grain production in PMAMP, rice super zone Bardiya. The complete list of farmers engaged in rice seed production was obtained from concerned seed companies and cooperatives which were used as sampling frame. From the sampling frame a total 50 rice seed producers were selected for assessment of production. Similarly, 50 grain producers were selected for assessing Seed Replacement Rate (SRR). The sampling was done by using purposive followed by simple random sampling technique.

Pre-survey activities

Field visits prior to survey was conducted to gather required information regarding the demographic, Socio-cultural and location of site. The obtained information was used in preparing interview schedule. During the field visits key informants, representative of cooperatives and seed companies were consulted as well.

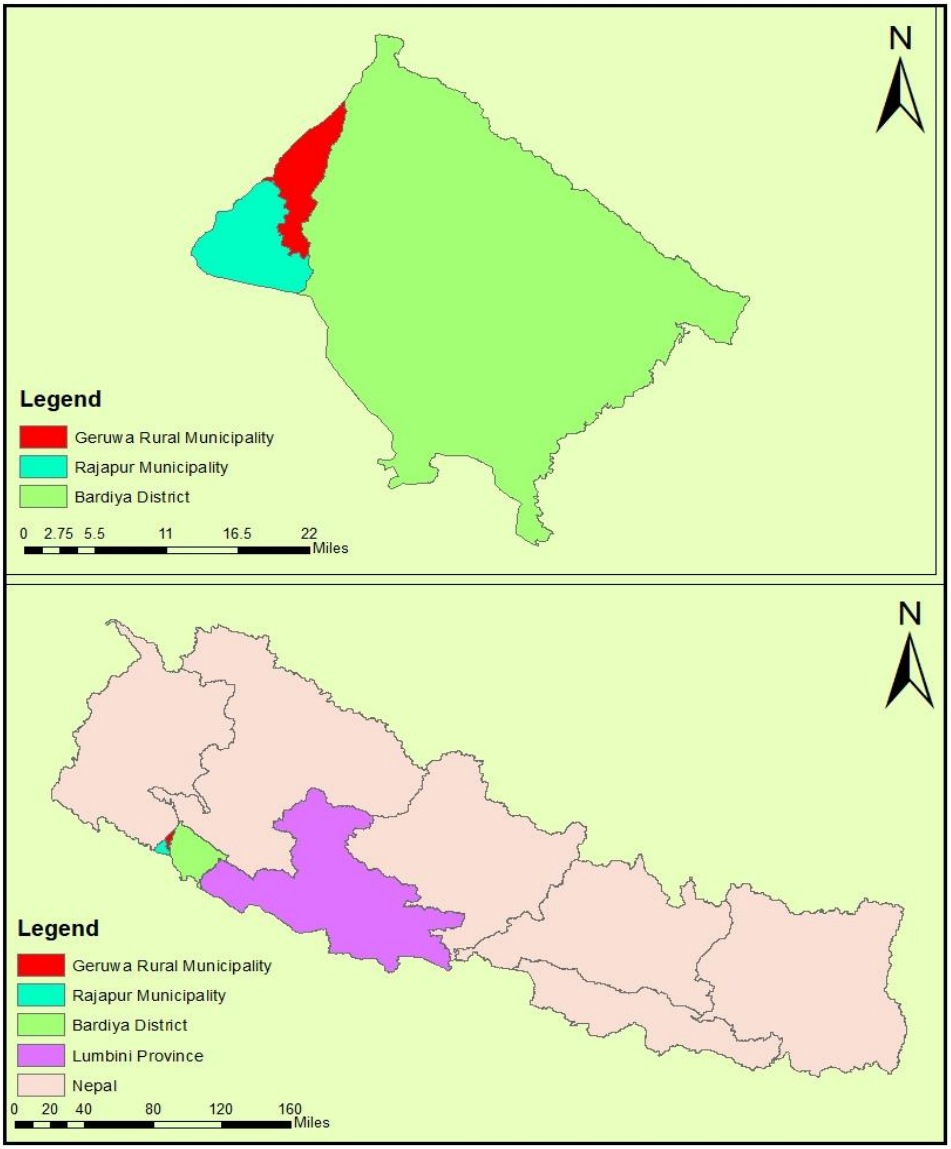

Figure 1: Map of research site
Source: Ministry of Federal Affairs and Local Development

Data and Data types

Both primary and secondary data were collected from the concerned sources.

