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Study on Relationship of Socioeconomic Factors of Citrus Growers in Lamjung, Nepal

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Abstract

Production and productivity of citrus has been decreased drastically in last few years in Nepal as well as in Lamjung district. The national production of citrus and productive area was 263,710Mt and 23,607 ha respectively in 2010/11 while that of 216,188Mt and 23,645ha in 2012/13. Similarly, the productive area and production of citrus in Lamjung was 1,542 ha and 16,893Mt in 2011/12 respectively while it was 578 ha and 4,657 Mt in 2015/16. Thus, this study aimed at analyzing the socioeconomic factors affecting citrus production by investigating major variables such as the total area under citrus cultivation, cropping pattern, literacy of household head, irrigation, pesticides, subsidies, and production related problems. With the selection of 50 farmers purposively, the household survey was conducted with semi-structured questionnaires in Tarkughat, Chandreshwor, Bhooteodar, Chitti and Duradanda VDCs and interview schedule was conducted during January- February 2016. The result revealed that 24% of the total area was under sole cropping pattern while remaining area was under mixed cropping with coffee and vegetables. Mandarin spp. was found to be exclusively cultivated among citrus. 53% of the total area under citrus cultivation was managed by grower having the literacy equivalent to secondary level or below. 88% of the variability of independent variables (number of plant giving fruits, total number of citrus plant, irrigation, pesticides, production-related problems, area under citrus) had a significant effect on citrus production while 12% of the variability had a random effect on the production at 5% level of significance. The mean production was found to be 18.84 quintals in 2012 while that of 10.35 quintals in 2016. This variation on citrus production was found due to various production related problems. 73% of the total area under citrus had been suffered by greening disease while 26% of the area was suffered by both input management problem and citrus greening resulting into a dead citrus plants. Thus, this drastic decreased in production caused the decline in production and cessation of citrus marketing in Lamjung. Through this survey, it was concluded that citrus production has been decreasing drastically in present years mainly due to citrus greening disease, different orchard managemental problems and other socio-economic factors adversely affecting the marketing. This has been limiting the source of income of farmers of Lamjung.

Keywords: Greening; Mandarin; Marketing; Orchard; Variables

Introduction

Citrus fruit covers large range of fruits of family Rutaceae. The three most important species on citriculture in Nepal are mandarin (*Citrus reticulata*), sweet orange (*Citrus sinensis*) and Acid lime (*Citrus aurantifolia*). Citrus fruits are cultivated all over the world in tropical and sub-tropical region where there is suitable soil and climatic condition. In Nepal, the climatic condition of mid-hill regions having altitude range of 800m to 1400 m from east to west of the country are considered favorable for all types of citrus cultivation. The commercial cultivation of citrus in Nepal started only after 1970 (NCRP 2010). At present major citrus producing district of Nepal are Illam, Panchthar, Terathum, Dhankuta, Bhojpur, Sindhuli, Ramechhap, Kavre, Dhading, Gorkha, Lamjung, Tanahun, Kaski, Shayanja, Gulmi, Arghakhanchi, Dailakh, Dadeldhura, Baitadi and Darchula. In mid-hills, citrus was considered as one of the dominating fruits and grown across the country in marginal land and terraces. Among citrus, majority of farmers are practising cultivation of Mandarin only. Lamjung, the mid-hill district of western development region is the one of the important mandarin orange growing area of Nepal. The total

area, productive area, and production in Lamjung district were 1,221 ha, 900 ha and 10,956 Mt during the year 2009/10 (MOAC 2010). About 34 thousand ha of land was covered by citrus, which accounts about 32 % of the total fruit area of the country (MOAC 2010). Total area under citrus cultivation was 24,284 ha in 2012 (MOAD 2013). In spite of great potentiality of citrus production in terms of climate and soil, production and area of citrus in Lamjung district is gradually decreasing year by year. Share of citrus production of Lamjung to national production was 6.4% & 3.46% in 2010/11 & 2012/13 respectively. In 2012, the productive area and production of citrus in Lamjung was 1,542 ha and 16,893Mt respectively while in 2016 is 578 ha and 4,657 Mt. (DADO 2016). Citrus decline is major reason behind the decreasing rate of citrus area and production in Lamjung. Citrus decline in Kaski, Lamjung, Gorkha, Syangja and Tanahu are mainly caused by this greening disease and it is spreading very fast and posing a great threat to citrus orchards (Regmi and Yadav 2007). This research is designed to analyze the citrus decline problem, various socioeconomic factors and its impact on marketed products of citrus fruit as well as income due to citrus fruits. The broad objective of this research is to study the relationship

of various socio-economic factors in citrus growers of Lamjung while the specific objectives are to describe current situation of citrus farmers in respect to production and marketing related variables as well as to analyze the relationship of various factors on citrus production and marketing. Null hypothesis was various socioeconomic variables donot have any effect on citrus production.

