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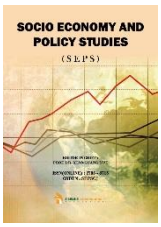


RESEARCH ARTICLE

# ASSESSMENT OF SOCIO-ECONOMIC CHARACTERISTICS OF VEGETABLE GROWERS IN PALPA, NEPAL

**Shreeya Nepali*, Jyoti Kumari Chaudhary, Roji Dura, Nayanta Subedi**

*Agriculture and Forestry University, Rampur, Chitwan, Nepal Valley Krishi Campus, Chapagaun, Lalitpur*
**Corresponding Author e-mail: shreeyanepali@gmail.com*



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**ABSTRACT**

The study was conducted from February to July 2023. This study aims to find out the socio-economic characteristics of farmers involved in vegetable cultivation in Palpa, Nepal. The specific objectives of the study were identifying the socio-demographic character of farmers, profitability of vegetable farming, study the perception of farmers towards increasing yield and technical services received and assess the problems associated with vegetable farming. A semi-structured interview schedule was designed for the vegetable growers. The survey was conducted by face-to-face method. Data were collected from primary and secondary sources. Primary data was collected through field survey, KII, whereas secondary data was collected through published journals, research articles, annual reports of PMAMP, AKC and government organizations. Information collected from the different sources was coded, analyzed, and tabulated using SPSS, MS-Excel, and descriptive statistics. The gross revenue, net revenue, BC ratio was found highest. According to survey the most important problem on cultivation was disease and insect followed by the problem of irrigation facilities, quality of seed materials, technical knowledge and training and lastly labor facilities. Also, the major problem in marketing was unsatisfactory price followed by no access to market, lack of technical knowledge about post-harvest loss, transportation and storage facilities. Farmers of Palpa has the strong perception on increasing yield and income after the implementation of the project.

**KEYWORDS**

Socio-Economic, Vegetable growers, Benefit cost ratio, post- harvest loss

## 1. INTRODUCTION

Nepal is an agrarian country with more than 65% of its population engaged in agriculture (MoAD, 2015). The main source of Gross Domestic Product (GDP), income and employment opportunities in Nepal is agriculture as it is the backbone of national economy and means of livelihood for majority of population (Shrestha, 2015). It provides employment opportunities and contributes about 27 percent in the GDP (MOALD, 2023).

The history of development of vegetables in Nepal dates back in early forties; however, its rapid development was started from 1972 when Vegetable Development Directorate (VDD) was established in the Department of Agriculture (Awasthi, 2003). There were 3,243,521 vegetables holding reported in Nepal. The total production of vegetable crops turned out to be 2,820,527 metric tons (Mt where total household consumption contributes 1,100,710Mt (CBS, 2010). Currently ADS project has 2776 pockets, 366 blocks, 106 zones and 16 super zones throughout the country. Mainly the zone and super zones development program is being implemented by 75 Project Implementation Unit (PIU) across the country. PMAMP is implementing web-based Agriculture Result Monitoring Information System (ARMIS) so that every data and information can be captured from the problematic areas (PMAMP, 2023). Nepalese agriculture is dominated by small farmers that constitute the majority of the country's poor population (Joshi et al., 2010). Thus, the agriculture sector in Nepal is thereby characterized by low productivity both in terms of labour and land (Khanal et al., 2020).

The term "vegetable" mostly refers to the soft, edible shoots, leaves, fruits, and roots of plants that are consumed in very modest amounts and can be eaten whole or in part, raw or cooked, as a supplement to starchy foods and meats (Awasthi, 2007). Vegetables are integral parts of a balanced diet that supply the majority of vitamins, protein and various micronutrients (Schreinemachers et al., 2018). Nepalese people have increased the consumption of vegetables in recent years but still most of the regular diet of the people is rice (ADB, 2019) According to standards set by dieticians and nutritionists, the minimum per capita per say requirement of vegetables is 300 grams(gm) (USAID, 2011).

