

Impact of Vegetable Farming on Farmer's Livelihood Capitals in Birendranagar, Surkhet

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Abstract

This research examines the impact of vegetable farming on farmer livelihoods in Birendranagar, Nepal, which is located in the Karnali province and Surkhet district. The study used a household questionnaire survey and field observation to obtain information about vegetable farming and its impact on farmers' livelihoods. The study used convenience and snowball sampling to perform 72 household questionnaire surveys in wards nine, ten, and eleven of Birendranagar municipality. The acquired field survey data was statistically analysed using the frequency, percentage, and chi-square tests. The outcome indicates that the livelihood of vegetable producers has improved in recent years. For their household expenses, 81.9 percent of households generate income from vegetable gardening. The majority of farmers did not take out loans. Only 31.9 percent of respondents received grants from various sources, although most respondents did not receive any subsidy. Farmers primarily utilise their revenue to manage food, clothing, children's education, and daily necessities. Furthermore, the majority of farmers have obstacles in their vegetable cultivation due to a lack of appropriate human resources, improved seeds, and fertiliser. According to the chi-square test results, there is a significant improvement in livelihood after engaging in vegetable farming, as well as significant increases in physical services (TV, mobile, internet), savings, social prestige, and agricultural technological knowledge after engaging in vegetable farming. Furthermore, vegetable farmers are utilising their expertise and are committed to improving their livelihood through vegetable farming.

Keywords: fertilizer, income, livelihood, saving, vegetable farming.

1. Introduction

The global population is currently 8.037 billion (Worldometers, 2023) and is projected to reach 8.5 billion by 2030 and 9.7 billion by 2050 (UN, 2015). Rapid population growth poses significant challenges to food security. With a projected global population of 9 billion in the coming decades, the United Nations and the Food and Agriculture Organization (FAO) emphasize the need for 70-100 percent more food to sustain humanity. The agricultural sector's ability to support this growing demand has long been a concern. To meet the increasing food requirements worldwide, various interventions and technological advancements, from plowing to harvesting, have been implemented in agriculture (Evenson & Gollin, 2022).

Farming encompasses cultivating crops and raising animals to produce food and sustain livelihoods (Shaikh, 2017). On farms, plants and animals are nurtured for nourishment and raw materials. It is a multifaceted, land-based activity. Farming systems vary widely in terms of resource availability, enterprise patterns, household livelihoods, and constraints, all of which influence layout and operations (Giller, 2014). This intricate system includes land, labor, livestock, market access, and other resources mobilized by households according to their preferences, capabilities, and available technologies within the environmental context (both biophysical and sociocultural). The practice of generating food, fiber, feed, and other goods through the cultivation of specific plants and the rearing of domestic animals is termed agriculture or "farming" (Mckenzie, 2005). Inputs in agriculture consist of seeds, pesticides, fertilizers, herbicides, water, feed, and livestock, while outputs are the final products (Ganesan et al., 2017).

Agriculture has been the primary means of subsistence since the dawn of human civilization. Although there is no universal definition of "livelihood," it generally refers to various economic activities that provide a means of earning a living. Livelihood encompasses the necessary skills, assets (both material and social), and activities for sustaining oneself. A livelihood is sustainable when it must be able to withstand and even thrive in the face of adversity, all while preserving or improving upon its inherent capacities and assets—all without compromising the integrity of the natural resource foundation (Carney, 1998).

In South Asia, Nepal is an agricultural nation where the government has focused on technology-led interventions to promote the growth and development of smallholder farmers (MoAD, 2015). Historically, agriculture has been the main source of livelihood, meeting the needs of an expanding population (OECD/FAO, 2019). As the world's largest industry, agriculture employs one-third of the global economically active population (GA, 2019). Vegetables, which provide essential minerals, vitamins, and protein, are a crucial part of the human diet. They offer critical micronutrients that help prevent various diseases and are valued for their food and economic benefits due to their affordable mineral and vitamin content. The commercial cultivation of vegetables is expanding to meet nutritional needs, improving food security, and providing employment opportunities, especially for women, who make up a significant portion of the population (Mlozi, 2003). Vegetables are also considered valuable cash crops, being 5-10 times more economically significant (Gurung et al., 2016). Since 1991-1992, the area devoted to vegetable farming in Nepal has steadily increased, with production growing even faster (Pandey et al., 2017). In agriculture-based economies, cash crops are essential for generating income and improving living conditions (Amatya, 1975). The government has now designated specific areas to facilitate vegetable production in Nepal.

