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An analysis of socio-economic factors and farming practices in vegetable production in Lal-lo, Cagayan: basis for an extension project

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Abstract

This study assesses the socio-economic profile, farming practices, and challenges that may affect vegetable production which will serve as basis for an extension project. A descriptive research design was used to gather data from farmers through structured questionnaires. The results indicate that 56% of the respondents grow hybrid vegetables, while 40% plant both hybrid and open-pollinated varieties (OPV). The majority of farms are rainfed, with 82% relying on rainfed lowland and having no access to irrigation systems, making them vulnerable to climate variability. Moreover interms of production cost per hectare the averaged amount is ₱20,340.00, while the mean income was ₱29,612.00, reflecting significant income disparity and production variability. Price-setting is largely influenced by traders (58%), with limited use of cooperative-based pricing. Additionally, 92% of farmers lack awareness of Good Agricultural Practices (GAP), and not practicing Good Agricultural Practices (GAP). ICrop losses due to typhoons (92%), floods (88%), and pests (60%) are prevalent, with 90% of farmers reporting low yields as a result. The study concludes that vegetable farmers are facing significant challenges related to financial resources, market access, and environmental hazards. It recommends different community extension services among vegetable farmers such as promoting GAP adoption, organizing cooperatives, and providing financial literacy training. The need to improve irrigation infrastructure is also important, as this can help to reduce cost of production of the farmers. Additionally, selected farmer cooperators should be supported through extension projects aimed at improving agricultural sustainability and profitability.

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Introduction

The production of vegetables not only addresses nutritional needs but also plays a crucial role in supporting local economies and enhancing agricultural resilience. Filipino farmers have always been victims of natural disasters and calamities frequently hitting the country, including droughts, cold spells and typhoons which result in severe damage to the agriculture sector, where farmers experience financial losses leading to a long-term cycle of debt. These challenges faced by Filipino farmers often harm food security in the country (Suansing, 2017).

The province of Cagayan has a wide area for crop production, among the local famers, they would prefer to cultivate for lowland pinakbet vegetables, which includes, but is not limited to, okra, eggplant, tomato, ampalaya, both bush and pole sitao, squash, and various types of pepper, all of which contribute to the agricultural biodiversity of the area. As of the year 2019, Cagayan Valley successfully sustained a regional food sufficiency level, more formally referred to as the Self-Sufficiency Ratio (SSR), which stood at 78.61% specifically in relation to the production of lowland vegetables, reflecting a significant achievement in agricultural self-reliance.

However, this statistical result may also serves as an indicator that the current levels of food sufficiency for the cultivation of lowland vegetables within the region are still insufficient to adequately meet the escalating demands of the resident population, a situation that has been corroborated by the Philippine Statistics Authority-OpenSTAT in the year 2021. This scenario underscores the critical importance of ensuring sustainable agricultural practices for vegetable production, which emerges as one of the predominant challenges facing Region 02, with particular emphasis placed on the Cagayan Province as a focal point of concern.

This study aimed to offer a thorough analysis of the socio-demographic and socio-economic profiles of vegetable farmers, their farming practices, and the environmental challenges that affected their vegetble farming activites. By getting the factors like age, education, household size, and income, the research seeks to uncover how these elements influence farmers' decisions and overall productivity on the farm.

Additionally, the types of vegetables grown, production costs, and income levels per cropping cycle will also be gathered to help reveal the profitability and sustainability of vegetable farming in the Lal-lo Cagayan. Marketing practices and access to markets is also an important data to the determine farmers' ability to sell their produce at competitive prices and access broader markets. Moreover, the study seeks to assess the adoption of Good Agricultural Practices (GAP) and the role of financial and infrastructural resources in enhancing productivity and profitability.

Farmers face significant challenges related to agriculture productivity such as environmental factor and socio- economic factors. By studying the socio-economic and environmental constraints that vegetable farmers encounter, this research will contribute valuable insights to improve vegetable production systems and promote extension frameworks aimed at enhancing both farm productivity and long-term sustainability. Moreover, the study seeks to assess the adoption of Good Agricultural Practices (GAP) and the role of financial and infrastructural resources in enhancing productivity and profitability.