Palpa district lies in the mid-hill region at an altitude ranging from about 157 meters above the sea level. It lies at about latitude 27°C34' - 27°C57' North and longitude 83°C15'- 84°C22', that covers an area of 1,366km$^2$. This district has climatic variation as it includes tropical areas and sub-tropical areas. The district's average maximum and lowest temperatures are 23°C and 14°C, respectively. This district mostly cultivates major cereals, grain legumes, oilseed crops, seasonal and off-season vegetables. Similar to this, crops of fruits are planted, including citrus, bananas, litchi, mangoes, etc. In addition, other spices that are grown include coriander, ginger, turmeric, onion, garlic, and chili (Republica, 2022). Out of total cultivated land only 37.6% land is irrigated, out of which 32.4% is seasonally irrigated or rainfed and only 5.2% is artificially irrigated all year round (PMAMP, 2023). In Palpa, the majority of farmers cultivate vegetables. With a yield of 16.12 Mt/ha, the vegetable zone in Palpa district, where PMAMP has started, was measured to be 2,901 ha and 33,705 Mt, respectively (MOALD, 2022).

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## 2. METHODOLOGY

### 2.1 Study Area

The survey was carried out in the vegetable zone of the Palpa district. It is the part of Lumbini province. Tansen municipality, Tinau rural municipality and Bagnashkali rural municipality were selected purposefully as a study site based on the level of production, access to road facilities, number of vegetables growing farmers. These sites are leading areas for the vegetable production in the district and has been declared vegetable zone under PMAMP. The map of Palpa districts showing the study area is presented in the Figure 1.

