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RESEARCH ARTICLE

Problem Identification on Major Cereal Crops Production (A Case of Rupandehi, Nepal)

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ABSTRACT

A survey was conducted to identify problems on major cereal crop production in Rupandehi district. Three Village Development Committees (VDCs) were selected purposively from the district. Sample size of 60 as 20 from each VDCs was taken, and the survey was conducted with the face-to-face interview of the respondents. The collected data were analyzed through statistical package system. In descriptive statistics, frequency, mean, and standard deviation were used to analyze the data. The index value was used to identify the major problem of the major cereal crops. The major problems before the cultivation of cereal crops were found to be unavailability of hybrid seeds, weeds and grass problems, irrigation problems, labors and mechanization problems, and fertilizers and manures problems, etc. Different problems during cultivation of cereal crops were found to be irrigation problems, labor problems weeds, fertilizers, insects, pests, and disease. Similarly, the problems of storage house, storage insects, climate change, and weather condition and threshing problems, etc., were found to be the post-harvest problems in cereal crops cultivation.

Key words: Cultivation practice, major cereals, post-harvest problems

INTRODUCTION

Agriculture is the major source of the Nepalese economy which alone contributes about 33% of the Gross Domestic Product[1] and plays the lead role in the economic development of the country. In Nepal, agriculture plays the main role for the employment and livelihood where about 60.4% of the people are still engaged in agriculture and support most of the manufacturing and other service sectors.[1] Achieving higher economic growth rate in the context of Nepal is not possible without pushing agriculture growth. Agriculture sector provides market for a significant portion of industrial outputs. The increasing population pressure on available agriculture land, predominant subsistence agriculture with low income, decreasing productivity, and slow increase in production, not like green revolution are the main characteristics of Nepalese agriculture. Agriculture system in Nepal is still largely subsistence; it is gradually shifting from subsistence to commercial farming. Subsistence farming challenges to address the problem of livelihood security for the ever-increasing population of the country. In this subsistence farms, most of the commodities are consumed within farm household, and limited product is sold in the local market.[2] Cereal crops are the main stay of agriculture, with key cereal crops being rice, wheat, and maize. These three cereal crops occupy major share of cropped area in Nepal. Cereals in Nepal are also crucial from the food security point of view because they form stable diet of Nepalese population.[1] The lower productivity and sluggish growth of these three cereals have been major concerns from economic and poverty alleviation point of view.[3] To meet the new demands and supply of crop products

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for increasing population, increasing the crop production by identifying the major problems in cultivation of crops and solving them is essential.

MATERIALS AND METHODS

A study was carried out in Rupandehi district, Western development region of Nepal, because the district is popular for cereal crop production. Rupandehi is considered as one of the potential districts in agriculture producing a large amount of cereal grains that support agriculture commercialization. An explanatory research design was carried out to analyze effectiveness of problem identification in cereal crops cultivation. Both qualitative and quantitative data were used to access the effectiveness of study. Information such as priority of cereal crops cultivation and production and pre- and post-harvest problems were mainly collected through a structured survey questionnaire. The population for the study was made up of all the farmers in Rupandehi district. Farmers cultivating cereal crops in more than 0.5 hectare of land were generally selected. Three localities including Semlar, Manigram, and Paklihawa were selected for research purpose using random selection. A sample of farmers of 20 households from each locality by using simple random sampling technique was taken as the respondent of the research. Therefore, there were altogether 60 respondents in total.

The collected data through questionnaire were coded, tabulated, and analyzed using both descriptive tools such as mean, standard deviation, and percentage. The descriptive statistics was used to describe the respondents' socioeconomic characters such as sex, age, farm size, education, and knowledge level. The analysis was carried out with the help of a statistical package known as SPSS (Version 20.0) and MS-Excel programs. The score of each problem in cultivation of cereal crops was tabulated after analyzing the frequencies in SPSS data entry. The priority of problems according to frequencies was indexed using summated scales. In this scale, the respondent is asked to respond to each of the statement in several degrees, usually 5° of agree and disagreement. This degree constituted a scale. Each point on the scale carries a score, response indicating the least favorable degree is given the least score, and the most favorable is given the highest score. Likewise, the least favorable degree of problem was given the least score (0.25) and the most favorable degree of problem was given the highest score (1).

Following formula was used for indexing:

Index=Total value/total index

$$\sum_{n=1}^{4} fn * wn / tn * wn$$

Where,

"*f*" indicates frequency of problem, "*w*" indicates weight of problems, "*n*" indicates no of problems, and "*t*" indicates total sum of problems.