Farmers face significant challenges related to agriculture productivity such as environmental factor and socio- economic factors. By identifying the specific socio-economic and environmental constraints that vegetable farmers encounter, this research will contribute valuable insights to improve vegetable production systems and promote extension frameworks aimed at enhancing both farm productivity and long-term sustainability.

Generally the study aimed to assess the socio-economic factors and farming practices that influence vegetable production which will serve as basis for an extension project. Specifically it aimed to: a) examine the socio-demographic profile of vegetable farmers; b)analyze the types of vegetable varieties grown and the farming practices employed by the respondents; c) evaluate the production costs and income levels of vegetable farmers per cropping cycle; d) investigate the marketing practices, price-setting methods, and market access challenges faced by vegetable growers; e)assess the environmental and financial challenges that affect vegetable production, such as crop losses due to climate factors and pest infestations; f)determine the level of awareness and adoption of Good Agricultural Practices (GAP) among vegetable farmers; g) identify the impact of socio-economic conditions, such as access to financial resources and infrastructure, on the productivity and profitability of vegetable farms.

Materials and methods

Research design

This study utilized a descriptive research design to analyze the socio-economic factors and farming practices that influence vegetable production. The descriptive method was applied to examine the socio-demographic profile of vegetable growers, their farming practices, production costs, income, and marketing strategies. Furthermore, the study employed a correlational design to explore the relationships between socio-economic conditions, farming practices, and their impact on productivity and profitability.

Locale of the study

The research was carried out in the municipality of Lal-lo, Cagayan, specifically in barangays known for their vegetable production activities. The areas were identified with the help of the Municipal Agriculture Office.

Respondents and sampling procedure

The respondents included are vegetable growers, with the selection criteria focusing on individuals engaged in vegetable production. Exclusion criteria included lack of interest and refusal to participate.

Research instrument

The data collection instrument was a structured questionnaire designed by researchers to gather specific information relevant to the study objectives. These questionnaires were verbally translated into the local dialect to ensure clarity and comprehension.

Collection of data

Before distributing the questionnaires, a request to conduct the study was made through the Municipal Mayor of Lal-lo, Cagayan. The Municipal Mayor provided endorsements, which were forwarded to the Municipal Agriculture Officer (MAO). Data were collected through structured questionaire and interviews with vegetable growers.

Analysis of data

The data collected were tallied, tabulated, and analyzed using Microsoft Excel and SPSS version 23. For descriptive statistics, simple frequency counts, percentages, means, and standard deviations were utilized to describe the profile of vegetable growers and other categorical data. The mean was specifically used to identify general trends in responses gathered through the Likert scale.

Results and discussion

Profile of vegetable growers

Table 1 shows the socio-demographic profile of vegetable growers which provides an important insights into the characteristics of those involved in this sector. The gender distribution is relatively balanced, with a modest male predominance (54% male and 46% female). The data indicates that both men and women are relatively equal in number and they are actively engaged in lowland- vegetable farming, showing a level of inclusivity among genders.

In terms of age, the respondents span various age groups, but the majority are in their middle years.

Notably, 30% of the participants are aged between 41 and 50, while 28% fall between 51 and 60. The average age of the respondents is 46.48 years, showing that the vegetable farming is primarily carried out by individuals in their mid to late working years. Ten percent (10%) of growers are over 60, and only 12% are younger (aged 20 to 30), indicating potential challenges in attracting younger individuals to this field. Moreover, in terms of marital status, a significant number (86%) of the respondents are married, which implies that vegetable farming often operates as a family-oriented activity. There are only a few single individuals (12%) and even fewer separated (2%).