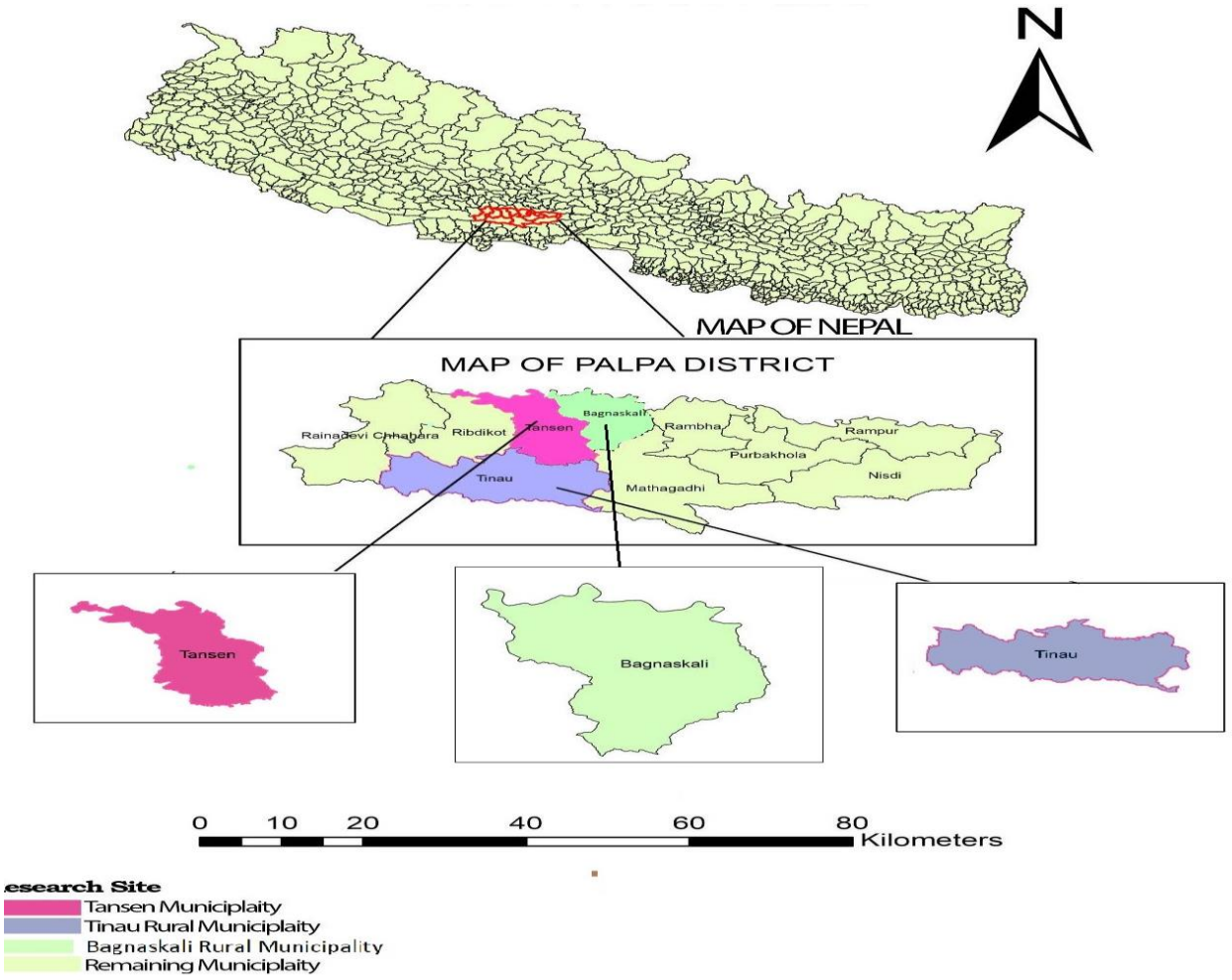



**Figure 1**: Map of Nepal showing Palpa district as research site, 2023

### 2.2 Sampling site and Sampling procedure

Vegetable growers of the study site are the target population for the study. A list of all the vegetable growers is the sampling frame. A total of samples 125 sample was taken among them 35 from Tansen municipality, 30 from Tinau municipality, 30 from Bagnashkali municipality and 30 from non pmamp farmers (to compare the economic status). The sampling technique used was purposive sampling technique.

### 2.3 Sources of data

The study belongs exploratory type, various sources and techniques of gathering information was used. The study contains primary and secondary data.

#### *2.3.1 Primary Data*

The primary data was collected from the farmers of respective site by developing the questionnaire, key informants, farm visit and personal communication etc. Both the subjective and objectives types of questionnaires were prepared for primary data collection.

#### *2.3.2 Secondary Data*

The secondary sources of information were collected from

- Annual report of Zone office, Program Implementation Unit, Palpa.
- Previous survey recommendations
- Publications of Nepal Agriculture Research Council (NARC), Gyan Kendra, PMAMP.
- Journals

The collected quantitative and quantitative data was analyzed by using tools like Microsoft Excel (MS-Excel) and Statistical Package for Social Science (SPSS) and final report was submitted to Agriculture and Forestry University (AFU), Rampur, Chitwan.

### 2.4 Data analysis techniques

MS-Excel and SPSS (Version-25) was used for the data analysis. Demographic and economic characteristics of the sample was described using the descriptive statistics. One-way ANOVA was used for mean comparison.

### 2.5 Indexing

Indexing is the method of ranking different factors on index value or weight assigned to different ranks. Problems related to vegetable production and marketing were ranked by the use of the index. To construct the index, the scaling technique, which provides the direction and extremity attitude of the respondents towards any prepositions, was used. The intensity of production and marketing problems being faced by the vegetable growers were identified by using 5 point scaling technique, comparing most serious, serious, moderately serious, a little bit, and least serious with scales values of 1, 0.8, 0.6, 0.4, and 0.2, respectively, indicating the severity of problems.

The value was calculated as, Index(I)=$\sum (S_i F_i/N)$

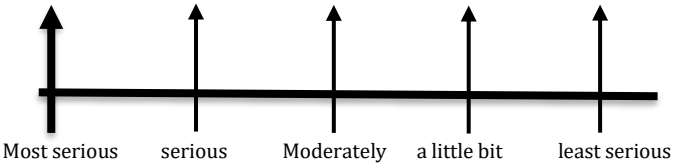
Where, I=index value for intensity of problem

$\sum$= summation

$S_i$= scale value at $i^{th}$ priority

$F_i$= frequency of $i^{th}$ priority

N= total number of respondents




## 3. Results And Discussion

### 3.1 Socio-demographic and Farm Characteristic

The socio-demographic and farm characteristics was used for descriptive analysis of the study areas and study populations. Different variables like family size, ethnicity, land holding, was analyzed by using descriptive statistical tools such as percentage (%), mode, means et cetera (etc.).