2. Statement of the Problems

While numerous studies have examined the impact of agriculture on farmers' livelihoods, there is a shortage of research specifically focusing on the impact of vegetable farming on farmers' livelihoods in the specific context of Birendranagar, Surkhet. Existing studies have predominantly concentrated on staple crops or cash crops, neglecting the unique dynamics, challenges, and opportunities associated with vegetable farming in this region. Therefore, a research gap exists in understanding how vegetable farming affects farmers' livelihoods in Birendranagar, Surkhet. The study centres on the socio-economic well-being of individuals engaged in vegetable farming, considering the challenges faced by the perishable nature of produce and its susceptibility to external influences. The research aims to address the following problems: i) Ownership or rental status of land by farmers. ii) The level of knowledge possessed by farmers regarding vegetable cultivation. iii) Assessment of farmers' annual revenue. iv) Investigation of farmers' technological proficiency. v) Examination of homes and tangible assets within the farming community. vi) Evaluation of available financial options and government assistance accessible to farmers. vii) Exploration of farmers' affiliations with various vegetable-producing organizations. viii) Investigation into the selling practices of farmers in local marketplaces. ix) Examination of the social network support system for farmers.

3. Objectives of the Study

The research will be conducted in the Birendranagar municipality of Surkhet district. This study focuses on vegetable producers and their means of livelihood. The following are the objectives of the research:

- i. To examine the impact of vegetable farming on the livelihood of the farmer.
- ii. To assess farmers' social network support and financial condition after vegetable farming.

4. Review of previous studies

Joshi et al. (2006) conducted a study on the impact of vegetable production on smallholders and found that vegetable farming is profitable and labor-intensive, making it suitable for smallholders. Smallholders could efficiently produce vegetables and employ family labor, generating regular profits. This led to the popularity of vegetable farming among smallholders, as it met their economic needs and utilised their resources effectively.

Rajbhandari (2011) conducted an 8-year study on bio-intensive farming (BIF) in Nepal's Udayapur district. The study revealed that BIF positively affected crop diversity, yield efficiency, food security, and rural livelihoods. Farmers who practiced BIF could sell their crops, use the income to meet their basic necessities, and invest in their farming enterprises. This indicated that BIF had long-term benefits for farmers' livelihoods. Pradhan et al. (2013) conducted a study in Bhaktapur district to examine the social and economic impact of growing organic vegetables. The study found that organic vegetable farming was more profitable than conventional farming. Farmers used the income from selling organic vegetables for various purposes, such as improving their homes, health, education, and social events. The study concluded that organic vegetable farming improved farmers' social and economic status and boosted their confidence.

Singh and Maharjan (2013) focused on the impact of organic farming and the market for organic vegetables in Nepal. The study highlighted the growing demand for organic farming due to environmental concerns and market expansion. Organic farmers were found to earn more than traditional farmers, particularly in the market for organic vegetables. The report emphasised the importance of new markets, research and development, and public education in increasing the profitability of organic vegetable farming.

Shrestha et al. (2014) examined the economics of organic and conventional vegetable farming in the Kathmandu Valley. The study revealed that traditional vegetable farming was more expensive than organic farming. The study recommended several measures to encourage the growth of commercial organic farming, including ensuring access to high-quality inputs, maintaining stable prices for both inputs and outputs and fostering cooperative or corporate marketing initiatives.

Gurung et al. (2016) investigated the vegetable farming business in Kapilbastu and Kaski districts. The study showed that vegetable cultivation significantly increased in these regions after implementing a PRISM program. The study also found that farmers were attracted to vegetable farming due to organised markets and increased income. Access to agro-inputs, production technologies, and marketing channels improved, leading to a transition from subsistence farming to commercial vegetable farming.

Shrestha et al. (2016) focused on the efficiency of small-scale vegetable farms in Nepal. The study suggested that improving farmers' access to improved seeds, agricultural financing, training, and extension services could enhance vegetable production efficiency. It also recommended political choices that prioritise market access, extension services for women, and training for sustainable production.

Rai et al. (2019) examined the relationship between vegetable farming and farmers' livelihoods in the Kathmandu Valley. The study found a positive association between vegetable farming and livelihoods, emphasising the need for systematic marketing management and monitoring to protect producers' sustainability.