Table 1. Distribution of vegetable growers in terms of socio-demographic information

Variable	Frequency	Percentage
Sex		
Male	27	54.0
Female	23	46.0
Age		
20-30	6	12.0
31-40	10	20.0
41-50	15	30.0
51-60	14	28.0
Above 60	5	10.0
Mean: 46.48 SD= 11.73		
Civil Status		
Married	43	86.0
Single	6	12.0
Widow/Widower	-	-
Separated	1	2.0
Religion		
Roman Catholic	50	100.0
Ethnicity		
Ilocano	50	100.0
Highest Educational Attainment		
Some Elementary	1	2.0
Elementary Graduate	8	16.0
Some High School	5	10.0
High School Graduate	26	52.0
Vocational	0	0
Some College	6	12.0
College Graduate	4	8.0
Registration in the RSBSA or Registry System for Basic Sectors in Agriculture		
Yes	50	100.0
No	0	0
Member of "Pantawid Pamilyang Pilipino Program" or 4Ps		
Yes	3	6.0
No	47	94.0
Availment in Crop Insurance		
Yes	36	72.0
No	14	28.0

In terms of religion, all respondents (100%) identified as Roman Catholic, and they all belong to the Ilocano ethnic group, reflecting a uniform religious and cultural background among the vegetable growers in the region.

Regarding educational background, most respondents (52%) are high school graduates. Sixteen percent completed elementary education, while 12% attended college education. Eight percent (8%) holds degree courses and only 2% have completed elementary schooling with no individuals with technical vocational training. This distribution shows that while many have foundational education, higher levels of education are less common, which could limit their access to advanced farming practices and innovative opportunities.

Table 2. Socio-economic activities and agricultural services received by vegetable growers

Variables	Frequency	Percentage
Family's Main Source of Income		
Farming	50	100.0
Farm Labor	0	0
Poultry/Livestock Raising	0	0
Fishing	0	0
Tenurial Status		
Owner	31	62.0
Tenant	17	34.0
Leaseholder	0	0
Sharecropper	5	10.0
Crops/Commodities Most Grown		
Rice	21	42.0
Corn	32	64.0
Vegetable	50	100.0
Root crops	0	0
Fruits	1	2.0
Vegetable Commodities Usually Grown		
Pole Beans	40	80.0
Eggplant	26	52.0
Ladies Finger	25	50.0
Bitter Gourd	27	54.0
Tomato	27	54.0
Pepper "Siling Panigang"	21	42.0
Cabbage	2	4.0
Pechay	21	42.0
Sponge Gourd	24	48.0
Squash	22	44.0
Bottle Gourd	6	12.0
Number of Years in Vegetable Farming		
Less than 5 years	3	6.0
5 to 10 years	18	36.0
11 to 20 years	14	28.0
21 to 30	9	18.0
31 to 40	6	12.0
41 to 50	0	0
51 years and above	0	0
Mean : 16.98 SD =10.97		
Number of cropping seasons per year		
Once per year	0	0
Twice per year	0	0
Thrice per year	0	0
All year round	50	100.0
Land Area Cultivated by Vegetable Growers (hectares)		
0.001-1.000	35	70.0
1.001-2.000	10	20.0
2.001-3.000	3	6.0
3.001-4.000	2	4.0
4.001-5.000	0	0
Mean: 1.03 SD = 0.81		
Source of Information on Government Services		
Barangay officials and employees	47	94.0
NGO, Association, or Cooperative	3	6.0
Municipal Agriculturist	30	60.0
DA officials	22	44.0
Private enterprise/agent	2	4.0
TV/Radio/Social Media	21	2.0
Agricultural Goods and Services Received		
Seeds	44	88.0
Fertilizers	24	48.0
Biological control agents	9	18.0

Botanical Pesticides	0	0
Construction of farm production facilities	2	4.0
Technology demonstrations	7	14.0
Information, education, and communication (IEC) materials	10	20.0
Postharvest equipment and machinery	2	4.0
Establishment of small-scale irrigation projects	0	0
Source Planting Materials		
Own supply of crops/seeds/seedlings	24	44.0
Vendors/Suppliers	50	100.0
Government in general	8	16.0
Local government	7	14.0
Department of Agriculture	18	36.0
Other National Government	3	6.0
Universities	0	0
NGOs	0	0
Cooperatives	0	0
Others-Online shop	0	0
Attendance on the training on Good Agricultural Practices		
Yes	4	8.0
No	46	92.0

All the vegetable farmers are registered under the Registry System for Basic Sectors in Agriculture (RSBSA), ensuring they are included in government initiatives. Additionally, 72% have taken advantage of crop insurance, safeguarding their livelihoods against various risks, though 28% remain without insurance. Members in the Pantawid Pamilyang Pilipino Program (4Ps) is low, with just 6% of respondents involved, indicating that most growers do not fall within the low-income households that this government initiative aims to support.