Male responders made up 57% of the total. This demonstrates that men predominate in the research area's families, where men perform a variety of farm tasks. Women know less about farming operations and financial conditions (Chhetri et al., 2021). Majority (50%) of respondents were Brahmin followed by Chhetri, Janjati and Dalit with 30%, 17% and 3% respectively. In the study area, majority of the respondent's major occupation was agriculture (69%), followed by government service (11%), private business and others holding 10% each. The education status of the respondents was 40% with primary education and 15% of them were illiterate. Age of the respondents on an average was found to be 46.95. The economically active members between the age group (15-60) years were on an average of 3.15 were found similar to (Paudel et al., 2021). It was evident that (42.23) years of experience farmers had on cultivation of vegetable. Our study indicated that amongst 125 respondents shows that majority of the respondents in the study area were cultivate the improved variety i.e. (84%) and (16%) of the respondents cultivate local variety of vegetable. On an average 7.53 of farmers started commercial vegetable farming. It was found that average area under vegetable cultivation was 6.58 ha. LSU was found to be 3.55 (Bajracharya et al., 2006), (Neupane et al., 2019) . According to respondents, major vegetables grown in Palpa are Tomato, cucumber, cabbage, cauliflower, beans etc. (Chhetri et al., 2021).

Regarding institutional characteristics of the sampled household, it was found that 71 percent of the household had access to loan (table 1). The source of their loan facility was described to be cooperatives, microfinance and banks. In the same way 52 percent had access to training regarding different agricultural practices from PMAMP and others organizations. Also, regarding the marketing process of the harvested vegetable 30 percent of the people claimed that they had got helped from PMAMP and other 70 percent sold their produced through middleman and some of them by own self. Moreover, 74 percent of the people are thinking to expand vegetable cultivation area.

**Table 1:** Institutional characteristics of the sampled households of Palpa, 2023

| Variables | Category | Frequency | Percentage |
|---|---|---|---|
| Access to loan | Yes | 89 | 71 |
| | No | 36 | 29 |
| Access to training | Yes | 65 | 52 |
| | No | 60 | 48 |
| Received help for marketing | Yes | 37 | 30 |
| | No | 88 | 70 |
| Thinking to expand vegetable cultivation area | Yes | 93 | 74 |
| | No | 32 | 26 |

### 3.2 Purpose of vegetable production

Our study indicated that among 125 respondents shows that majority of the respondents in the study area cultivated vegetable for commercial purpose (44%) followed by household use (17.6%), sold in small quantity (11.2%) and all of the above and seed production (13.6%) each. This also indicates that most of the fresh vegetable to Butwal market were transported from Palpa (table 2).

**Table 2:** Purpose of vegetable production of respondents in Palpa, 2023

| Vegetable grown purpose | Frequency | Percentage |
|---|---|---|
| Household purpose | 22 | 17.6 |
| Sold in small quantities | 14 | 11.2 |
| Commercial purpose | 55 | 44.0 |
| All of the above | 17 | 13.6 |
| Seed production | 17 | 13.6 |
| Total | 125 | 100 |

### 3.3 Source of vegetable seeds

From the study among 125 respondents that shows vegetable seeds are brought from agrovet (86.87%) followed by seed bank (10.10%), local source (2.02%) and cooperative (1.01%) (figure 2). This may explain that higher yield of vegetable contributes to commercial scale.

