



RESEARCH PAPER

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Profile of lowland vegetable growers in cagayan province, Philippines

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Abstract

This study was implemented from January to June 2021 in response to government efforts in improving farm productivity to combat food insecurity amidst the pandemic. The study aimed to establish baseline information of vegetable growers and improve the economic benefits of vegetable production in the province. There are 221 profiled vegetable growers from 12 barangays in 7 municipalities covered by the project through the aid of structured questionnaires, where the consolidated data were analyzed using a statistical tool. The result shows that the respondents are middle-aged Ilocano, slightly male-dominated, married with a 4-member nuclear family, Roman Catholic, attained secondary education and members of an organization. Furthermore, the respondents claimed that vegetable production provides them the highest income with an average income amounting to Php15,773.85 per cropping season from an average area of 0.77 ha. The respondents also claimed that the high price of fertilizers, scarcity of manual labor, high perishability and low market absorption of commodities severely affected them in their production, harvesting, post-harvest and marketing operations. Given the remarkable contribution of vegetable production to the respondents amidst the effects of pressing problems encountered in their operations, it is therefore recommended to intensify government assistance to *pinakbet* vegetable growers on mechanization, inputs, product consolidation, marketing, and support price to sustain a whole year-round supply of *pinakbet* vegetables in the province of Cagayan or in Region 02.

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Introduction

Food insecurity remained to be a pressing concern in the Philippines even before the Covid-19 pandemic hit. Survey results based from the Expanded National Nutrition Survey (ENNS) of the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) revealed that the percentage of Filipinos claiming to be food insecure increased significantly by 10.2% from 2018 to 2019 alone (DOST, 2021). The ENNS further revealed that food insecure Filipinos mostly belong to households engaged in agriculture.

Therefore, the occurrence of the Covid-19 pandemic exacerbated the existing food insecurity issue in the country as Covid-19 impacts ravages the agriculture sector. This resulted in increased market risks in vegetable production, broadened the gap between the farm gate price and the market price of vegetable commodities as well as declined small-scale farmers' income (Gu and Wang, 2020).

In response, the government enacted the Republic Act No. 11469, known as Bayanihan to Heal as One Act (Bayanihan I), in March 2020, declaring a state of national emergency over the country and granting the President additional authority to adopt temporary emergency measures. Furthermore, the Republic Act No. 11494, known as Bayanihan to Recover as One Act (Bayanihan II), was enacted in September 2020 as a follow up to Bayanihan I to promote dynamic social order that will ensure the prosperity and independence of the nation and free the people from poverty, particularly in the aftermath of this natural and man-made disaster. Likewise, it aims to accelerate the recovery and bolster the resilience of the Philippine economy through measures grounded on economic inclusivity and collective growth through fiscal sustainability.

In support to Bayanihan II, the "Massive Seeds and Seedlings Production Program" under the "Plant, Plant, Plant Program" or "Ahon Lahat, Pagkaing Sapat (ALPAS) Laban sa Covid-19 Program" of the Department of Agriculture was implemented in

partnership with the different State Universities aiming to increase farm productivity and to ensure food sufficiency amidst pandemic. Thus, the Cagayan State University, as one of the implementing institutions, was able to implement the study through the funding support of the Department of Agriculture-High Value Crops Development Program Regional Field Office 02 (DA-HVCDP Ro2) for massive sustainable lowland vegetable seeds and seedlings production in Cagayan province. The study assisted twelve (12) barangays in seven (7) municipalities through the four (4) agricultural campuses of the Cagayan State University.

Lowland vegetables, including eggplant, okra (ladyfinger), bitter melon, pepper, tomato, string beans, bottle gourd and squash, which are locally known as *pinakbet* vegetables, are abundantly grown in Cagayan province, especially during the wet season. However, most of the *pinakbet* vegetables in the market during the dry season come from the Ilocos region as the top producing region of lowland vegetables (DA-Ilocos Region, 2018). Thus, the study intended to sustain *pinakbet* vegetable supply in the province throughout the year, considering that *pinakbet* vegetable crops are efficient in generating cash in a short period, even in just a small land area operation. The study assisted and selected vegetable growers in the province in producing safe *pinakbet* vegetables on a commercial and backyard scale to support food security as a quick response for their recovery from the pandemic. Likewise, the study established baseline information from the vegetable growers covering their sociodemographic and socioeconomic profile and problems encountered in their farming operation.

Materials and methods

Research design

The study was conducted in the twelve (12) barangays of seven (7) agricultural municipalities in Cagayan province including: Brgy. Cagumitan, Tuao; Brgy. Aquib, Piat; Brgy. Sto. Domingo, Piat; Brgy. Palusao, Sto. Niño; Brgy. Bangan, Sanchez Mira; Brgy. Dagueray, Sanchez Mira; Brgy. Centro 1, Sanchez

Mira; Brgy. Centro 2, Sanchez Mira; Brgy. Allasitan Pamplona; Brgy. Tapel, Gonzaga; Brgy. Sta. Maria, Gonzaga; and Brgy. San Mariano, Lal-lo. Each of the mentioned municipalities belongs to the service areas of the four (4) agricultural campuses of the Cagayan State University including CSU Gonzaga, CSU Lal-lo, CSU Sanchez Mira and CSU Piat. CSU Gonzaga is in-charge in the implementation of the study in the municipality of Gonzaga, CSU Lal-lo in the municipality of Lal-lo, CSU Sanchez Mira in the municipalities of Sanchez Mira and Pamplona and CSU Piat in the municipalities of Piat, Tuao and Sto. Niño. A structured questionnaire was used to gather data from the selected respondents who engage in vegetable production. The collected data was consolidated and analyzed with the aid of Statistical Package for Social Sciences software.