Primary data

Primary data was obtained from farmers engaged in rice seed production and grain production through face-to-face interviews. To validate the data obtained from farmers, focus group discussion and key informant interview was carried out.

Secondary data

Government reports, different bulletins, newsletters and websites were assessed for collecting relevant information regarding rice seed production.

Data analysis technique

The collected data was entered in MS-Excel and analyzed by using SPSS software. The result and conclusion were prepared in bar-graphs and charts by preparing report at the end of tenure of LEE program

T-test

t test was used to judge the significance of several statistical measure, particularly mean.

$$t = \frac{\bar{x}1 - \bar{x}2}{\sqrt{s^2\left(\frac{1}{n1^2} + \frac{1}{n2^2}\right)}}, \quad df: n1+n2-2$$

where $s^2 = \frac{[(n1-1)s1^2+(n2-1)s2^2]}{n1+n2-2}$ is pooled variance

Chi square test

Chi square test was used to compare the frequencies of data between subsidy receivers and non- receivers.

$$X^2 = \frac{\sum(O-E)^2}{E}$$

where O is observed value, E is expected value

Scaling

Scaling techniques are basically employed for quantitative measurement of subjective view of the respondents regarding particular topic (Kothari, 2004). Three to seven-point scale are in practice. At first problem faced by rice seed grower were identified and were ranked using five-point scaling technique which comprises most severe, severe, medium severe, less severe and least severe using scale values 1, 1-1/n, 1-2/n, 1-3/n and 1-4/n respectively. Here, n refers to number of categories in ranking. Following formula was used to calculate index value:

$I = \sum Si f i / N$

Where,

I = index value; $0 \angle I \angle 1$

S_i = scale value at i^{th} priority

f_i = frequency of the i^{th} priority

N = total number of respondents

Value of index (score) ranged from 0 to 1. The option with highest score had highest rank and lowest score had lowest rank.

RESULT AND DISCUSSION

Socio-demographic characteristics of respondent

The socio-demographic characteristics includes quantitative variables like age household head, family size, economically active family members, gender of respondent, ethnicity, education of respondent etc. Table no.5 shows 86% of the population of the study are was within economically active age group suggesting they have ability to grasp information regarding innovative production practices. Beside they also have good working ability. Similarly, 88% of the seed producer in Rajapur were within economically active age group whereas 84% in Geruwa however they are statistically non-significant.

About 82% of the population were male headed and 18% were female headed. It implies that the society was male dominated. The finding was contemporary to the finding of (Bhandari et al., 2021a) where 50% of the producers were male and 50% female. In Rajapur population of male was higher (92%) than Geruwa (72%), Whereas the no. of female population of Geruwa was higher i.e.28% than Rajapur which was 8%. And, the statistics suggest there was association between gender and local levels at 5% level of significance.

The education status of respondent depicted, majority of respondents (32%) had primary education and many of them i.e.20% had secondary class education Similarly 8% illiterate. At the same time 18% were SLC passed ,16% were plus 2 passed and only 6% had education level equal to or above bachelor. Statistical test suggests that there was no association between level of education and local levels.

The study also revealed majority of house hold (70%) had nuclear family whereas only 30% had joint family. The statistical test suggested there was no association between family type and local levels.

Table 1: Sociodemographic characteristics of seed producers

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi-value	p-value
Age					
<15	0(0)	0(0)	0(0)	0.16	0.684
15-59	43(86)	22(88)	21(84)		
>59	7(14)	21(84)	4(16)		

Gender					
Female	9(18)	2(8)	7(28)	3.3875**	0.066
Male	41(82)	23(92)	18(72)		
Family size					
joint	15(30)	8(32)	7(28)	0.0952	0.758
Nuclear	35(70)	17(68)	18(72)		
Education					
Illiterate	4(8)	1(4)	3(12)	5.6111	0.346
Primary class	16(32)	6(24)	310(40)		
Secondary class	10(20)	5(20)	5(20)		
SLC	9(18)	7(28)	2(8)		
Plus 2	8(16)	5(20)	3(12)		
Bachelors above	3(6)	1(4)	2(8)		
Total	50(100)	25(50)	25(50)		

Area under seed cultivation

Overall average 1.11 ha land was under rice seed cultivation in the study area. The average area under rice seed cultivation in Rajapur (1.40 ha) was higher than Geruwa (0.8 ha). The test suggested area under rice seed cultivation had association with local levels with 10% level of significance.