Methodology

Research design

Study used survey research design in order to collect information from primary respondents.

Selection of research site

The research was conducted in Lamjung district of Nepal, which was considered as potential area of citrus production in terms of area and production. Major five VDCs of Lamjung district namely Chiti, Tarkughat, Chandreshwor, Duradandha and Bhoteoodar were purposively selected as these VDCs were citrus pocket area, as identified from District Agriculture Development Office (DADO 2015) (Fig. 1).

Sampling procedure and sample size

Study used purposive sampling technique in order to conduct household survey. The list of citrus growers was prepared with the help of DADO office staffs and key informants. Altogether 50 respondents i.e. 6 from Tarkughat, 10 from Bhoteoodar, 13 from Chiti, 11 from Duradadha and 10 from Chandreshwor VDC were selected for sample study.

Types of data

Study used primary and secondary data and information. Primary data were collected through the households survey of citrus growers in different VDCs of Lamjung. The information like production situation, marketing system, manegerial system, problems related to production and marketing were collected from citrus growers by means of semi-structured questionnaires. Pre-testing was done with 3 non-respondents nearby study area. The suggestions given during pre-testing was incorporated to finalize questionnaire. Survey was conducted in the month of Janauary to February 2016. Interview time was fixed as per the farmer's convenience. Secondary data such as geographical condition, present status of citrus cultivation in Lamjung, available infrastructures were collected through desk study of the publication of the DADO Lamjung, MOAD, published and unpublished thesis.

Technique of Data tabulation and analysis

Collected data and information were coded in order to quantify qualitative information and conditions. For example, socioeconomic variables like education, irrigation, subsidy, use of pesticides and types of problems were coded as per requirement of ordinary, ratio and nominal scale under SPSS 16 data sheet. Tools like mean, standard deviation, percentage, graphical presentation, correlation and multiple regression were used for data analysis and interpretation.