General agricultural activities and services received by farmers

Table 2 shows the socio-economic profile of vegetable growers and services received by vegetable growers. It shoes a key detail about their agricultural practices, service access, and land ownership. All the respondents (100%) rely exclusively on vegetable farming as their primary source of income, indicating a complete dependence on agriculture for their livelihood. There are no reports in other activities like farm labor, poultry rising, or fishing, which emphasizes their singular focus on vegetable cultivation.

Regarding land ownership, majority of respondents (62%) own the land they farm. Thirty four (34%) are tenants and 10% are sharecroppers. This scenario indicates a fairly high level of land ownership, although a notable number of farmers do not own the land they work on, which may affect their ability to invest in their farming operations over the long term.

All farmers grow vegetables, with 64% also planting corn and 42% cultivating rice. Diversification into root crops or fruits is minimal, as only 2% of respondents grow fruits. The most common vegetables grown include pole beans (80%), bitter gourd (54%), and tomatoes (54%). Other grown vegetables include eggplant (52%), okra (50%), and sponge gourd (48%), highlighting a wide variety of crops.

In terms of farming experience, majority (36%) have been in farming for about 5 to 10 years, with an average of 16.98 years of experience. This showa that the group is relatively experienced, although there are fewer farmers with over 30 years in the field. Notably, all respondents report farming year-round, indicating the intensity of vegetable cultivation without any fallow periods.

When it comes to land size, most respondents cultivate on small land area, with 70% is cultivating less than 1 hectare. The average size is 1.03 hectares, indicatring that these are small-scale agricultural operations.

The farmers primarily get agricultural information from local sources, such as through barangay officials (94%) and municipal agriculturists (60%), with 44%

sourcing information from the Department of Agriculture. This suggests a strong reliance on local governmental support and technical advice, with minimal engagement from NGOs or private sectors.

In terms of agricultural supplies and services, the majority have received seeds (88%) and fertilizers (48%), but more sophisticated services, like biological control agents or post-harvest equipment, are less accessible. Interestingly, there is no record of botanical pesticide use, and just 4% of farmers have access to technology demonstrations or production facilities, highlighting a gap in modern agricultural practices and tools.

Most respondents depend on vendors or suppliers for planting materials (100%), rather than relying on government programs or cooperatives.

Lastly, in terms of training, especially on Good Agricultural Practices (GAP) is quite limited, with only 8% of respondents had participated in such training. This lack of exposure to modern and sustainable farming techologies might pose challenges for future productivity and sustainability in vegetable farming in the municipality.

Farming practices, inputs, and technologies among vegetable growers

Most of the respondent's preferred hybrid seeds, with 56% of the farmers cultivating hybrid vegetables (Table 3). A significant portion (40%) grows both hybrid and open-pollinated varieties (OPV), while only 4% of respondents exclusively plant open-pollinated varieties. This show a that hybrid seeds are preferred for their higher yield potential and possibly better adaptability to the environment, though some farmers still value OPVs for their resilience and seed-saving potential.

In terms of the nature of vegetable farms, the vast majority of the farms are rainfed lowland (82%), while a smaller percentage (18%) operates in rainfed upland areas. The table also shows that there are no irrigated farms, indicating that the vegetable farmers rely entirely on rainfall, which indicate that they farm are vulnerable to to drought. When it comes to the irrigation services, none of the respondents have an access to irrigation systems from private groups or from the goverment specifically the projects of National Irrigation Administration (NIA), further reinforcing their dependence on rain-fed irrigation.