Ghimire (2020) studied the involvement of women in commercial vegetable farming and its impact on food security and livelihoods. The research highlighted the potential of women's employment in agriculture to improve household livelihoods and food security. The study emphasised the importance of local value chain processes in commercialising vegetables among women producers in Nepal's Kailali district.

Paudel and Bhandari (2021) conducted a study in Dhankuta, Nepal, to assess the influence of vegetable cultivation on farmer livelihoods. The study found that vegetable cultivation positively impacted the socio-economic status and livelihoods of vegetable farmers. Improved utilisation of local resources, the formation of cooperatives, and appropriate transportation were identified as contributing factors to the success of vegetable farming. However, the study emphasised the need for an education campaign to address the improper use of chemical fertilisers and pesticides for sustainable vegetable farming and soil fertility improvement.

Conceptual framework

From the Conceptual Framework diagram, we can identify the concept of the research and the different variables used in the study. Also, identify the process and method of the research. There are six-livelihood capital, which indicates the standard of the livelihood indicators. Then livelihood outcomes appear like an increase in income, saving, well-being, food security, etc., and ultimately an increase in livelihood capital. The framework clearly shows this concept.

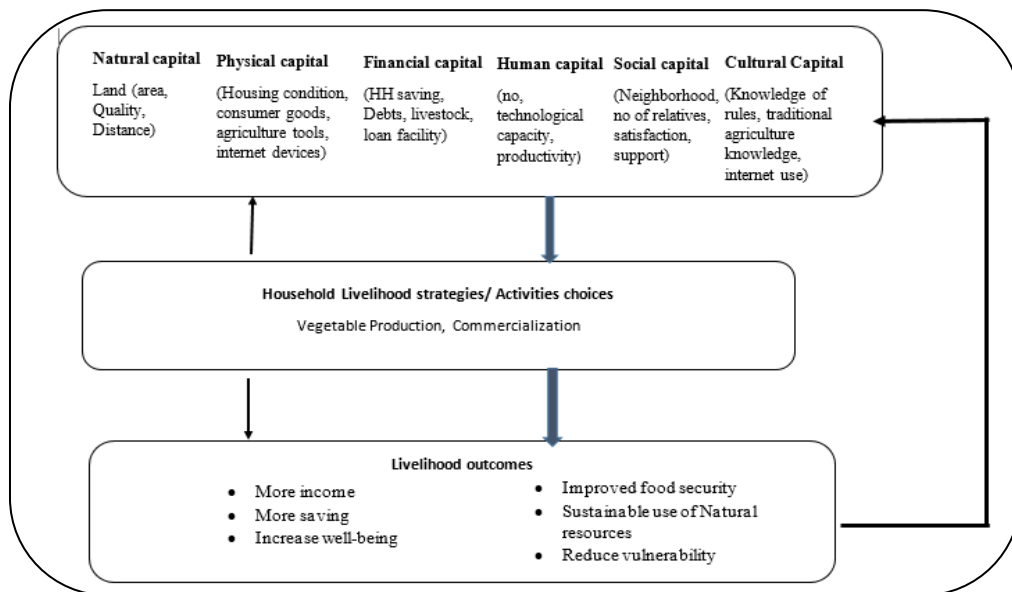


Figure 1 Conceptual Framework

5. Research Design

The research design involved collecting data through a structured questionnaire to achieve the study's objectives. The research design employed a descriptive and exploratory approach, which necessitated the collection of both quantitative and qualitative data. Both primary and secondary sources of data were utilized. Various techniques, including household surveys, were employed to generate the required data. The study focused on factors such as farm size, location of land holdings, and the type of farmers, as these variables were considered crucial for the analysis. Primary sources of data, such as survey research methods and participant observation, were used to gather information for the study.

The sampling procedure used in the study focused on the people of Birendranagar Municipality's Ward No. 9, 10, and 11 in Surkhet district. Non-probability snowball sampling was employed to collect reliable data. The selection of households for the survey was conducted from different wards of Birendranagar municipality, specifically targeting those who have been settled there for a long time and are primarily engaged in vegetable farming. A sample size of 72 respondents was chosen from various households to represent the study. The population of the study was defined as households involved in vegetable farming and selling their produce, which accounted for approximately 350 vegetable farmers in Birendranagar Municipality Ward No. 9, 10, and