Table 2: Area under rice seed cultivation

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Mean difference	t-value	p-value
Area under rice cultivation	1.11(1.19)	1.40(1.51)	0.8(0.66)	0.58	1.78*	0.081

Irrigation system

Table no. 6 shows different kinds of irrigation system used by seed producers. Overall 50% of the producers used both canal and boring as irrigation system. About 38% of them used boring and only 12% used canal only as a irrigation system. In both the municipality; Rajapur (50%), Geruwa (48%) majority of producers used both canal and boring as an irrigation system and only canal system used by few. Therefore, the association between the irrigation system and local level is insignificant.

Table 3: Different irrigation system

Variable	Overall	Rajapur	Geruwa	Chi2	P-value
Irrigation system				0.7593	0.68
Canal system	6(12)	4(16)	2(8)		
Boring	19(38)	9(36)	10(40)		
Canal and boring both	25(50)	12(48)	13(52)		
Total	50(100)	25(50)	25(50)		

Production status

Major rice seed varieties grown

Different types of rice varieties had been used by the farmers in the study area for the rice seed production. From the study it was found that Makwanpur (26%) was the dominant variety followed by Bahuguni-2(20%), Radha-4(32%), Hardinath-6(18%), Sworna-sub (14%) and Gorakhnath (4%). In Rajapur municipality, Radha-4(32%) is majorly produced followed by Sworna sub (20%), Bahuguni (16%), Makwanpur (16%) whereas in Geruwa, Makwanpur (36%) is most preferred which is followed by Bahuguni (24%), Hardinath (20%), Gorakhnath (8%) and Radha-4(4%).

(Gauchan et al., 2016b) also revealed that the dominant rice varieties involved in seed business in Nepal are Makwanpur-1, Radha-4, Ram Dhan, Swarna Sub-1, Khumal-4.