Research instruments

One (1) research instrument, which is the Vegetable Growers' Profile Data Questionnaire, was used to collect necessary data. The said research instrument is composed of three (3) parts. The first part of the instrument contains the sociodemographic profile of the vegetable grower respondents, which includes age, sex, religion, ethnicity, civil status, type of family, family size, highest educational attainment, and organizational membership.

The second part contains the socioeconomic profile of the respondents such as other economic activities of the vegetable grower respondents; homeownership status; home condition; the number of rooms; location of kitchen; fuel used in cooking; source of lighting; location of bathroom; toilet type; drainage type; source, sufficiency and quality of water supply; major source of income, area cultivated for vegetable production; income generated from vegetable production; the number of cropping seasons per year; tenure status; and grown vegetable commodities. The third part contains the problems encountered by the respondents during their production, harvesting, post-harvest and marketing operations, as well as their willingness and reasons to continue in vegetable production.

Data gathering procedures

The establishment of baseline information through profiling was conducted with the assistance of the Local Government Units of the seven (7) municipalities through their Municipal Agriculture Offices and barangay officials of the twelve (2) adopted barangays. Each involved campus designated a Campus Project In-Charge to spearhead and supervise the conduct of the data gathering as well as to ensure the validity of the data gathered. All in all, a total of 221 vegetable grower respondents were profiled and selected as project beneficiaries. The Gonzaga and Sanchez Mira campuses profiled 50 respondents each, where 51 respondents were also profiled per Lal-lo campus, while the Piat campus profiled a total of 70 respondents.

Data analysis

The collected data were consolidated and encoded by the Campus Project In-Charge using Microsoft Excel for data cleaning purposes. The organized data was imported to Statistical Package for Social Sciences software for data analysis, where the analyzed data output includes frequency, percentage, mean and standard deviation. Lastly, analyzed data interpretation, discussion as well as ranking was conducted.

Results and discussion

Sociodemographic profile of vegetable grower respondents

Table 1 shows the sociodemographic profile of the vegetable grower respondents. The data shows that out of the 221 respondents, 123 or 55.66% are males, and 98 or 44.34% are females. The respondents in the municipality of Gonzaga are slightly dominated by females with 27 or 54%, while 23 respondents or 46% are males. In the municipality of Lal-lo, 28 or 54.9% are also males. The municipality of Piat and Sanchez Mira both have 60% male respondents. This data shows that vegetable farming in the three towns, including Lal-lo, Piat, and Sanchez Mira, is slightly dominated by males. However, it also indicates that the engagement of females in vegetable farming is encouraged, given their remarkable participation rate.

Regarding the respondents' age, 221 respondents in the four municipalities are in their middle age, with an average age of 46.34 and a standard deviation of 13.84. In the municipality of Gonzaga, a total of 21 or 42% of the respondents have ages ranging from 31-40 years old, followed by 19 or 38% of the respondents belonging to the age bracket of 41-50. Respondents from the municipality have a mean age of 43.06 and a standard deviation of 8.76. While in the municipality of Lal-lo, the 51 vegetable grower respondents have an age ranging from 28-67 years old with an average age of 47.25 and a standard deviation of 10.78. Fifteen of the respondents, or 29.4%, are between 41 and 50 years old. On the other hand, the least number belongs to the 21-30 age bracket with only four respondents or 7.8%. Moreover, the vegetable

growers in the municipality of Piat have seventy (70) respondents with ages ranging from 17-84 years old with a mean age of 45.19 and a standard deviation of 16.30. Similar to Gonzaga, most of the respondents in Piat belong to the 31-40 age bracket with 20 respondents, equivalent to 28.6%, while the least number of respondents belong to ages 17-20 and 71-80 with only one respondent or 1.4% for each age bracket. In the municipality of Sanchez Mira, out of 50 vegetable grower respondents, the youngest is 20 years old and the oldest 82 years old. Most of the respondents have ages ranging from 51-60 years old, while only two respondents, or 4%, belong to the 81-74 age bracket. Vegetable grower respondents in the municipality of Sanchez Mira have an average age of 50.32 and a standard deviation of 16.24.

Table 1. Sociodemographic profile of vegetable grower respondents.