For equipment and tools used in farm operations, the majority of farmers (98%) still rely on carabaos or farm animals for plowing, indicating traditional methods of farming. Garden tools such as rakes, shovels, and trowels are also widely used (50%), while 46% of respondents have adopted mechanized machinery or tractors, showing that some farmers have started to modernize their operations. However, only 10% use rotavators, highlighting the relatively slow adoption of more advanced mechanized tools for land preparation.

In terms of awareness of Good Agricultural Practices (GAP), only 8% of the respondents are aware of GAP standards, and none of the farmers (0%) practice GAP.

Regarding the types of fertilizers used, most of the respondents (64%) rely on inorganic fertilizers such as T-14, Urea, and Amonium Phosphate, while 32% used a combined organic and inorganic fertilizers. Only 4% of the vegetable farmers used pure organic fertilizers, showing a heavy reliance on chemical fetilizer inputs to improve their farm productivity. This highlights a potential area for promoting organic farming techniques as one of the Good Agriculture Practices which could improve soil health over time.

For pesticide use, a large portion (74%) of farmers rely solely on commercial or synthetic pesticides, while 26% use a combination of botanical and synthetic pesticides. No respondents reported the exclusive use of botanical pesticides, indicating that the adoption of more environmentally friendly pest control methods is still quite low among vegetable farmers in the area.

Table 3. Farming practices, inputs, and technologies among vegetable growers

Variables	Frequency	Percentage
Vegetable Varieties Grown		
Hybrid	28	56.0
Both Hybrid and Open Pollinated Variety (OPV)	20	40.0
Open Pollinated Variety (OPV)	2	4.0
Nature of Vegetable Farm		
Irrigated	0	0
Rainfed lowland	41	82.0
Rainfed upland	9	18.0
Provision of Irrigation Services/System		
Private individual/group	0	0
National Irrigation Administration	0	0
Equipment/Tools/Material Used in Farm Operation		
Carabaos/Farm animals	49	98.0
Disc Harrow	2	4.0
Garden Tools (rake, shovel, trowel)	25	50.0
Mechanized machinery/Tractors	23	46.0
Rotavator	5	10.0
Awareness of Good Agricultural Practices (GAP)		
Yes	4	8.0
No	46	92.0
GAP Practitioner		
Yes	0	0
No	50	100.0
Type of Fertilizer Used		
Both organic and inorganic fertilizer	16	32.0
Inorganic fertilizer	32	64.0
Organic fertilizer	2	4.0
Type of Pesticide Used		
Commercial/Synthetic Pesticides	37	74.0
Both Botanical and Commercial/Synthetic Pesticides	13	26.0
Botanical Pesticides	0	0
Source of Fertilizer and Pesticide Guide/Assistance		
Knowledge from experience or what you normally do	39	78.0
Advice/recommendations from fellow farmers or neighbours	10	20.0
Money at hand that can be used to buy fertilizers and pesticides	5	10.0
Technical advice from experts	12	24.0
Directions for use indicated on container/packaging	15	30.0
Soil analysis	2	4.0
Information for crop sensors	0	0
Tools/Equipment Used in Fertilizer and Pesticide Application		
Hand-held/portable sprayers/applicators	46	92.0
No tool, equipment, or technology	3	6.0
Mechanized sprayers/applicators	2	4.0
Weeding Practices		
Manual	44	88.0
Use of garden tools	12	24.0
Use of equipment	21	42.0
Herbicide application	32	64.0
Harvesting Practices		
Manually	50	100.0
Using mechanized/ automated equipment	0	0

The source of fertilizer and pesticide guidance for most farmers (78%) comes from their own experience or what they normally do. A smaller portion (24%) receives technical advice from experts, and 20% rely on fellow farmers' recommendations, showing a strong reliance on informal knowledge sharing within the farming community. Only 4% of respondents mentioned the use of soil analysis to guide their fertilizer use, and none reported using crop sensors, showing limited adoption of advanced precision agriculture techniques.