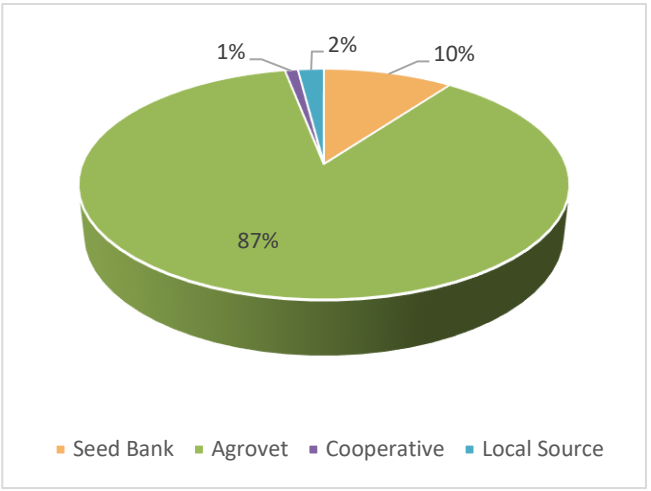



**Figure 2:** Source vegetable seed bought by sampled household respondents in Palpa, 2023

### 3.4 Major source of irrigation and off-season cultivation

This study revealed that majority of the respondents interviewed used pipe irrigation (49%) whereas 20% used sprinkler irrigation. followed by drip irrigation which is 18% and only 12% depends on canal irrigation. The major source of irrigation for the cultivation of vegetable was found pipe irrigation which supports the finding of (Subedi et al., 2020). This study revealed that most of the respondents grow off seasonal vegetable i.e., 52.8% mainly tomato and 47.2% grow vegetable as seasonal basis which is similar to t. Also, it was found that 60% of farmers used plastic mulch for cultivation of vegetables (Ghimire et al., 2022).

### 3.5 Cost of vegetable production

It was studied that among total cost of production, labor had the highest share with 18.83 percent followed by fertilizer with 18.32 percent, land preparation with 16.17 percent, organic manure with 11.91 percent, transportation with 9.13 percent, seed with 7.54 percent seedling and pesticide cost is at 5.04 and 5.62 each. Land leased cost followed by packaging is at lowest (figure 3). The seed cost for production of vegetable per Ropani of land was NRs. 680.71 on average table18). Similarly, seedling cost accounted for NRs. 452.25 for production of vegetable. For land preparation and land leased cost NRs. 1449.03 and 444.41 respectively on average. The labour cost amounted to NRs. 1687.39 on average. Organic manure cost NRs1067.09 and fertilizer cost NRs. 1641.64 on average. The cost of transportation NRs. 817.85 on average. The cost of insecticide and pesticide is NRs. 504.21 and for packaging NRs. 212.89 on average. Among the cost components, labor cost, fertilizer and land preparation cost for the production of vegetable per Ropani was found higher which is supported by (Sharma et al., 2021).