Variable	Campus										Rank
	Gonzaga		Lal-lo		Piat		Sanchez Mira		OVERALL		
	Frequency (n=50)	Percent	Frequency (n=51)	Percent	Frequency (n=70)	Percent	Frequency (n=50)	Percent	Frequency (n=221)	Percent	
Sex											
Male	23	46.0	28	54.9	42	60.0	30	60.0	123	55.66	1
Female	27	54.0	23	45.1	28	40.0	20	40.0	98	44.34	2
Age											
17-20	0	0	0	0	1	1.4	0	0	1	0.45	8
21-30	3	6.0	4	7.8	12	17.1	5	10.0	24	10.86	4.5
31-40	21	42.0	13	25.5	20	28.6	8	16.0	62	28.05	1
41-50	19	38.0	15	29.4	9	12.9	8	16.0	51	23.08	2
51-60	6	12.0	12	23.5	14	20.0	17	34.0	49	22.17	3
61-70	1	2.0	7	13.7	10	14.3	6	12.0	24	10.86	4.5
71-80	0	0	0	0	1	1.4	4	8.0	5	2.26	6.5
81-82	0	0	0	0	3	4.3	2	4.0	5	2.26	6.5
Mean	43.06		47.25		45.19		50.32		46.34		
SD	8.76		10.78		16.30		16.24		13.84		
Ethnicity											
Ilocano	50	100.0	38	74.5	0	0	47	94.0	136	61.54	1
Tagalog	0	0	0	0	69	98.6	0	0	69	31.22	2
Kalinga	0	0	10	19.6	0	0	0	0	10	4.52	3
Ibanag	0	0	0	0	1	1.4	3	6.0	4	1.81	4
Agta	0	0	2	3.9	0	0	0	0	2	0.90	5
Religion											
Roman Catholic	39	78.0	39	74.5	69	98.6	14	28.0	160	72.40	1
Methodist	0	0	0	0	0	0	16	32.0	16	7.24	2
Born Again	5	10.0	7	13.8	0	0	2	4.0	14	6.33	3
Iglesia Ni Cristo	0	0	1	2.0	1	1.4	5	10.0	7	3.17	4
Baptist	0	0	0	0	0	0	5	10.0	5	2.26	5.5
Iglesia Filipina Independiente	0	0	0	0	0	0	5	10.0	5	2.26	5.5
Jehovah's Witnesseth	4	8.0	0	0	0	0	0	0	4	1.81	7.5
Mormon	1	2.0	2	3.9	0	0	1	2.0	4	1.81	7.5
Pentecost	0	0	0	0	0	0	1	2.0	1	0.45	10.5
Protestant	0	0	0	0	0	0	1	2.0	1	0.45	10.5
Unitarian Universalist Church of the Philippines	1	2.0	0	0	0	0	0	0	1	0.45	10.5
Union Espiritista Cristiana de Filipinas Inc.	0	0	1	2.0	0	0	0	0	1	0.45	10.5
Civil Status											
Married	48	96.0	45	88.2	53	75.7	31	62.0	177	80.09	1

Single	0	0	3	5.9	10	14.3	14	28.0	27	12.22	2
Widow/ Widower	2	4.0	3	5.9	7	10.0	5	10.0	17	7.69	3
Type of Family											
Nuclear	50	100.0	45	88.2	70	100.0	50	100.0	215	97.29	1
Extended	0	0	6	11.8	0	0	0	0	6	2.71	2
Family Size											
2	5	10.0	6	11.8	1	1.4	1	2.0	13	5.88	4
3	11	22.0	7	13.7	23	32.9	6	12.0	47	21.27	2
4	16	32.0	21	41.2	38	54.3	16	32.0	91	41.18	1
5	14	28.0	8	15.7	8	11.4	10	20.0	40	18.10	3
6	2	4.0	5	9.8	0	0	1	2.0	8	3.62	6
7	1	2.0	1	2.0	0	0	7	14.0	9	4.07	5
8	1	2.0	2	3.9	0	0	4	8.0	7	3.17	7
9	0	0	1	2.0	0	0	3	6.0	4	1.81	8
10	0	0	0	0	0	0	1	2.0	1	0.45	9.5
11	0	0	0	0	0	0	1	2.0	1	0.45	9.5
Mean	4.1		4.29		3.76		5.2		4.29		
SD	1.33		1.55		0.67		1.9		1.47		
Organizational Membership											
Yes	0	0	33	64.71	44	62.86	50	100	127	57.47	1
No	50	100	18	35.29	26	37.14	0	0	94	42.53	2
Highest Educational Attainment											
High School Level	39	76.0	21	41.18	43	61.43	27	54.0	130	58.82	1
High School Graduate	3	6.0	6	11.8	7	10.0	8	16	24	10.86	2
Elementary Graduate	2	4.0	7	13.7	8	11.43	6	12	23	10.41	3
Elementary Level	2	4.0	7	13.7	8	11.43	0	0	17	7.69	4
College Level	1	2.0	4	7.8	4	5.7	5	10	14	6.33	5
College Graduate	3	6.0	5	9.8	0	0	3	6	11	4.98	6
Vocational Graduate	0	0	1	2.0	0	0	1	2.0	2	0.90	7

Most of the vegetable grower respondents in the four municipalities are Ilocano in their ethnicity accounted for 100% in the municipality of Gonzaga, 74.5% in the municipality of Lal-lo, and 94% in the municipality of Sanchez Mira, as shown in Table 1. Overall, 136 out of 221 respondents, equivalent to 61.54%, are Ilocano. On the other hand, almost all of the respondents in the municipality of Piat are Tagalog, by 98.6%. This accounts for 31.22% of the total number of respondents, which is second to the Ilocano ethnicity. As to the religious affiliations of the respondents, most of the respondents from the four municipalities are Roman Catholic. Other religious affiliations of respondents are; Baptist, Born Again, Iglesia Filipina Independiente, Iglesia Ni Cristo, Methodist, Pentecost, Jehovah's Witnesseth, Mormon, Unitarian Universalist Church of the Philippines, Union Espiritista Cristiana de Filipinas Inc.