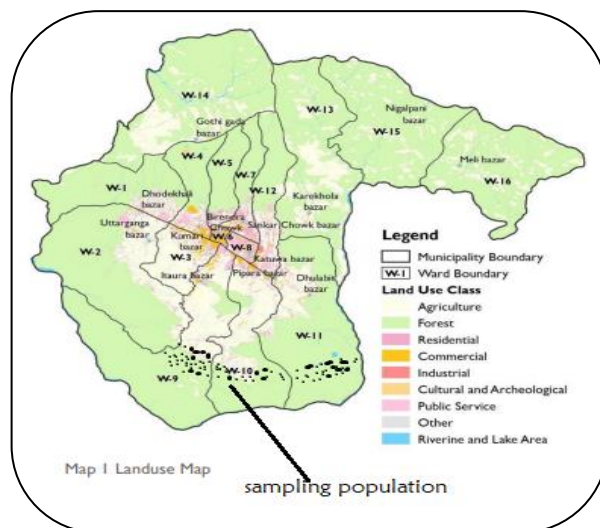


Figure 2 Study area

11. From this population, a sample of 72 households was selected. The Snowball sampling techniques is used for find the sample respondent. The main causes of choose snowball sampling is the select the real household engaged in vegetable farming.

For data analysis, the collected firsthand information served as the primary source of analysis. Data analysis involved the process of gathering, modeling, and transforming data to derive useful information, draw conclusions, and support decision-making. Both quantitative and qualitative approaches were employed in the analysis, with data being tabulated, arranged, and classified based on relevant information and its nature. Statistical tools such as Excel and SPSS (The questionnaire and survey data were labeled and entered into SPSS for analysis) were used to analyse the data, presenting the frequency of responses in percentages, averages, discriptive analysis and hypothesis testing. Qualitative information was presented descriptively, and the analysis findings were interpreted.

5. Discussion and findings.

The study focuses on the impact of vegetable farming on the livelihood of farmers in Birendranagar, Surkhet district of Karnali Province. It analyses various dimensions of vegetable farming and its effects on the socio-economic livelihood of farmers.

Table 1

Demographic and social economic condition of respondents

Variable	Catagories	Frequency	Percent
Gender	Male	52	72.2
	Female	20	27.8
Family type	Separate	15	20.8
	Joint	57	79.2
Quality of Land	Fertile	11	15.3
	Medium	61	84.7
Distance between Home and Land	Less than 1 km	53	73.6
	More than 1 km	19	26.4
Do you have irrigation facility for your land	Yes	45	62.5
	No	27	37.5
Do you sell your vegetable in local market	Yes	67	93.1
	No	5	6.9
Condition of your house	Kachhi	24	33.3
	Ardha pakki	30	41.7
	Pakki	18	25.0
Use of tunnel	Yes	48	66.7
	No	24	33.3
Internet facilities	Yes	52	72.2
	No	19	26.4
Use internet for agricultural Knowledge	Yes	43	59.7
	No	29	40.3
Sufficient Income generation for expenditure from vegg farming	Yes	59	81.9
	No	13	18.1
Loan for vegetable farming	Yes	35	48.6
	No	37	51.4
Loan for vegetable farming	Cooperative	28	38.9

	Bank	6	8.3
	Relatives	1	1.4
Receive grant	Yes	23	31.9
	No	49	68.1
Grant from	Government	3	4.2
	Non government	2	2.8
	Cooperative	12	16.7
	Other	1	1.4

Source: field survey, 2023

The respondents' gender status reveals that 72.2% are male, while 27.8% are female, with no respondents falling into the "others" category. Regarding caste status, the respondents consist of 20.8% Brahman, 31.9% Chhetri, 29.2% Janajati, and 18.1% others (primarily Dalit). In terms of religion, 84.7% of the respondents are Hindu, while 15.3% are Christian.

The academic condition of respondents shows that 93.1% are literate, while 6.9% are illiterate. Among them, 5.6% have education below primary level, 27.8% have completed primary level, 55.6% have secondary level qualification, 6.9% have higher education, and the rest have a master's degree or higher. The age status of the respondents indicates that 51.4% fall within the age group of 26-35, with 87.5% of respondents being under 45 years old. The majority of the respondents (79.2%) live in joint families, and 77.8% have family sizes of 5 members or more.

The section on vegetable farming and its effect on socio-economic livelihood explores several dimensions, such as natural resources, physical resources (capital), financial resources, human resources (capital), social capital, and cultural capital.