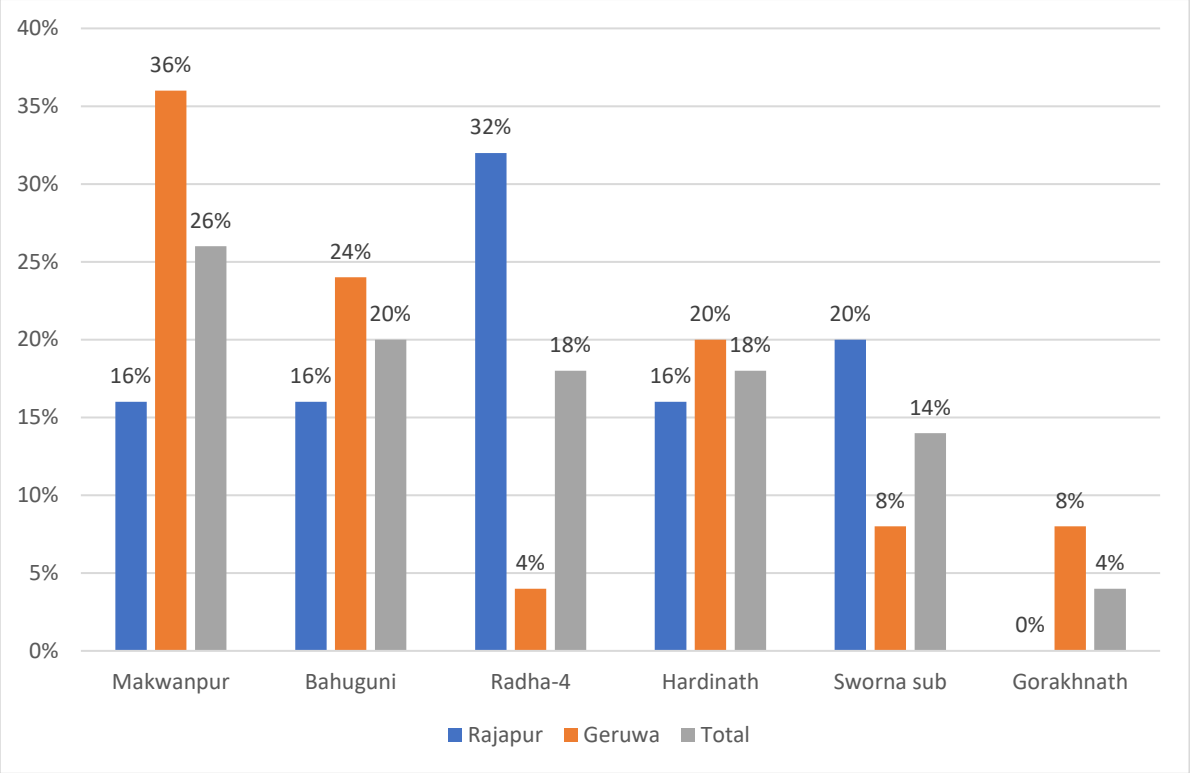

Figure 1: Major varieties produced in the research site

Perception on variety

The perception was categorized as Satisfied, unsatisfied and neutral. Out of 50 seed producers 60% were satisfied with their variety whereas only 1% were not satisfied. Similarly, In Rajapur 68% were satisfied, 32% being neutral whereas nobody was unsatisfied Whereas, in Geruwa 52% were satisfied, 44% neutral and only 4% were unsatisfied. However, there was no association between perception on the variety and local levels.

Table 4: Perception regarding adopted variety

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi2	p-value
Satisfied	30(60.00)	17(68.11)	13(52)	2.007	0.367
Neutral	19(38)	8(32)	11(44)		
unsatisfied	1(2)	0	1(4)		
Total	50(100)	25(50)	25(50)		

Type and source of seed

In Rajapur, seed company called Ganesh Baba agro seed company was dominant providing seed to the seed producers Therefore 79.17% seed was supplied by seed company. In Geruwa cooperatives were dominant providing 80% 0f seed whereas 4% was provided by seed companies. Similarly, Agro vet provided overall 4% seeds and Government Bodies Provided 5% seed Moreover, the test suggested source of seed and local levels were statistically significant at 1% level of significance. Regarding the type of seed, most of the farmers (74%) were using foundation seed as source and produced certified. Despite legal prohibition of production of breeder seed by farmers in Nepal, about 8% of the respondent were found using it as source for production of foundation seed. Similarly, Certified and improved seed were used by 3% and 6% respondent respectively. However, there was no association between type of seed used and local level.

Table 5: Type and Source of seed

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi-Square	p-value
Source					
Seed company	20(40.82)	19(79.17)	1(4)	37.39*	0
Cooperative	20(40.82)	0(0)	20(80)		
Agro vet	4(8.16)	3(12.50)	1(4)		
Government bodies	5(10.20	2(8.33)	3(12)		
Type					
Foundation seed	32(64)	18(72)	14(56)	0.53333	0.766
Certified	11(22)	5(20)	6(24)		
Improved	7(14)	2(8)	5(20)		
Total	50(100)	25(100)	25(100)		

Total Production and demand

The table no.9 shows the independent sample t-test conducted to compare the production of two municipalities. Overall average production was 44.64 quintal, with Rajapur showing a higher average of (51.20) quintal compared to Geruwa's (38.08) quintal. The mean difference was 13.12 quintal, but the result was not statistically significant (t=1.18, p=0.24), indicating that variation in seed production between the two municipalities were not strong enough to be considered significant. Despite this, Rajapur's contribution was noticeably higher than that of Geruwa rural municipality.

Moreover, the overall average demand for rice seed among farmers was found to be 44.64 kg. The average demand for the rice seed in Rajapur was 34.4 kg which was higher than the average demand of farmers in Geruwa (29.36 kg) however, the association between the demand and local levels was insignificant (t=0.65, p=0.51).