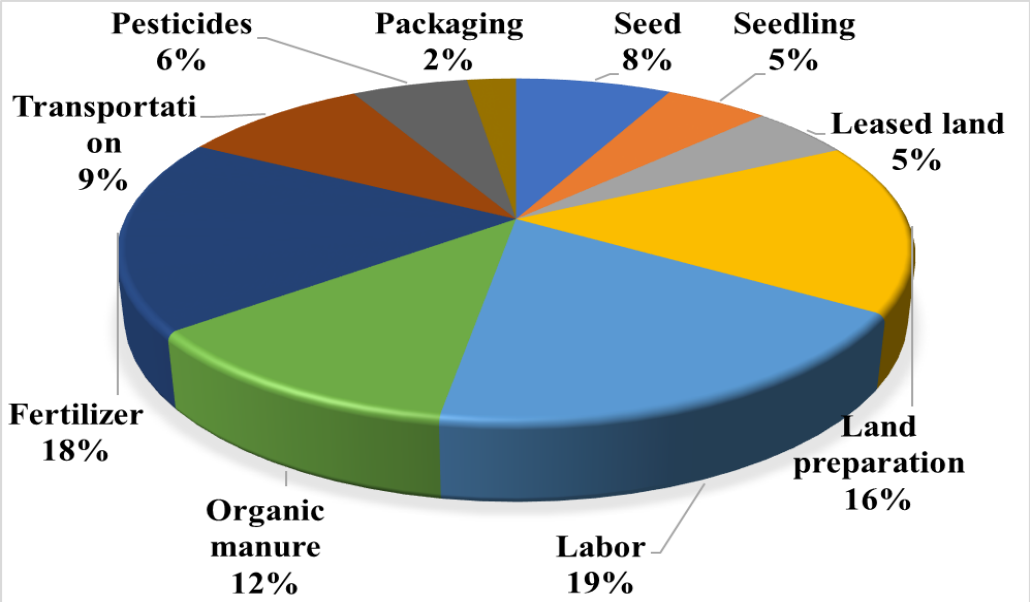



**Figure 3:** Contribution of different cost items to total cost of vegetable production by sampled household respondent in Palpa, 2023

**Table 3:** Cost of production of vegetables in Ropani by sampled household respondents in Palpa, 2023

| Variables | Mean± Standard deviation | Percentage of total cost |
|---|---|---|
| Seed | 680.71 ± 127.27 | 7.54 |
| Seedling | 452.25 ± 237.23 | 5.04 |
| Lease land | 444.41 ± 120.97 | 4.96 |
| Land preparation | 1449.03 ± 409.91 | 16.17 |
| Labor | 1687.39 ± 334.80 | 18.83 |
| Organic manure | 1067.09 ± 457.77 | 11.91 |
| Fertilizers | 1641.64 ± 138.77 | 18.32 |
| Transportation | 817.85 ± 234.40 | 9.13 |
| Pesticides | 504.21 ± 187.46 | 5.62 |
| Packaging | 212.89 ± 105.76 | 2.37 |

Note: Value after± indicates standard deviation.

### 3.6 Profitability analysis of vegetable production

The average production of vegetable was found to be 8967.43 kg in the study area. The total production of vegetable was lower in Bagnashkali rural municipality (521.53 kg) in comparison to others municipality (not involved in PMAMP). The highest production of vegetable in the Tansen municipality on average and statistically significant at 1% level of significance. The profitability analysis of vegetable production was done between 4 strata where the total cost, gross revenue, net revenue and B:C ratio was calculated. The total cost of production of vegetable was found to be 9,893.74 on average where the difference was statistically significant between 4 strata with F-value 2.981 at 5% level of significance. The study revealed that gross revenue was 20,739.23 which is statistically significant between four strata at 5% level of significance at value 3.180. Also, the net revenue was statistically significant at 5% level of significance. On the average the net revenue was 14,901.66 with F- value 3.550. From the study it shows that the B:C ratio was 1.52 where the difference was statistically significant at 1% level of significance at F-value 6.285. B:C ratio was found to be 1.52 which is supported by (Chhetri et al., 2021) .

**Table 4:** Profitability analysis of vegetable production by respondents in Palpa, 2023

| Variable | Tansen Municipality | Tinau Rural Municipality | Bagnashkali Rural Municipality | Others | Overall | F-value |
|---|---|---|---|---|---|---|
| Total cost | 11000.36 | 11050.16 | 8720.19 | 8253.14 | 9,893.74 | 2.981** (0.034) |
| Gross revenue | 2167717 | 22853.56 | 18563.65 | 19706.13 | 20,739.23 | 3.180** (0.027) |
| Net revenue | 16540.35 | 17356.56 | 12644.27 | 12792.36 | 14,901.66 | 3.550** (0.017) |
| B:C ratio | 1.50 | 1.57 | 1.45 | 1.55 | 1.52 | 6.285***(0.001) |

Note: ***significant at 1% level, **significant at 5% level and *significant at 10% level.

Figures in parenthesis indicate significance.