The majority of respondents use private land (no government or community land) for vegetable farming. Most have medium-quality land and use rented private land. Irrigation facilities are available to 62.5% of respondents. The main market for vegetable sales is the local area.

In terms of physical resources, most respondents have brick and mud houses and own land for cultivation. Mobile and internet facilities are widespread, but not all respondents use the internet for agriculture-related information.

Financially, 81.9% of households generate income from vegetable farming, and 76.4% deposit their savings regularly. Around 48.6% of farmers have taken loans for vegetable farming, mainly from cooperatives.

Regarding human resources, most farmers are involved in vegetable farming with their families. Only 44.4% have received training related to vegetable farming, and 56.9% use advanced agriculture technology.

Socially, 79.2% of respondents receive support from relatives, and about half are involved in production groups or cooperatives related to vegetable farming. Support is mainly in the form of seeds.

Cultural capital includes knowledge about professional vegetable farming and technology use. 73.6% of farmers have knowledge about professional vegetable farming, and 63.9% sometimes use the internet for farming-related information.

Finally, at the end of the questionnaire seven livelihood question asked to the respondent in likert scale where totally agree is coded by 5, agree coded by 4, neutral coded by 3, disagree coded by 2 and totally disagree coded by 1. The summary of the question is given below.

Table 2

Livelihood Questions after vegetable farming and their response in Likert scale

	N	Minimum	Maximum	Mean	Std. Deviation
Increases in physical services (TV, mobile, internet)	72	3	5	4.69	0.62
Improvement in the condition of child education	72	2	5	4.47	0.671
Increase in access to health services	72	3	5	4.29	0.592
Increases in saving	72	2	5	3.93	0.924
Increases in social prestige	72	2	5	3.94	0.886
Increases in agricultural technology knowledge	72	1	5	4.1	0.842
Able to give employment to others	72	1	4	1.94	0.87

Source: field survey, 2023

In above table, the question after vegetable farming you have increases physical services (TV, mobile, internet)? In this question mean value is 4.69. it means that almost respondent are totally agreed in after farming they were success to increase in physical facilities. The mean value of the statement after farming you have Improvement in the condition of child education is 4.47 and standard deviation is only 0.671. it means almost respondent are agreed in their children get the quality education after vegetable farming. In above table in the statement after vegetable farming they have Increase in access to health services, Increases in saving, Increases in social prestige, Increases in agricultural technology knowledge the mean value around 4. So all the participates agreed in the statement and agree with vegetables farming increase their livelihood. but in case of generate the employment opportunities all most of the firm can't generate opportunity to the others in the statement after vegetable farming the are able to give employment to others mean value is 1.94. so most of the respondent did not agree with the statement.

Tests of Hypothesis

The chi-square test is a statistical test used to determine if there is a significant association between two categorical variables. In this case, it seems that the chi-square test was conducted to analyse the relationship between engaging in vegetable farming and various outcomes or improvements.

Table 3

chi-square Test Statistics

	Have there been increases in physical services (TV, mobile, internet)	Improvement in the condition of child education	Increase in access to health services	Increases in saving	Increases in social prestige	Increases in agricultural technology knowledge	Able to give employment to others
Chi-Square	64.333	58.333	27.25	34.778	17.333	60.361	43
df	2	3	2	3	3	4	3
Asymp. Sig.	0.00	0.00	0.00	0.00	0.001	0.00	0.47

Source: author calculation using SPSS

Hypothesis 1

Null Hypothesis (H01): There is no significant improvement in livelihood after engaging in vegetable farming.

Alternative Hypothesis (H11): There is a significant improvement in livelihood after engaging in vegetable farming.

Test Statistic (Chi-Square): 64.333

Degrees of Freedom (df): 2

Asymp. Sig.: .000 ($p < 0.001$)

The chi-square test result indicates that there is a significant improvement in livelihood after engaging in vegetable farming. The p-value is less than the conventional significance level of 0.05, suggesting strong evidence to reject the null hypothesis (H01) and accept the alternative hypothesis (H11).

Hypothesis 2

Null Hypothesis (H02): There have been no increases in physical services (TV, mobile, internet) after engaging in vegetable farming.

Alternative Hypothesis (H12): There have been increases in physical services (TV, mobile, internet) after engaging in vegetable farming.