Most of the respondents are married, which is accounted for 80.09% of the total number of respondents. In the municipality of Gonzaga, married respondents are accounted for 96%, 88.2% in the municipality of Lal-lo, 75.7% in the municipality of Piat, and 62% in the municipality of Sanchez Mira. Moreover, 27 out of 221 or 12.22% of the respondents

are single, while 17 or 7.69% are widow/widowers.

Meanwhile, respondents maintain a nuclear type of family as revealed by all (50 or 100%) of the respondents from the municipality of Gonzaga, Piat, and Sanchez Mira and by 45 or 88.2% from the municipality of Lal-lo. The remaining 11.8% of respondents from the municipality of Lal-lo are extended families.

For the respondents' family size, the municipality of Gonzaga has an average family size of 4.1 and a standard deviation of 1.33, while the respondents from the municipality of Lal-lo have a mean family size of 4.29 and a standard deviation of 1.55. In the municipality of Piat, the average family size of the respondents is 3.76, with a standard deviation of 0.67. Furthermore, in Sanchez Mira, the respondents declared that they have a mean family size of 5.2 and a standard deviation of 1.9. Overall, the average family size of the 221 respondents is 4.29, with a standard deviation of 1.47. As to organizational membership, none of the vegetable grower respondents from the municipality of Gonzaga is affiliated with any organization. At the same time, 33 or 64.71% from the municipality of Lal-lo, 44 or 62.86%

from the municipality of Piat, and all (50 or 100%) of the vegetable grower respondents from the municipality of Sanchez Mira declared that they are members of organizations. Moreover, the majority of the vegetable farmer respondents attained high school level as their highest educational attainment, with 130 or 58.82% in the four municipalities. There

are 39 or 76% from the respondents in the municipality of Gonzaga, 21 or 41.18% in the municipality of Lal-lo, 43 or 61.43% from the municipality of Piat, and 27 or 54% from the municipality of Sanchez Mira who confirmed that high school level is their highest level of education attained.

Table 1. Socioeconomic profile of vegetable grower respondents.

Variable	Campus										Rank
	Gonzaga		Lal-lo		Piat		Sanchez Mira		OVERALL		
	Frequency (n=50)	Percent	Frequency (n=51)	Percent	Frequency (n=70)	Percent	Frequency (n=50)	Percent	Frequency (n=221)	Percent	
Home Ownership											
Owned	50	100.0	48	94.1	70	100.0	35	70.0	203	91.86	1
Staying with parents/relatives	0	0	0	0	0	0	11	22.0	11	4.98	2
Occupying for free	0	0	3	5.9	0	0	2	4.0	5	2.26	3
Rented	0	0	0	0	0	0	2	4.0	2	0.90	4
Home Condition											
Combination of concrete and wood	50	100.0	32	62.8	34	48.6	33	66.0	149	67.4	1
Combination of concrete and light materials	0	0	11	21.6	36	51.4	12	24.0	59	26.7	2
Combination of wood and light materials	0	0	7	13.7	0	0	4	8.0	11	5.0	3
Light materials	0	0	1	1.9	0	0	1	2.0	2	0.90	4
Number of Rooms											
1	3	6.0	14	27.5	0	0	0	0	17	7.69	4
2	20	40.0	25	49.0	36	51.4	12	24.0	93	42.08	1
3	19	38.0	9	17.7	30	42.9	18	36.0	76	34.39	2
4	7	14.0	2	3.9	4	5.7	15	30.0	28	12.67	3
5	1	2.0	1	2.0	0	0	1	2.0	3	1.36	6
6	0	0	0	0	0	0	4	8.0	4	1.81	5
Mean	2.66		2.90		2.54		3.34		3.31		
SD	0.87		1.06		0.61		1.12		1.67		
Location of Kitchen											
Attached to rooms/house	43	86.0	35	68.6	70	100.0	28	56.0	176	79.64	1
Separate	7	14.0	16	31.4	0	0	22	44.0	45	20.36	2
Fuel Used											
Gas and Wood	10	20.0	7	13.7	70	100.0	11	22.0	98	44.3	1
Wood	35	70.0	38	74.5	0	0	10	20.0	83	37.7	
Gas	1	2.0	3	5.9	0	0	28	56.0	32	14.5	2
Electric	4	8.0	1	2.0	0	0	1	2.0	6	2.7	3
Electric and Wood	0	0	1	2.0	0	0	0	0	1	0.5	4.5
Electric and Gas	0	0	1	2.0	0	0	0	0	1	0.5	4.5
Location of Bathroom											
Outside the house	38	76.0	41	80.4	60	85.7	13	26.0	152	68.78	1
Within the house	12	24.0	10	19.6	10	14.3	37	74.0	69	31.22	2
Toilet Type											
Water Sealed	39	78.0	51	100.0	69	98.6	46	92.0	205	92.76	1
Pit Type	11	22.0	0	0	1	1.4	4	8.0	16	7.24	2
Type of Drainage											
Open Canal	50	100.0	44	86.3	69	98.6	48	96.0	211	95.48	1
Close	0	0	7	13.8	1	1.4	2	4.0	10	4.52	2
Source of Water Supply											
Manual Pump Well and Open Well	31	62	45	88.24	67	95.71	45	90	188	85.07	1
Electric Pump	19	38	2	3.9	2	2.8	5	10	28	12.67	2
Piped	0	0	3	5.9	1	1.4	0	0	4	1.81	3
Spring	0	0	1	2	0	0	0	0	1	0.45	4
Water Sufficiency											
Sufficient	50	100	36	70.6	65	92.9	50	100	201	90.95	1
Insufficient	0	0	15	29.4	5	7.1	0	0	20	9.05	2
Water Quality											
Potable	50	100	48	94.1	70	100	50	100	218	98.64	1
Unsafe	0	0	3	5.9	0	0	0	0	3	1.36	2