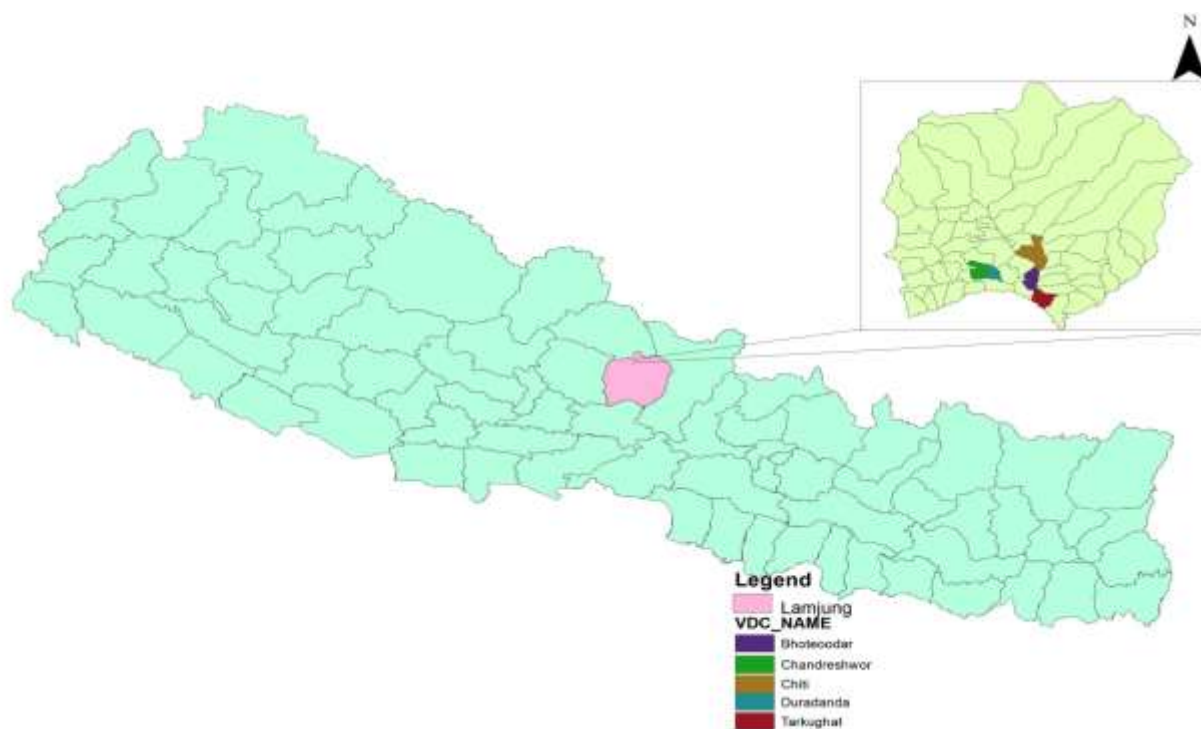


Fig. 1: Map showing research area in Lamjung district

Equation (1), mentioned below explains the multiple regression model.

$$Y_i = \hat{\beta}_0 + \hat{\beta}_1 \chi_{1i} + \hat{\beta}_2 \chi_{2i} + \hat{\beta}_3 \chi_{3i} + \hat{\beta}_4 \chi_{4i} + \hat{\beta}_5 \chi_{5i} + \hat{\beta}_6 \chi_{6i} + e_i \text{-----(1)}$$

Where, Y_i =citrus production (dependent variable)

$\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3, \hat{\beta}_4, \hat{\beta}_5$ & $\hat{\beta}_6$ = slope factors

χ_{1i} = no. of plants giving fruits

χ_{2i} = total no. of citrus plants

χ_{3i} = total area under citrus

χ_{4i} = irrigation

χ_{5i} = use of pesticides

χ_{6i} = production related problems

e_i = error value

Result and Discussion

Status of production related socio-economic variables

As per the study, it was observed that majority of farmers i.e. 48% of household head of citrus growers had taken formal education below secondary level. Majority of farmers i.e. 68% claimed citrus greening as major production related problems resulting into citrus decline. Farmers were practising citrus cultivation under the land size of 0.25 to 5 ropani i.e. 68% which implies that majority of farmers were of small land holdings. 74% of farmers were practising mixed cropping of citrus with other crops like vegetables and coffee.

Status of marketing related socio-economic variables

Mode of selling: Most of the production that is 96% was sold through farm gate by contractors, collectors and consumers while 4% was sold through market centre (2%) and collection centre (2%). pre-harvest contract and petty collectors (doke) are the important source which collects mandarin orange from production sites. (Shrestha et al.1998).

Marketing channel: Majority of market channel found on citrus marketing of Lamjung district was producers-collectors-wholesalers-retailers- consumers and producers-retailers-consumers. Dhakal et al. (2005) found same types of marketing channel in the market survey of acid lime and hill lemon in Nepal.

Relationship between different socio-economic factors

Effect of literacy of household head on area of citrus production

The study revealed that 53% of total citrus cultivation area was managed by grower of education status equivalent to secondary or below secondary level. Very low area i.e. 15% was under the household head with literacy level above secondary level. This may be due to involvement and migration of people with higher education in other sectors than agriculture. Above secondary level implies above SLC. ment and migration of people with higher education in other

sectors than agriculture. Above secondary level implies above SLC (Fig. 2).

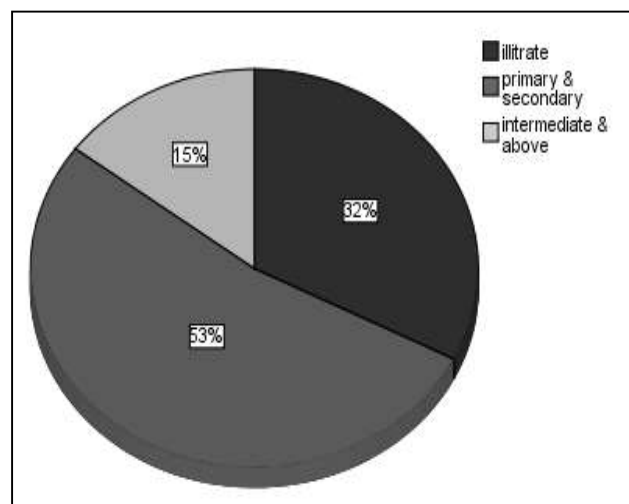


Fig. 2: Effect of literacy of HH head of citrus grower on total area of citrus production