This shows as per the demand, the rice seed production in the study area was comparatively higher indicating that the local demand is easily fulfilled.

Table 6: Average rice seed production by seed producers and average demand by grain producers in the study area.

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Mean difference	t-value	p-value
Production (quintal)						
Rice seed production	44.64(39.34)	51.20(48.43)	38.08(26.92)	13.12	1.184	0.24
Demand(kg)						
Rice seed demand	32.4(32.46)	35.44(31.66)	29.36(33.61)	6.08	0.65	0.51

Contract agencies

Table no.10 shows chi-square, conducted to compare the contract agencies for rice seed producers in the study area. From the analysis it was found 50% of the population had contract with seed companies and 50% had contract with cooperatives. In Rajapur 100% producer have contract with seed company. Similarly, in Geruwa 100% population had contract with cooperative. This indicates dominance of seed company in Rajapur area and dominance of cooperatives in Geruwa rural municipality. The statistical data suggest there is an association between local levels and contract agencies at 1% level of significance.

Table 7: Contract agencies

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi-square	P-value
Seed company	25(50)	25(100)	0(0)	50***	0
Cooperatives	25(50)	0(0)	25(100)		
Total	50(100)	25(100)	25(100)		

Field inspection and inspection personnel

Out of 50 seed producers 100% of them had their field inspected by various personnel either government officials, seed company officials, co-operative officials and so on in both the municipalities.

Table no.11 shows chi-square conducted to compare the inspection personnel coming to inspect in the study area for seed production. From the table it was found that overall average, 26% of respondent assured that the field was inspected by seed company officials and cooperative officials both similarly, 22% of the respondent said the field was inspected by government officials and seed company officials both and finally 16% assured that the field was inspected by seed company officials and cooperative officials each.

In Rajapur area, 68% assured the field was inspected by seed company officials followed by Government officials and seed company officials both (32%).

In Geruwa area, 52% assured the field was inspected by seed company officials and cooperative officials both followed by cooperative officials (32%). The statistical data suggest that there is an association between inspection personnel and local levels at 1% level of significance.

Table 8: Field inspection personnel

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi-square	P-value
Seed company officials	18(16)	17(68)	1(4)	37.49***	0
Cooperative officials	8(16)	0(0)	8(32)		
Government officials and seed company officials both	11(22)	8(32)	3(12)		
Seed company officials and cooperative officials both	13(26)	0(0)	13(52)		
Total	50(100)	25(100)	25(100)		

Seed Replacement rate

The average seed replacement rate was much higher than the national average i.e. 62.26 %. The SRR of Rajapur (78.36%) was found to be higher than Geruwa (46.16%). Similarly, there was significant relationship between Seed replacement rate and local levels at 1 % level of significance. The higher seed replacement in the study area could be due to several factors. Better agriculture infrastructure such as irrigation facilities, regular availability and adoption of quality seed, additionally more effective agricultural extension services, favorable climatic conditions and better access to equipment, fertilizers further justify the higher SRR of the study area. Similarly, (Bhandari et al., 2021a) also reported higher Seed Replacement Rate (SRR) of rice in the PMAMP zone area than outside zone area.

Table 9: Seed Replacement Rate in study area.

Variable	overall	Rajapur (n=25)	Geruwa (n=25)	Mean difference	t-value	P-value
Seed replacement rate	62.26(51.38)	78.36(32.71)	46.16 (37.15)	32.2	3.25***	0.0021

Institutional support system

Input supply system

The overall average 90% of the respondent have regular supply of quality seed whereas only 10% complained for irregular supply therefore there is no significant relationship between the local levels and quality seed availability. The seed quality of the study area was also much better as over all 92% rated the quality as good and 8% rated as satisfactory and none of them rated the quality as poor. The statistical test suggests there is no significant relationship between quality of seed and local levels. Similarly, the

institutions providing quality seed were Seed company, cooperatives and agro vet. To the 48% of respondent quality seed was provided by seed companies and cooperatives each whereas only 4% of the respondent were supplied by agro vets. In Rajapur(88%) majority of seed producer were supported by seed companies for quality seed whereas in Geruwa(92%) majority of seed producer are given quality seed by cooperatives. The statistical test suggested there is significant (chi-square=38.83, p-value=0) relationship between Institutions and local levels at 1% level of significance.