Source of Lighting											
Electricity	50	100	47	92.2	70	100.0	50	100.0	217	98.19	1
Solar Power	0	0	3	5.9	0	0	0	0	3	1.36	
Gas	0	0	1	2.0	0	0	0	0	1	0.45	
Other Economic Activities (Multiple Response)											
Rice Production	28	56.0	13	25.5	34	48.57	18	36.0	121	54.75	1
Corn Production	26	52.0	44	86.3	32	45.71	2	4.0	104	48.06	2
Fruits Production	0	0	3	5.9	0	0	1	2.0	4	1.81	3.5
Animal Raiser	0	0	0	0	4	5.7	0	24.0	4	1.81	3.5
Fishermen	0	0	0	0	0	0	3	6.0	3	1.36	5
Fishpond Operator	0	0	0	0	0	0	1	2.0	1	0.45	6
Major Source of Income											
Crop Production	50	100	51	100	66	94.30	50	100	217	98.19	1
Crop and Animal Production	0	0	0	0	4	5.70	0	0	4	1.81	2
Commodities Grown (Multiple Response)											
Vegetables	0	0	2	3.94	66	94.3	24	48	92	41.63	1
Rice	40	80	0	0	0	0	26	52	66	29.86	2
Corn and Vegetables	0	0	29	56.86	0	0	0	0	29	13.12	3
Corn	10	20	0	0	0	0	0	0	10	4.52	4
Rice and Vegetables	0	0	9	17.65	0	0	0	0	9	4.07	5
Vegetable, Rice, and Corn	0	0	8	15.67	0	0	0	0	8	3.62	6
Swine	0	0	0	0	4	5.7	0	0	4	1.81	7
Fruit-bearing trees	0	0	1	1.96	0	0	0	0	1	0.45	9
Vegetable, Corn, Fruit-bearing trees	0	0	1	1.96	0	0	0	0	1	0.45	9
Rubber tree and vegetables	0	0	1	1.96	0	0	0	0	1	0.45	9
Area Cultivated for Vegetable Production, ha											
0.001-1.000	50	100	33	64.71	67	95.7	41	82	191	86.43	1
1.001-2.000	0	0	16	31.37	1	1.4	8	16	25	11.31	2
2.001-3.000	0	0	2	3.92	2	2.9	0	0	4	1.81	3
3.001-4.000	0	0	0	0	0	0	1	2	1	0.45	4
Mean	0.53		1.87		0.6		0.15		0.77		
SD	0.25		2.08		0.48		0.14		0.62		
Income Generated from Vegetable Production											
10,000 and below	13	26	9	17.6	23	32.9	18	36	63	28.51	2
10,001-20,000	27	54	5	9.8	32	45.7	1	2	65	29.41	1
20,001-30,000	6	12	12	23.5	9	12.9	8	16	35	15.84	3
31,001-40,000	3	6	6	11.8	3	4.3	1	2	13	5.88	4.5
41,000-50,000	1	2	7	13.7	0	0	5	10	13	5.88	4.5
50,001-60,000	0	0	6	11.8	3	4.3	3	6	12	5.43	6
60,001-70,000	0	0	2	3.9	0	0	3	6	5	2.26	8
70,001-80,000	0	0	1	2	0	0	3	6	4	1.81	9
80,001 and above	0	0	3	5.9	0	0	8	16	11	4.98	7
Mean	15,316.00		25,350.39		15,311.00		7,118.00		15,773.85		
SD	8,453.76		15,421.53		13,616.20		3,651.26		10,285.67		
Number of Cropping Season per Year											
1	0	0	6	12	24	34.3	4	8	34	15.38	2
2	50	100	44	86	45	64.3	43	86	182	82.35	1
3	0	0	1	2	1	1.4	3	6	5	2.26	3
Mean	2		1.94		1.66		1.98		1.87		
SD	0		0.47		0.48		0.38		0.42		
Tenurial Status of Cultivated Land											
Owner	50	100	27	52.9	67	95.7	44	88	188	85.07	1
Tenant	0	0	22	43.1	3	4.3	6	12	31	14.03	2
Owner and Tenant	0	0	2	4	0	0	0	0	2	0.90	3

Socioeconomic profile of the vegetable grower respondents

Table 2 shows the socioeconomic profile of the vegetable grower respondents. As to the respondents' homeownership status, data shows that 100% of the respondents in the municipalities of Gonzaga and Piat

owned the home they occupied. While in the municipality of Lal-lo, 48 respondents accounted for 94.1% of are homeowners, and 35 or 70% of the respondents from the municipality of Sanchez Mira are also homeowners. The home condition of the vegetable grower respondents is generally concrete

and a combination of concrete and wood type of houses as described by all (50 or 100%) of the respondents in the municipality of Gonzaga, by 32 or 62.8% of the respondents in the municipality of Lal-lo, 34 or 48.6% of the respondents in the municipality of Piat and 33 or 66% of the respondents in the municipality of Sanchez Mira. Overall, a total of 149 or 67.42% in the four towns of Cagayan have houses made up of a combination of concrete and wood. Other home conditions of the 221 vegetable grower respondents are a combination of concrete and light materials with 59 respondents accounting for 26.7%; a combination of wood and light materials with 11 respondents accounted for 5% and; light materials with two respondents accounted for 0.9%.