Table 4. Marketing practices, production costs, income, price setting, and financial capacity of vegetable farmers

Variables	Frequency	Percentage
Marketing Practices		
Market	28	56.0
Intermediary (Middle man/woman)	27	54.0
Community	7	14.0
Production Cost in one cropping cycle per hectare		
₱10,000.00 and below	17	34.0
₱10,001.00 to ₱20,000.00	21	42.0
₱20,001.00 to ₱30,000.00	2	4.0
₱30,001.00 to ₱40,000.00	2	4.0
₱40,001.00 to ₱50,000.00	8	16.0
Mean: 20,340.00 SD=15,316.20		
Income (Php) in one cropping cycle per hectare		
₱10,000.00 and below	15	30.0
₱10,001.00 to ₱20,000.00	4	8.0
₱20,001.00 to ₱30,000.00	16	32.0
₱30,001.00 to ₱40,000.00	2	4.0
₱40,001.00 to ₱50,000.00	4	8.0
₱50,001.00 to ₱60,000.00	4	8.0
₱60,001.00 to ₱70,000.00	1	2.0
₱70,001.00 to ₱80,000.00	3	6.0
₱80,000.00 and above	1	2.0
Mean: 29,612.00 SD = 24,764.79		
Price Setting Practices		
Word-of-Mouth	27	54.0
Based on Cooperative/Association Pricing	0	0
Set by the trader/buyer	29	58.0
Farm Gate Price	0	0
Prevailing Market Price/Farm Gate Price	10	20.0
Do You Transport Your Products		
Yes	42	84.0
No	8	16.0
Transportation Used when Trading Products		
Animals (carabao, horses)	9	21.43
Tractors, kuliglig, and other mechanized equipment	33	78.57
Sufficiency of Capital for Farm Operation		
Yes	39	78.0
No	11	22.0
Savings as a Source of Capital		
Yes	25	50.0
No	25	50.0

For fertilizer and pesticide application, nearly all farmers (92%) use hand-held sprayers or applicators, while only 4% use mechanized sprayers, and 6% do not use any tools or equipment at all. This reflects the small-scale and labor-intensive nature of most vegetable farms in the area.

When it comes to weeding practices, the majority of the farmers (88%) are still rely on manual methods (uprooting weeds using their bare hand), while some (64%) use herbicides to control weeds. A smaller percentage (42%) use equipment for weeding, indicating that mechanized weed control is still not widely practiced. Additionally, 24% of respondents used garden tools for weeding.

Lastly, in terms of harvesting practices, all of respondents (100%) harvest their crops manually, with no farmers using mechanized or automated equipment. This shows that a complete reliance on manual labor for harvesting.

Table 4 shows the marketing practices, production costs, income, price setting, and financial capacity of vegetable farmers**.** The **r**espondents' marketing practices reveals that majority (56%) sell their produce directly to the market, while 54% rely on

intermediaries or middlemen. A smaller portion (14%) markets their products within their local communities. This shows that there is a high reliance on intermediaries that many farmers might not be able to access markets directly, potentially limiting their profit margins as intermediaries typically take a cut from the farmers' earnings. Strengthening direct-to-market channels or cooperative marketing could help increase farmers' income by eliminating middlemen.

In terms of the production costs per hectare, 42% of farmers report that they are spending ₱10,001.00 and ₱20,000.00, while 34% manage to keep their costs below ₱10,000.00. A smaller percentage (16%) spends between ₱40,001.00 and ₱50,000.00, indicating that while the average production cost is around ₱20,340.00, there are wide disparities in farming expenses among the respondents. The large standard deviation (SD = ₱15,316.20) reflects this variability, maybe that the farmers face different challenges and levels of investment in their farming operations, which may affect overall productivity and profitability.

Income levels from one cropping cycle per hectare vary significantly among respondents. Most farmers (32%) earn between ₱20,001.00 and ₱30,000.00, while 30% earn ₱10,000.00 or less. A small percentage (6%) report earnings of ₱70,001.00 to ₱80,000.00, with only 2% earning ₱80,000.00 or more. The mean income per hectare is ₱29,612.00, with a high standard deviation (SD = ₱24,764.79), indicating substantial income inequality. Farmers who can reduce production costs or access better markets tend to earn more, while others struggle to achieve profitability.