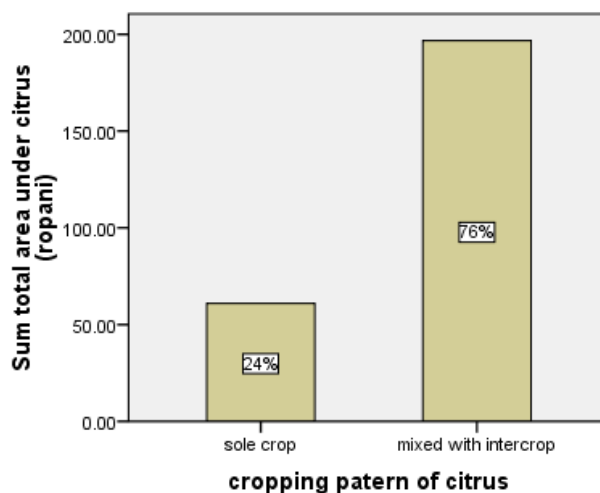


Fig. 3: Effect of cropping pattern on area of citrus production

Effect of cropping pattern on total area under citrus cultivation

Result showed that 76% area of respondents was under the mixed cropping with ginger, coffee and vegetables while remaining portion was covered by sole citrus (Fig. 3).

Effect of production related problems on study area

Result showed that 73% of area was governed by sole citrus greening problems. It was observed that majority of citrus growers were severely affected by citrus greening on their citrus orchard. Although citrus greening disease has been spread throughout Nepal, it is reported to be severe in the western development region (NARDF 2010).

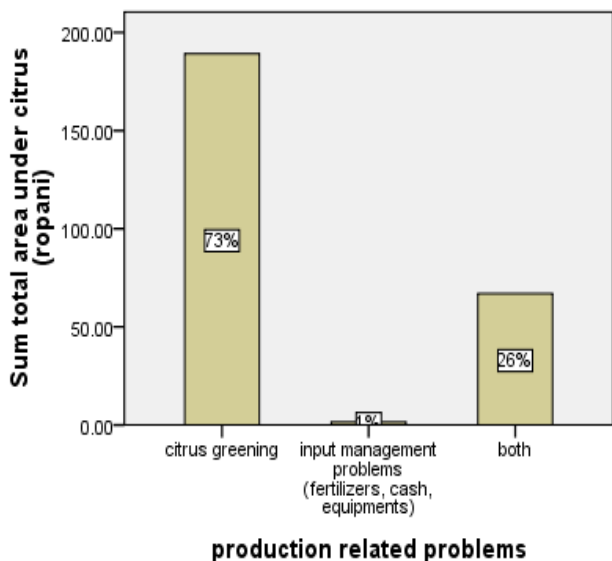


Fig. 4: Effect of production related problems on citrus production area

Analysis on effect of different factors on citrus production

Independent variables were number of citrus fruit giving plants, total number of citrus plant, irrigation, use of pesticides, production related problems and total area under citrus crop while dependent variable was citrus production of 2015/16. By the help of multiple regression it was found $R^2=0.883$ which implies that 88% of the variability of the independent variables is explained by the model meaning that rest 12% variability in the yield had random effect. Correlation($R=0.94$) implies that chosen independent variables had significant effect on yield. The probability value was 0.00 which is highly significant at 0.05 level. Hence, null hypothesis was rejected. This value signifies that independent variables were statistically significant for the variation on citrus production (Table 1).

As per Table 1, it can be observed that no. of plants giving fruits had significant effect on production of citrus ($p=0.00$). Slope factor 0.145 implies that increase in 1 fruit giving plants has yield effect by 0.145. While other variables did not have individual statistical significant effect on production. This implies that other variables were statistically correlated with each others. Positive effect of

no. of plants giving fruits, total no. of citrus plants, irrigation to citrus plants and use of pesticides had been observed on citrus production. In contrast, negative effect of production related problems and area on production had been observed. Slope factor -2.180 implies that increase in 1 ropani land had negative yield effect by 2.180. This explained that citrus production was less in larger area. This is due to infection of larger orchard by citrus greening disease more severely resulting into larger no. of dead plants and unproductive plants.