For the number of rooms in the respondents' houses, data shows that the majority of the respondents in the municipalities of Gonzaga, Lal-lo, and Piat have two rooms in their houses. In the municipality of Gonzaga, 20 out of 50, equivalent to 40%, have two rooms in their houses. It is followed by three rooms represented by 19 respondents or 38% and four rooms represented by seven respondents or 14%. In the municipality of Lal-lo, 25 respondents, equivalent to 49%, have two rooms, followed by 14 respondents accounted for 27.5% with one room, and nine respondents accounted for 17.7% with three rooms in their houses. In the municipality of Piat, 36 out of 75 respondents, equivalent to 51.4%, have two rooms in their houses. It is followed by 30 respondents, equivalent to 42.9% with three rooms, and only four respondents accounted for 5.7% with four rooms in their houses. In the municipality of Sanchez Mira, 18 out of 50 respondents, equivalent to 36%, have three rooms in their houses. Meanwhile, 15 respondents, equivalent to 30%, have four rooms, and 12 respondents, equivalent to 24%, have two rooms in their houses. Generally, the vegetable grower respondents have an average of 3 rooms in their houses as exhibited by the mean number of rooms; 2.66 by the respondents in the municipality of Gonzaga, 2.9 in the municipality of Lal-lo, 2.54 in the municipality of Piat, 3.34 in the municipality of Sanchez Mira with an overall mean of 3.31.

Meanwhile, the data shows that more than three fourths (176 or 79.64%) of the respondents in the four municipalities have a kitchen attached to their house, which breaks down as follows; 43 or 86% in the municipality of Gonzaga, 35 or 68.6% in the municipality of Lal-lo, 70 or 100% in the municipality of Piat and 28 or 56% in the municipality of Sanchez Mira. Moreover, 45 out of 20.36% of the respondents have separate kitchens. As to the fuel used in the respondents' households, a total of 213 or 96.38% of the 221 respondents declared to have been using a combination of gas and wood as fuel in cooking which breaks down as follows: 45 or 92% of the respondents in the municipality of Gonzaga; 48 or 94.1% of the respondents in the municipality of Lal-lo; 70 or 100% of the municipality of Piat; and 49 or 98% of the municipality of Sanchez Mira. Other fuels used in cooking in the respondents' households include wood, gas, electric, a combination of electric and wood, and a combination of electric and gas. Regarding the location of the bathroom and toilet type in the respondents' houses, the respondents claimed to have bathrooms located outside their houses accounted for 38 or 76% in the municipality of Gonzaga, 41 or 80.4% in the municipality of Lal-lo, 60 or 85.7% in the municipality of Piat, 13 or 26% in the municipality of Sanchez Mira. The data show that majority of the respondents accounted for 152 or 68.78% revealed to have their bathrooms located outside their houses.

The same table shows that almost all (205 or 92.76%) of them are using a water-sealed type of toilet. This breaks down as follows: 39 or 78% in the municipality of Gonzaga; 51 or 100% in the municipality of Lal-lo; 69 or 98.6% in the municipality of Piat; and 46 or 92% in the municipality of Sanchez Mira. Meanwhile, 16 or 7.24% of the respondents use pit-type toilets.

Moreover, almost all (211 or 95.48%) of them are using Open Canal as their drainage system. All (50 or 100%) in the municipality of Gonzaga, 44 or 86.3% in the municipality of Lal-lo, 69 or 98.6% in the municipality of Piat, and 48 or 96% in the municipality of Sanchez Mira to have been using the open canal drainage system.

Table 3. Problems encountered by the vegetable grower respondents.

Variable	Campus										Rank
	Gonzaga		Lal-lo		Piat		Sanchez Mira		OVERALL		
	Frequency (n=50)	Percent	Frequency (n=51)	Percent	Frequency (n=70)	Percent	Frequency (n=50)	Percent	Frequency (n=221)	Percent	
Problems encountered											
Production (Multiple Response)											
High price of fertilizer	50	100	45	88.2	70	100	10	20	175	79.19	1
High price of pesticides	0	0	40	78.4	70	100	9	18	119	53.85	2
High price of seeds	23	46	0	0	0	0	18	36	41	18.55	3
Scarcity of water supply	0	0	23	45.1	0	0	5	10	28	12.67	4
High labor cost	0	0	13	25.5	0	0	6	12	19	8.60	5
Scarcity of labor	0	0	1	2	0	0	5	10	6	2.71	6
Insufficient government support and subsidy	0	0	0	0	0	0	3	6	3	1.36	7
Low production employing GAP and Organic Production	0	0	0	0	0	0	1	2	1	0.45	8
Harvesting (Multiple Response)											
Scarcity of manual labor for harvesting	0	0	28	54.9	70	100	4	8	102	46.15	1
High machinery rental	0	0	15	29.4	70	100	41	82	126	57.01	2
High labor cost in harvesting	0	0	19	37.3	0	0	9	18	28	12.67	3
Post-harvest (Multiple Response)											
Highly perishable	50	100	51	100	70	100	50	100	221	100	1
High hauling cost	0	0	35	68.6	0	0	7	14	42	19.00	2
Absence of hauling	0	0	16	31.4	0	0	1	2	17	7.69	3
Marketing (Multiple Response)											
Low market absorption	0	0	51	100	70	100	41	82	162	73.30	1
Low market price during peak season	0	0	0	0	70	100	9	18	79	35.75	2
Willingness to Continue in Vegetable Farming											
Yes	50	100	51	100	70	100	50	100	221	100.00	1
Reasons of Interest in Vegetable Farming (Multiple Response)											
Additional Income and food for family consumption	50	100	51	100	70	100	51	100	221	100.0	1
Hobby/Passion	0	0	0	0	0	0	13	26	13	5.88	2
High Market Demand	0	0	3	6	0	0	2	4	5	2.26	3
Less production cost	0	0	1	1.96	0	0	2	4	3	1.36	4