The overall average 6% had regular supply of fertilizer and 94% had irregular supply of fertilizer. In Rajapur none of the respondent had regular supply of fertilizer whereas in Geruwa 12% had regular supply. There is significant relationship between fertilizer availability and local levels at 10% level of significance. Regarding the quality of fertilizer overall average 86% rated the quality as good and 14% rated as satisfactory and none of them rated as poor. The institution providing fertilizers are seed company and cooperatives. Overall average 96% were provided by cooperatives and 6% by seed companies. In both the municipalities majority of fertilizer was provided by cooperatives. The test suggested there was in –significant relationship between institution and local levels.

Regarding pesticide 100% of the respondent had regular supply of pesticide in the study area. Regarding the quality 90% of the respondent rated the quality as good,8% rated quality as satisfactory. And only 2% rated the quality as poor. There is insignificant relationship between the local levels and pesticide quality. The institution providing the pesticide are agro vet, seed companies ad cooperatives. Overall average 82% of the respondent were supplied pesticide by agro vets followed by cooperatives (16%) and seed companies (12%). There is insignificant relationship between the local levels and institutions.

Availability of equipment was found to be regular. The overall average 98% of the respondent had regular supply of equipment and only 2% had the irregular supply. There is no association between the local levels and equipment availability. Overall average 96% rated the equipment quality as good, 4% rated as satisfactory and none of them rated as bad. However, there is no association between the quality of equipment and local levels. The institution providing the equipment are cooperatives, seed company, custom hiring and super zone. In the study area majority of seed producers had their own (46%) equipment. Similarly, 18% of respondent did custom hiring, 14% had equipment from super zone and cooperative each and lastly, 8% had their equipment from seed company. In Rajapur(60%) and Geruwa(32%) majority of the producer had their own equipment and the test suggest there is an association between local levels and institution at 5% level of significance

Table 10: Input supply system

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi2	P-value
Quality seed availability					
Regular	27(54)	17(68)	10(40)	3.9452***	0.047
Irregular	23(46)	8(32)	15(60)		
Seed Quality					
Good	36(72)	21(84)	15(60)	3.5714*	0.059
Satisfactory	14(28)	4(16)	10(40)		
Bad	0(0)	0(0)	0(0)		
Institution					
Seed companies	24(48)	22(88)	2(8)	38.83***	0
Cooperatives	24(48)	1(4)	23(92)		
Agro vet	2(4)	2(8)	0(0)		
Fertilizer availability					

Regular	3(6)	0(0)	3(12)	3.19*	0.074
Irregular	47(94)	25(100)	22(88)		
Fertilizer quality					
Good	43(86)	21(84)	22(88)	0.16	0.68
Satisfactory	7(14)	4(16)	3(12)		
Bad	0(0)	0(0)	0(0)		
Institution					
Seed Company	3(6)	3(12)	0(0)	3.19**	0.07
Cooperative	47(94)	22(88)	25(100)		
Pesticide quality					
Good	45(90)	22(88)	23(92)	1.02	0.6
Satisfactory	4(8)	2(8)	2(8)		
Bad	1(2)	1(4)	0(0)		
Institution					
Agro vet	41(82)	20(80)	21(84)	1.02	0.5
Cooperative	8(16)	4(16)	4(16)		
Seed company	1(2)	1(4)	0(0)		
Equipment availability					
Regular	49(98)	25(100)	24(96)	1.02	0.312
Irregular	1(2)	0(0)	1(4)		
Equipment quality					
Good	48(96)	24(96)	24(96)	0	1
Satisfactory	2(4)	1(4)	1(4)		
Bad	0(0)	0(0)	0(0)		
Institution					
Cooperative	7(14)	2(8)	5(20)	9.7**	0.04
Seed company	4(8)	0(0)	4(16)		
Custom hiring	9(18)	3(12)	6(24)		
Own	23(46)	15(60)	8(32)		
Super zone	7(14)	5(20)	2(8)		
Total	50(100)	25(100)	25(100)		

Labor supply system

Table no.14 shows the labor supply system. The overall average 84% had irregular labor supply and only 16% had regular supply in the study area. The test suggested there is no association between local levels and labor availability. In case of accessibility 76% voted for difficulty to access labor similarly 18% had easy access and 6% had o access. The test suggested there is no association between local levels and labor accessibility. The statistical test suggested there was an association between local levels and institution at 5% level of significance.