These income disparities point to the need for financial and technical support to help lower-income farmers increase their productivity and earnings.

Regarding price-setting practices, 58% of respondents report that traders or buyers determine the prices for their produce, while 54% rely on word-of-mouth for pricing information. Only 20% of farmers use the prevailing market price or farm gate price as a reference, and no respondents follow cooperative or association-based pricing. This shows that many farmers cannot control the pricing of their products, which may leave them to unfair market practices. Strengthening market transparency and providing farmers with better access to market information may help them secure fairer prices for their produce.

Table 5. Causes of crop loss and their effects on production among vegetable farmers

Variable	Frequency	Percentage
Loss or Damage of Crops from the following Causes		
Flood	44	88.0
Typhoon	46	92.0
Pest/Pestilence	30	60.0
Lack of Financial Resources for Operation	11	22.0
Drought	7	14.0
Effects of Damaging Causes on Production		
Low yield/harvest	45	90.0
No yield/harvest	5	10.0

Transportation of farm products is carried out by 84% of respondents, with most using mechanized equipment (78.57%) such as tractors and "kuliglig," while 21.43% still rely on traditional methods, such as using carabaos.

In terms of financial sufficiency, 78% of respondents report having sufficient capital for farm operations, while 22% struggle with insufficient capital. Moreover, only half of the farmers (50%) rely on savings as a source of capital, while the other half do not have savings to support their farming activities. This shows that many farmers may need to depend on loans or external funding sources. Financial literacy training and encouraging doing savings could help improve the financial resilience of vegetable growers,

allowing them to self-finance their operations and reduce reliance on debt.

Problems encountered

Table 5 shows the causes of crop loss and their effects on production among vegetable farmers highlights several critical challenges faced by vegetable farmers. Typhoons appear to be the most significant threat, affecting 92% of respondents. This high percentage indicates that typhoons are frequently visiting and a severe concern for the farmers in the area which leads to a significant crop damage, loss of income. Similarly, floods impact 88% of farmers, further emphasizing the vulnerability of vegetable farms to extreme weather events. These natural calamities (combination of typhoons and floods) present a severe risk to agricultural sustainability in locality. In addition to weather-related challenges, 60% of the farmers reported losses due to pests' incidence. This highlights for an effective pest management strategies in mitigating crop damage. The high prevalence of pest-related losses indicates that many farmers has no or lack of effective pest control methods and resources. Financial constraints also affect 22% of respondents, limiting their ability to purchase inputs or hire labor, which can hinder recovery from crop damage.

While drought impacts 14% of the vegetable farmers, underscoring the need for resilient agricultural practices, it also highlights their vulnerability to prolonged dry spells. Additionally, 90% of farmers reported low yields due to these challenges, with 10% experiencing complete crop failure. This data reflects a fragile agricultural system heavily influenced by climate-related issues and financial limitations.

Conclusion

The research study identified several critical aspects faced by vegetable growers, most of them rely on hybrid seeds and traditional farming practices. While some farmers have adopted mechanized tools and market-driven strategies, many struggle with production costs, income variability, and a limited ability to set prices. Additionally, the absence of Good Agricultural Practices (GAP), restricted access to irrigation, and financial constraints negatively impact both productivity and resilience to environmental stressors such as typhoons and floods. Moreover, disparities in income and financial management suggest that certain farmers are better positioned for success, while others remain vulnerable to external factors. These findings underscore the necessity for targeted interventions to address the economic and environmental challenges inherent in vegetable farming.

Recommendation(s)

To enhance agricultural productivity and sustainability, several key recommendations include in promoting awareness and adoption of Good Agricultural Practices (GAP) through training programs, conduct regular workshops and training sessions to educate farmers on GAP, improve financial literacy of vegetable growers, which can improve productivity and soil health. Support the establishment of farmer cooperatives to enhance their access to markets and enable them to have greater control over pricing. Additionally, provide financial literacy programs to empower farmers to manage and allocate their resources effectively. Finally, select farmer cooperator carefully for extension projects to ensure that technical assistance and resources reach those who will benefit the most, resulting in improved farming practices and increased profitability.

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