At the same time, the manual pump well and open well are the sources of water supply by most (188 or 85.07%) of the respondents. This is accounted for 31 or 62% in the municipality of Gonzaga, 45 or 88.24% in the municipality of Lal-lo, 67 or 95.71% in the municipality of Piat, and 45 or 90% in the municipality of Sanchez Mira. Other sources of water supply in the four municipalities include an electric pump with 28 respondents equivalent to 12.67%;

piped barangay supply with four respondents equivalent to 1.81%; and spring with one respondent equivalent to 0.45%.

Further, almost all (201 or 90.95%) of the respondents disclosed that their water supply is sufficient. It was claimed by 100% of the respondents in the municipality of Gonzaga and Sanchez Mira, 36 or 70.6% in the municipality of Lal-lo, and 65 or 92.9%

in the municipality of Piat. Meanwhile, a total of 20 respondents from the municipality of La-lo and Piat claimed to have an insufficient water supply. As to the water quality in the respondents' households, 218 out of 221 or 98.64% claimed to have potable water while only three respondents, or 1.36%, claimed the opposite.

Concerning their source of lighting, 217 or 98.19% of the total respondents confirmed to have been using electricity subscribed from the Cagayan Electric Cooperative (CAGELCO) as their sole source of lighting. Similarly, all (50 or 100%) of the respondents from the municipality of Gonzaga, 47 or 92.2% from the municipality of Lal-lo, all (70 or 100%) from the municipality of Piat, and all (50 or 100%) of the respondents in the municipality of Sanchez Mira are enjoying the electricity services of CAGELCO. Meanwhile, in the municipality of Lal-lo, three respondents, or 5.9%, use solar power, and one respondent, or 2%, use gas as the source of lighting.

Table 2 also shows other economic activities of vegetable grower respondents. The respondents from the municipality of Gonzaga revealed that aside from being vegetable growers, 28 or 56% of them are rice farmers, and 26 or 52% are corn farmers. In the municipality of Lal-lo, the majority (44 or 86.3%) are corn farmers, 13 or 25.5% are rice farmers, 3 or 5.9% are fruit/tree growers, and 1 or 2% are animal raisers. Among the fruit/tree grown by the respondents are pineapple, banana, avocado, and rubber trees. In the municipality of Piat, 32 or 45.71% are corn farmers, 34 or 48.57% are rice farmers, and 4 or 5.7% are animal raisers. The municipality's vegetable grower/animal raiser respondents are into backyard swine production with five heads each of the respondents. In the municipality of Sanchez Mira, 18 or 36% are rice farmers, 2 or 4% are corn farmers, 1 or 2% is fruit grower, and another 1 or 2% is fishpond operator, 3 or 6% are fishermen, and 2 or 4% are animal raisers. Overall, the majority of the respondents from the four municipalities are engaged in rice farming. This data shows that respondents in the municipalities of Gonzaga, Lal-lo, and Sanchez

Mira rely on crop production as their major source of income. In the municipality of Piat, 66 out of 70 respondents, equivalent to 94.3%, claim that crop production is their major source of income, while the remaining four respondents rely on both crop and animal production as their major source of income. For crop production, the respondents are into rice, corn, vegetables, and fruit production.

As to the rank of commodities grown by respondents and rated as their highest generating income, Table 2 shows vegetable ranks number one (1) as the highest generating income by the vegetable grower respondents, followed by rice as rank two (2), the combination of corn and vegetable as ranked number three (3), corn as ranked number four (4), rice and vegetables as ranked number five (5), the combination of rice, corn and vegetable as ranked six (6), swine as ranked seven (7), while fruit-bearing-trees, vegetable in combination with corn and fruit-bearing trees and rubber tree in combination with vegetables garnered the same ranks of nine (9). Hence, vegetable production as cash crops is recognized as the highest household income contributor by the respondents considering its short growth and return to investment.

Regarding the area cultivated (ha) by the respondents devoted to vegetable production, data shows that the municipality of Gonzaga are cultivating a mean area of 0.53 hectare and a standard deviation of 0.25. In the municipality of Lal-lo, the respondents cultivate an average area of 1.87 hectares and a standard deviation of 1.08. Moreover, the respondents in the municipality of Piat are cultivating an average area of 0.6 hectare and a standard deviation of 0.48, while an average area of 0.15 and a standard deviation of 0.14 is cultivated by the respondents in the municipality of Sanchez Mira. Overall, the 221 respondents are cultivating an average area of 0.77 hectare with a standard deviation of 0.62.