Test Statistic (Chi-Square): 58.333

Degrees of Freedom (df): 3

Asymp. Sig.: .000 ($p < 0.001$)

The chi-square test result suggests that there have been significant increases in physical services (TV, mobile, internet) after engaging in vegetable farming. The p-value is less than 0.05, providing strong evidence to reject the null hypothesis (H02) and support the alternative hypothesis (H12).

Hypothesis 3

Null Hypothesis (H03): There are no significant increases in savings after engaging in vegetable farming.

Alternative Hypothesis (H13): There are significant increases in savings after engaging in vegetable farming.

Test Statistic (Chi-Square): 27.250

Degrees of Freedom (df): 2

Asymp. Sig.: .000 ($p < 0.001$)

The chi-square test result indicates that there are significant increases in savings after engaging in vegetable farming. The p-value is less than 0.05, providing strong evidence to reject the null hypothesis (H03) and accept the alternative hypothesis (H13).

Hypothesis 4

Null Hypothesis (H04): There are no significant increases in social prestige after engaging in vegetable farming.

Alternative Hypothesis (H14): There are significant increases in social prestige after engaging in vegetable farming.

Test Statistic (Chi-Square): 34.778

Degrees of Freedom (df): 3

Asymp. Sig.: .000 ($p < 0.001$)

The chi-square test result suggests that there are significant increases in social prestige after engaging in vegetable farming. The p-value is less than 0.05, providing strong evidence to reject the null hypothesis (H04) and support the alternative hypothesis (H14).

Hypothesis 5

Null Hypothesis (H05): There are no significant increases in agricultural technology knowledge after engaging in vegetable farming.

Alternative Hypothesis (H15): There are significant increases in agricultural technology knowledge after engaging in vegetable farming.

Test Statistic (Chi-Square): 17.333

Degrees of Freedom (df): 3

Asymp. Sig.: 0.47 ($p < 0.001$)

The chi-square test result indicates that there are not significant increases in agricultural technology knowledge after engaging in vegetable farming. The chi-square value is 43 with 3 degrees of freedom, and the p-value is 0.47. The p-value is higher than the common significance level of 0.05, providing strong evidence to accept the null hypothesis (H05) indicating that there may not be a significant association for this variable.

In summary, the chi-square test results suggest that engaging in vegetable farming is associated with significant improvements in livelihood, physical services, savings, social prestige, and agricultural technology knowledge but failed to create employment opportunities.

6. Conclusion and Recommendations

The study focuses on the impact of vegetable farming on the livelihood of farmers in Birendranagar, Surkhet district of Karnali Province.

The study examines various dimensions of vegetable farming and its effects on the socio-economic livelihood of farmers, including natural resources, physical resources (capital), financial resources, human resources (capital), social capital, and cultural capital. The majority of respondents use private land for vegetable farming, have medium-quality land, and use rented private land. Irrigation facilities are available to 62.5% of respondents, and the main market for vegetable sales is the local area.

Financially, the majority of households generate income from vegetable farming (81.9%), regularly deposit savings (76.4%), and have taken loans for vegetable farming (48.6% from cooperatives). Most farmers are involved in vegetable farming with their families, although only 44.4% have received training related to vegetable farming. Most of the respondents receive support from relatives and are involved in production groups or cooperatives related to vegetable farming.

In terms of cultural capital, a significant percentage of farmers have knowledge about professional vegetable farming and sometimes use the internet for farming-related information. In the study, respondents generally agreed or totally agreed with the positive impacts of vegetable farming on various aspects of livelihood, such as physical services, child education, health services, savings, social prestige, and agricultural technology knowledge.

The chi-square test results suggest that there is a significant improvement in livelihood after engaging in vegetable farming, as well as increases in physical services, savings, social prestige, and agricultural

technology knowledge but there is not significant improvement in the employment opportunity after vegetable farming.

Overall, the study indicates that vegetable farming has a positive impact on the livelihood of farmers in terms of various socio-economic aspects, including physical services, education, health, savings, social status, and agricultural knowledge.

The study's recommendations emphasise the importance of government intervention and support to promote vegetable farming and improve the livelihood of farmers. Governments should invest in infrastructure and provide technical training and incentives for farmers to shift to vegetable farming. Ensuring access to quality inputs, extension services, and markets is crucial for making vegetable farming a viable option for rural farmers. Skill development training related to vegetable farming and access to technology are also essential. Supporting farmers with grants, managing insurance policies for their produce, and addressing the impact of mediators on farmers are other crucial measures that can encourage and motivate farmers in the vegetable farming sector.

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