Table 1: Effect of different factors on citrus production, 2016

S.N.	Predictors	Slope factor (B)	t-value
1	No. of plant giving fruits	0.145	5.038**
2	Total no. of citrus plant	0.34	1.053
3	Total area under citrus	-2.180	1.470
4	Irrigation	3.106	0.878
5	Use of pesticides	1.358	-1.277
6	Production related problems	-1.375	-0.654

Regression model:

$$Y_i = -2.930 + 0.145\chi_{1i} + e_i \text{ -----(2)}$$

Comparison of citrus production in 2011/12 and 2015/16

This drastic decrease in mean production of citrus i.e. from 18.84 quintal to 10.35 quintal 5 years earlier and that in present year had been observed. Reason behind this may be due to occurrence of different production related problems and other socio-economic factors. From the survey it was found that with the passage of time, citrus greening and other disease problems has been occurring severely and adversely affecting the citrus production (Fig. 5 & 6).

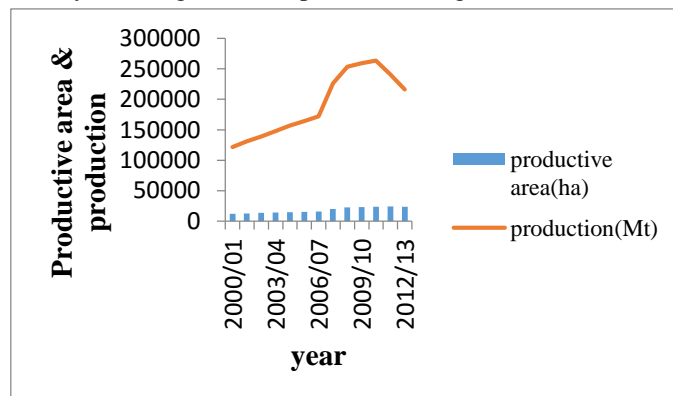


Fig. 5: National trend of citrus productive area and production (MOAD 2014)

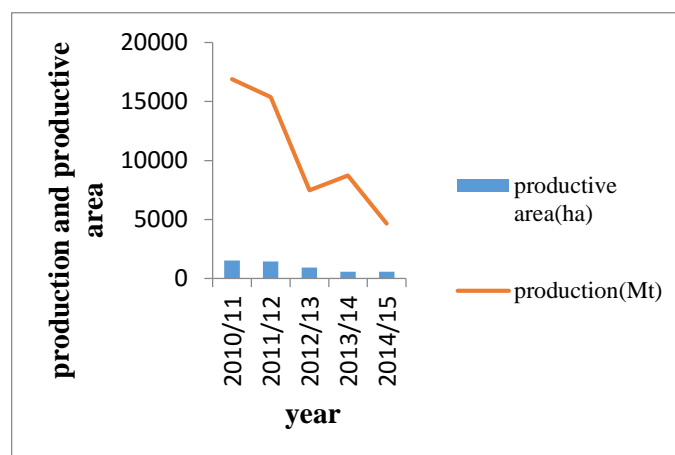


Fig. 6: Trend of citrus productive area and production of Lamjung (DADO 2016)

Conclusion

Lamjung district was considered as potential production area of citrus due to soil and climatic condition. However, production has been drastically decreased in recent years due to effect of different socio-economic variables such as literacy of citrus growers, total area under citrus cultivation, irrigation, pesticides, subsidy and production related problems. 88% of variability of independent variables (number of plant giving fruits, total number of citrus plant, irrigation, pesticides, production related problems, area under citrus) had significant effect on citrus production while 12% of variability had random effect on production under significance level of 0.05. The mean citrus yield was 18.84 qt in 2011/12 and that of 10.35 qt in 2015/16. The reason behind it was lack of adequate irrigation facility and pesticides, low technical knowhow, involvement of farmer with lower education status, other input management problems and occurrence of citrus greening as well as other diseases like pink disease on citrus orchard. 68% of farmer claimed that major problem as citrus greening on citrus orchard resulting into number of dead and unproductive citrus plants. 73% of total citrus cultivated area was affected by citrus greening virus. Due to this reason, the marketing of citrus products has been decreasing. This resulted into decrease in economic income of farmers who were solely dependent on citrus.

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