Meanwhile, the income generated by the respondents from their vegetable growing during their wet season operation, i.e., July-December 2020, is also shown in

the table. The vegetable grower respondents from the municipality of Gonzaga divulge to have realized an average gross income amounting to Php15,316.00 with a standard deviation of Php8,453.76, respondents from Lal-lo raised an average gross income amounting to Php25,350.39 with a standard deviation of Php15,421.53, an amount of Php15,311.00 and a standard deviation of Php13,616.20 was also realized by the grower respondents from the municipality of Piat, and an amount of Php7,118.00 with a standard deviation of Php3,651.26 was gained by the grower respondents from the municipality of Sanchez Mira. An overall mean of Php15,773.85 and a standard deviation of Php10,285.67 were generated by the respondents in the four growing municipalities of Cagayan province.

Moreover, most (182 or 82.35%) of the vegetable grower respondents were revealed to have operated for two (2) cropping seasons a year. This is accounted for 50 or 100% in the municipality of Gonzaga, 44 or 86% with an average of 1.94 and standard deviation of 0.47 in the municipality of Lal-lo, 45 or 64.3% with an average of 1.66 and a standard deviation of 0.48 in the municipality of Piat and 43 or 86% with an average of 1.98 and standard deviation of 0.38 in the municipality of Sanchez Mira.

For the tenure status of the respondents, the data shows that all 50 respondents of the municipality of Gonzaga own the land they cultivate. In the municipality of Lal-lo, the majority of the respondents accounted to 52.9% are landowners, while 22 respondents, equivalent to 43.1%, are tenants, and two respondents, equivalent to 4%, are both landowners and tenants. In the municipality of Piat, almost all (67 or 95.7%) of the respondents own the land they cultivate, while 3 or 4.3% are tenants. Similar to Piat, most (44 or 88%) of the respondents in Sanchez Mira are landowners, while 6 or 12% are tenants.

Problems encountered by the vegetable grower respondents

Table 3 shows the problems encountered by the

vegetable grower respondents from the production stage to harvesting, post-harvest, and marketing stage.

For the production stage, in the municipality of Gonzaga, the most pressing problems by the vegetable grower respondents are the high price of inorganic fertilizers by 100% and the high price of seeds by 46%. In the municipality of Lal-lo, the most encountered problems by the vegetable grower respondents are the high price of inorganic fertilizer by 88.2%; the high price of chemical-based pesticides by 78.4%; scarcity of water supply by 45.1; high labor cost by 25.5%; and scarcity of labor by 2%. While in the municipality of Piat, all the respondents claim that the high price of inorganic fertilizers and pesticides caused them problems during the production stage. In the municipality of Sanchez Mira, the most experienced problem was the high price of hybrid vegetable seeds, with 18 respondents accounting for 36%. It is followed by a high price of inorganic fertilizers with ten respondents accounting for 20% and a high price of chemical-based pesticides with nine respondents accounting for 18%.

For the harvesting stage, the respondents' most experienced problems in the municipality of Lal-lo are the scarcity of manual labor by 54.9%, high labor cost in harvesting (37.3%), and high machinery rental (29.4%). In the municipality of Piat, the respondents' most problems encountered during the harvesting stage are both high machinery rental and scarcity of manual labor, both accounting for 100% each. In the municipality of Sanchez Mira, the respondents' most encountered problems during the harvesting stage are high machinery rental (82%), high manual labor cost (18%), and scarcity of labor (8%).

For the post-harvest stage, the respondents' most encountered problems in the four municipalities are the high perishability of vegetable products, where all (100%) of them agreed. Absence of hauling (68.6%) and high hauling cost (34.4%) in the municipality of Lal-lo. In the municipality of Sanchez Mira, the respondents' also encountered problems during the

post-harvest stage, are high hauling cost (14%); and absence of hauling (2%).

For the marketing stage, all respondents in the municipality of Lal-lo encountered the problem of the low market absorption of products. Meanwhile, in the municipality of Piat, all respondents encountered problems on low market absorption and the low market price of their products. While in the municipality of Sanchez Mira, the respondents' most encountered problems during the harvesting stage are low market absorption (82%) and low market price (18%) with all the problems encountered by the respondents.

Furthermore, the same table presents the respondents' willingness and reasons for vegetable production. In the municipalities of Gonzaga, Lal-lo, Piat, and Sanchez Mira, all (100%) of the respondents claim that they are still willing to continue in vegetable production. All of them take an interest in vegetable farming for the benefits of additional income and food for their families. On the other hand, 13 or 26% said that it is a part of their hobby/passion, 2 or 4% each revealed that with high market demand and lower production cost compared to other commodities.

Conclusion

Based from the results of the study, vegetable production is the highest source of the vegetable grower respondents' income, operating in 2 cropping seasons a year, with an average income generated amounting to Php15,773.85.00 during the last season operation (January- June 2020). The most pressing problems encountered by respondents include the high price of fertilizers, scarcity of manual labor, high perishability and low market absorption of commodities. Considering the significant contribution of vegetable production to the respondents' income despite several problems

encountered in their operations, it is therefore recommended to intensify government assistance to *pinakbet* vegetable growers on mechanization, inputs, product consolidation, marketing, and support price to sustain a whole year-round supply of *pinakbet* vegetables in the province of Cagayan or in Region 02. Furthermore, projects benefiting vegetable growers should be institutionalized and formed as a part of a regular extension project of the four implementing agricultural campuses to sustain the project towards the attainment of a positive impact.

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