Table 11: Labor supply system

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi2	P-value
Labor availability					
Regular	8(16)	5(20)	3(12)	0.59	0.44
Irregular	42(84)	20(80)	22(88)		
Labor accessibility					
Easy	9(18)	5(20)	4(16)	3.53	0.1
Difficult	38(76)	17(68)	21(84)		
No access	3(6)	3(12)	0(0)		
Total	50(100)	25(100)	25(100)		

Credit and subsidy supply system

The table no. 15 shows the credit and subsidy supply system. Regarding loan availability, the overall average 58% had regular supply of loan needed for seed production. In Rajapu(84%) loan availability was higher than Geruwa(32%). Only 16% complaint for irregular supply in Rajapur and 68% in

Geruwa. The statistical test suggested there was an association between local levels and loan availability at 1% level of significance.
The loan accessibility was found to be higher in Rajapur i.e.84% whereas only 32% had easy loan accessibility in Geruwa. In Rajapur 16% had difficulty to access loan and 24% had difficulty I loan accessibility. Similarly, in Geruwa 44% had no access to loan where as in Rajapur none of the respondent were devoid to loan accessibility. The statistical test suggested there was an association between local levels and loan accessibility at 1% level of significance.
The institutions providing loan were Banks, Cooperative, Farmers Group. Some of them also took loan from local money lenders. The overall average 38% were provided loan by cooperatives which was followed by Banks (32%), farmers group (20%) and local money (10%) lenders. The statistical test suggested there was no association between local levels and loan institution.

Table 2: Credit and subsidy supply system

Variable	Overall	Rajapur (n=25)	Geruwa (n=25)	Chi^2	P-value
loan availability					
Regular	29(58)	21(84)	8(32)	13.87***	0.001
Irregular	21(42)	4(16)	17(68)		
loan accessibility					
Easy	29(58)	21(84)	8(32)	17.22***	0
Difficult	10(20)	4(16)	6(24)		
No access	11(22)	0(0)	11(44)		
Institution					
Bank	16(32)	11(44)	5(20)	4.5	0.212
Cooperative	19(38)	9(36)	10(40)		
Farmer's group	10(20)	4(16)	6(24)		
Local money lenders	5(10)	1(4)	4(16)		
subsidy supply					
Yes	10(20)	4(16)	6(24)	0.5	0.48
No	40(80)	21(84)	19(76)		
Total	50(100)	25(100)	25(100)		

Seed production problem

Respondents' household were asked to rank seven problems related to rice seed production faced by them. The results of problem indexing were presented in the Table. As per the respondent's response, Insect pest was ranked first with the index value 0.88 which was followed by Disease with the index value of 0.77. Beside labor scarcity with index score of 0.69 ranked third. Fertilizer scarcity ranked fourth having index value 0.588 and least index score (0.25) was obtained for unavailability of preferred varieties. (Hollis, 2023) reported pest and diseases are a significant constraint in rice sector accounting up to 30% of yield loss.

Table 13: Constraints of rice seed production in the study area

Production problem	Index	Rank
Insect pest	0.888	I
Disease	0.6676	II
Labor shortage	0.6988	III
Fertilizer scarcity	0.5884	IV
Technical support	0.4564	V
Irrigation	0.3832	VI
Unavailability of Preferred varieties	0.2548	VII

CONCLUSION

The average rice seed production of the area was sufficient as per the demand This indicates, the seed produced fulfilled the demand of the area. The SRR of the area was found sufficiently higher than national average. Makwanpur was the dominant variety followed by Bahuguni-2. Lastly, Insect pest followed by labor unavailability, diseases, and timely unavailability of fertilizer were the major problems in seed production.

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