RESULT AND DISCUSSION

Study on socioeconomic status of farmers [Tables 1-3]

The farmers' socioeconomic characteristics included in this study were age, education, occupation, gender, landholding size, and family size. The education level of respondent farmers was categorized as

Table 1: Different socioeconomic attributes of farmers

Particulars	Attributes	Frequency
Sex	Male	48 (80.00)
	Female	12 (20.00)
	Total	60 (100.00)
Education	No schooling	8 (13.33)
	Primary	12 (20.00)
	Secondary	24 (40.00)
	Higher secondary	16 (26.67)
	Total	60 (100.00)
Secondary job	Yes	35 (58.30)
	No	25 (41.70)
	Total	60 (100.00)

Source: Survey, 2014

Table 2: Indexing the problems in rice before cultivation

Problems	Total value	Index
Seed	36.5	0.302
Soil fertility	26.25	0.217
Weed	14	0.116
Irrigation	32.75	0.271
Labor	11.5	0.095

Source: Survey, 2014

Table 3: Indexing the problems in wheat before cultivation

Problems	Total value	Index
Seed	27.25	0.241
Soil fertility	29.5	0.261
Weed	19	0.168
Irrigation	20	0.177
Late maturity of previous crop	17.25	0.153

Source: Survey, 2014

illiterate, i.e., no schooling, primary secondary, and higher secondary. Furthermore, the secondary source of job holding was recorded in the study. The sampled respondents were majorly male and few females. The education status among the samples was found in highest number of people who were studied secondary level followed by higher secondary and primary, and the lowest numbers of people were illiterate. Majority of people have next job to agriculture.

Problems before cultivation of rice [Tables 4-7]

The major problems before the cultivation of rice we have found from the research were unavailability of seed, irrigation, soil fertility, weeds, labor, etc. These problems caused the reduction in the production of rice. The following problems with their priority index were recorded after the research study.

The major problem revealed was seed (0.302) and the least problem revealed was labor (0.095).

Table 4: Indexing the problems in maize before cultivation

Problems	Total value	Index
Hybrid seeds	30	0.300
Irrigation	27.75	0.278
Low nutrient soil	26.25	0.263
Compost manure	10	0.100
Machinery and tools	6	0.060

Source: Survey, 2014

Table 5: Indexing the problems in rice during cultivation

Problems	Total value	Index
Irrigation	42	0.427
Fertilizer	5.5	0.056
Weed	20.75	0.211
Labor	28.5	0.290
Climate change	4.5	0.046

Source: Survey, 2014

Table 6: Indexing the insects in rice cultivation

Problems	Total value	Index
Gundhi bug	30.5	0.247
Stem borer	34.5	0.279
Grasshopper	31.75	0.257
Rice hispa	24.5	0.198
Field cricket	2.25	0.018

Source: Survey, 2014

Table 7: Indexing the disease in rice cultivation

Problems	Total value	Index
Khaira	38	0.321
Blight	32.5	0.274
Blast	30	0.253
Foot rot	15.25	0.129
Nematodes	2.75	0.023

Source: Survey, 2014

Problems before cultivation of wheat [Tables 8-10]

The problems before the cultivation of wheat according to the research we have found are soil fertility seed, irrigation, weed, and late maturity of the previous crops respectively. These activities resulted in a decrease of the result of the production of wheat. The various problems are listed with their priority index.

Major problem as soil fertility (0.261) was recorded; likewise, late maturity of the previous crop (0.153) was seen accordingly.

Problems before the cultivation of maize

The problems before the cultivation of maize recorded in the research are listed as hybrid seeds, irrigation, low nutrient soil, compost manure, and machinery and tools which resulted the decrease in the yield of the maize.

The major problem recorded after the research is the availability of the hybrid seeds (0.300) and machinery and tools (0.060) were recorded as the least.

Table 8: Indexing the problems during wheat cultivation

Problems	Total value	Index
Irrigation	35.75	0.386
Climate change	25.75	0.278
Weeds	18.25	0.197
Fertilizers	12.5	0.135

Source: Survey, 2014

Table 9: Indexing the insects in wheat cultivation

Problems	Total value	Index
Stem borers	29	0.239
Aphids	32.5	0.268
Worms	25.25	0.208
Parrot	28.75	0.237
Rat	5.75	0.047

Source: Survey, 2014

Table 10: Indexing the problems in maize cultivation

Problems	Total value	Index
Weeds	29.5	0.273
Labour	23.5	0.218
Irrigation	35	0.324
Climate change	12	0.111
Manures	1	0.009

Source: Survey, 2014

Problems in rice during cultivation

After the research, different problems we have found during the cultivation of rice were irrigation, labors, weeds and grasses in the crop field, fertilizer, and climate changes. We have prioritized the problems in the respective index during the research.
Irrigation (0.427) was seen as a major problem and climate change (0.046) as the least followed by labor, weed, and fertilizer, respectively.

Insects in the rice cultivation practice

We have found that the different insects attack on the rice were recorded as gundhi bug, stem borer, grasshopper, rice hispa, and field cricket, and we have calculated the index value according to the data obtained from the respondents.
Major field problem was stem borer (0.279) in the rice, and field cricket (0.018) as the least.

Disease and pest in the rice cultivation [Tables 11,12]

We observed that the different diseases were recorded as Khaira, leaf blight, blast, foot rot, and nematodes as pest in rice. The indexing of the observed disease was shown in the table with their prioritization.
The major disease recorded after the research was Khaira (0.321), and nematodes (0.023) were among the least.