### 3.7 Problem ranking analysis

In the study area, farmers were facing several problems related to vegetable production. Based on the perception of farmers, the scaling technique(indexing) was used to rank the problems. The study revealed that, among the production problems, the incidence of disease and insect pest (I=0.82) was identified as the most important problems followed by irrigation facilities (0.73), quality seed materials (0.59), technical knowledge and training (0.44) and labour facilities (0.42) (table 24). These problems may be due to lack of coordination among the farmers and others concerned authorities like government. The yield of vegetable could be increased by mitigating or minimizing these problems. According to the study, it was revealed that the most important problem in marketing of produced vegetable was unsatisfactory price/price fluctuation during the marketing followed by the distant market or no access to market, lack of technical knowledge about the minimization of postharvest loss, problems in transportation and lack of proper storage facilities. The government should launch the price policy, provide training to the farmers regarding the minimization of postharvest loss and also build the different

storage facilities like the cold store to minimize these problems. The details of the marketing problem faced by the sampled farmers are presented. Production and marketing problem (disease and pest, irrigation facilities and marketing: unsatisfactory price, no access to market) were encountered similar to that of the problems encountered by (Panth, 2021; Sharma, 2019 in Paudel et al., 2021).

**Table 5:** Ranking of production problem in Palpa, 2023

| Problem | Index | Rank |
|---|---|---|
| Disease and pest | 0.82 | I |
| Irrigation facilities | 0.73 | II |
| Quality seed materials | 0.59 | III |
| Technical knowledge and training | 0.44 | IV |
| Labour facilities | 0.42 | V |

**Table 6:** Ranking of marketing problem in Palpa, 2023

| Problem | Index | Rank |
|---|---|---|
| Unsatisfactory price | 0.914 | I |
| No access to market | 0.877 | II |
| Lack of technical knowledge about post-harvest loss | 0.530 | III |
| Transportation | 0.459 | IV |
| Storage facilities | 0.217 | V |

### 3.8 Perception on vegetable production status

This study shows that 31.2% of the respondents strongly agree on increasing yield and income and 46.4% agree that through vegetable cultivation their yield and income has increased. 8.8% do not know how much income and yield has been made. Total suggest that 70.4 % of respondents agree that the technical services that they received from PMAMP is guiding them fully for vegetables cultivation and production. Besides that, 29.6% of the respondents do not agree that services received has helped them for the production of vegetables which is supported by (Prasad, 2020). Majority (70.4%) of the farmers had said that they had felt improvement in yield after services received like machines that is used in different agriculture operations which is supported by (Chhetri et al., 2021 andTimsina and Shivakoti, 2018).

**Table 7:** Farmers perception on increase yield and income in Palpa, 2023

| Farmers Perception | Frequency | Percentage |
|---|---|---|
| Strongly agree | 39 | 31.2 |
| Agree | 58 | 46.4 |
| Disagree | 17 | 13.6 |
| Strongly disagree | 11 | 8.8 |
| Total | 125 | 100 |

**Table 8:** Satisfaction on technical services received from PMAMP in Palpa, 2023

| Farmer's Perception | Frequency | Percentage |
|---|---|---|
| Yes | 88 | 70.4 |
| No | 37 | 29.6 |
| Total | 125 | 125 |

## 4. Conclusion

Cultivation of vegetables in Palpa district has always been a huge potential because of the favorable climate. Agriculture was the major source of livelihood for the majority of the household of the study area where cultivation of vegetables like tomato, cucumber etc. is an indispensable part. Farmers in the study area faced various production, post-harvest and marketing problems. The study revealed that disease, insect/pest and irrigation was an important problem. Also, the market related problem like unsatisfactory price, transportation, lack of technical knowledge are most important problems. The study discovered that in comparison to farmers those who are not involved in Pmamp has less production of vegetable than of those involved in Pmamp. Farmers are growing vegetable at commercial scale those who are involved in Pmamp and those who are not involved are growing for own self and sold in small quantity. The reason behind the lower productivity of vegetable by farmers who were not involved in zone office was lack of availability of modern tools, mulching material, tunnels. Farmers were also unknown about improved varieties and extension and training services provided to them. So, there is an immense need for proper coordination between agricultural service providers and farmers. In comparison the cost of production, net revenue, gross revenue and BC ratio is higher than others municipality. From the overall study, it could be concluding that growing vegetable is a good option for contributing food security and increasing overall economic growth and lifestyle of farmers.

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