Problems during wheat cultivation

The problems in the wheat cultivation were recorded as irrigation, climate change, weeds, and fertilizers from the respondents. The indexing of the problems was analyzed and tabulated.
The major problem during the wheat cultivation was irrigation (0.386), and fertilizers (0.135) were among the least.

Insects in wheat cultivation [Tables 13-15]

The insects and pest in the wheat were recorded as stem borer, aphids, worms, parrot, and rat. These pests result in the considerable damage in the yield of wheat. We have indexed the problem insect parameters of the wheat cultivation.
The major insect causing yield reduction is obtained as aphid (0.268), and rat (0.047) is observed as among the least.

Disease in wheat cultivation

The disease causing damage on wheat production was found loose smut, leaf blight, spot blotch, and

Table 11: Indexing the insects in maize cultivation

Problems	Total value	Index
Stem borer	36.5	0.287
Worms	21.25	0.167
White grub	35.25	0.278
Parrot	26.5	0.209
Grasshopper	7.5	0.059

Source: Survey, 2014

Table 12: Indexing the disease in maize cultivation

Problems	Total value	Index
Stalk rot	45.75	0.365
Ear rot	25.25	0.201
Leaf blight	24.25	0.193
Smut	21	0.167
Downy mildew	9.25	0.074

Source: Survey, 2014

Table 13: Indexing the post-harvest problems in rice cultivation

Problems	Total value	Index
Storage insects	36	0.283
Threshing	30.5	0.240
Uneven rainfall	20.5	0.161
Rodents, mice	20	0.157
Store house	10	0.079

Source: Survey, 2014

Table 14: Indexing the post harvest problems in wheat cultivation

Problems	Total value	Index
Uncertain rainfall	31.75	0.293
Threshing	26.75	0.247
Rodents	15.5	0.143
Storage insects	20.5	0.189
Weevils	14	0.129

Source: Survey, 2014

Table 15: Indexing the post-harvest problems in maize cultivation

Problems	Total value	Index
Storage insect	28.75	0.255
Storage house	24	0.213
Threshing	15.25	0.135
Strom, winds	18.75	0.166
Weevils	26	0.231

Source: Survey, 2014

Table 16: Indexing the disease in wheat cultivation

Problems	Total value	Index
Loose smut	33.5	0.276
Blight	25.25	0.208
Spot blotch	25.25	0.208
Powdery mildew	21.25	0.175
Tan spot	16	0.132

Source: Survey, 2014

tan spot. The diseases of the wheat are prioritized and are listed in the form of Table 16.
The above tables reveal that loose smut (0.276) is a major problem in the sample and tan spot (0.132) is among the least.

Problems in maize cultivation

The major problems during the cultivation of maize according to the above table mention irrigation, weed, labor, climate change, and manures.
The major problem identified is irrigation (0.324) and manure (0.009) is among the minors.

Insects in maize cultivation

The problems identified in the maize cultivation were stem borer, white grub, parrot, worms, and grasshopper. We found major as stem borer (0.287) and minor as grasshopper (0.059) among both of them.

Disease in maize cultivation

The disease causing damage in maize is stalk rot, ear rot, leaf blight, smut, and downy mildew.
Above table reveals that downy mildew (0.074) is the minor problem and the stalk rot (0.365) is the major problem.

Post harvest problems in rice cultivation

The different post-harvest problems of rice cultivation were storage insect's weevils, threshing problems, uneven rainfall, rodents, and storage house.
The major problem recorded as storage insects (0.283) and store house (0.079) availability as among the least.

Post-harvest problems in wheat cultivation

The different post-harvest problems by the research study of wheat cultivation were uncertain rainfall, threshing problems, rodent, and weevil.
The above table reveals that uncertain rainfall (0.293) is the major problem and rodents (0.143) are the minor.

Post-harvest problems in maize cultivation

The different post-harvest problems of maize cultivation were storage insects, storage house, storms and winds, weevils, and threshing.
From the above table, we can conclude that storage insects (0.255) are the major problem in the maize cultivation and threshing (0.135) is the minor problem in the cultivation practice.

SUMMARY AND CONCLUSION

The major problems before the cultivation of cereal crops were found to be unavailability of hybrid seeds, weeds and grass problems, irrigation problems, labors and mechanization problems, and fertilizers and manures problems, etc. Different problems during cultivation of cereal crops were found to be irrigation problems, labor problems weeds, fertilizers, insects, pests, and disease.
Similarly, the problems of storage house, storage insects, climate change, and weather condition and threshing problems, etc., were found to be the post-harvest problems in cereal crops cultivation. At last, the expensive mechanization over small landholding was creating the problems in adoption of new technology in farmer field. The study of the problem identification in cultivation of major cereal crops was effective because the production of these cereals was subsequently reducing due to different cultivation problems. Thereby, the study was helpful for the enrichment of the productivity of the cereal crops in the district. Farmers who were cultivating the cereal crops pointed out the different core problems, before, during, and after the cultivation of major cereal crops which have made the study further flexible in solving the problem for the better farming.

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