

ESTABLISHMENT OF PEST PROFILE IN DROUGHT AFFECTED VEGETABLE AREAS OF NEGROS ISLAND

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ABSTRACT

A study was conducted for one year (2011-2012) involving 275 respondents in nine vegetable growing areas of Negros Island that were affected by drought. The areas covered by the survey were: Sipalay City, Hinoba-an, Kabankalan City, Moises Padilla, Pulupandan, Valladolid, Escalante City, San Carlos City and Canlaon City. The objectives of the study were: to survey the different pests (insects and diseases) found in the drought-affected vegetable areas; to determine the extent of damage caused by these pests on vegetables grown in the area particularly pinakbet, chopsuey and indigenous vegetables and to identify the prevalent pests particularly insects and diseases that have been observed frequently occurring on vegetables grown in the said areas.

Results of the survey reveal that insects categorized as borers, defoliators or leaf feeder, sucking or plant sap feeder and underground were found prevalent by inflicting damage on different vegetables parts in nine vegetable growing sites. The borers were identified as eggplant fruit and shoot borer (*Leucinodes orbonales* Guenee), legume pod borer (*Maruca vitrata* Geyer) and tomato fruitworm (*Helicoverpa armigera* Hubner). Moreover, semi-looper (*Chrysodeixis chalcites* Esper), cutworm (*Spodoptera litura* Fab.), armyworm (*Spodoptera mauritia* Basidural), diamond back moth (*Plutella xylostella* Linn.), lady beetle (*Epilachna* sp), leafminer (*Liriomyza huidobrensis* Blanchard) and webworm (*Hellula undalis* Fabricius) were among the leaf feeding insects that have been observed frequently occurring on vegetables commonly grown by the respondents in their respective areas. Similarly, sucking insects particularly aphids (*Aphis* sp.), white fly (*Bemecia tabaci* Gennadius), bean bug (*Anoplocnemis phasiana* F.), plant hopper (*Stenocranus bakeri* Muir), green soldier bug (*Nezara viridula* Linn.) and mealy bugs (*Planococcus* sp.) were likewise noted by the respondents their incidence on the different growth stages of their vegetables. On the other hand, bacterial soft rot, damping off, anthracnose, phomopsis blight and Cercospora leaf spot were identified infecting most of the vegetables grown in the affected areas.

Findings from the study show that the extent of damage caused by insects and diseases on vegetables ranged from less than 10% to more than 30%.

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RATIONALE

Vegetables are known to play a vital role in the human diet as source of vitamins, minerals and other essential nutrients needed by the increasing populace. Production of these crops, however, still remains a nuisance among growers since vegetables are prone to damage and injury caused by insects and diseases which can occur anytime of the year. Complementary to this are weather factors like climate and temperature that can possibly favor the incidence of insect pests and diseases.

Apart from this, the long dry spell or the El Niño phenomenon which was experienced for the past years in almost part of the archipelago due to climate change has indeed affected vegetable production. Consequently, its occurrence associated with extreme climatic variability can greatly paralyze the agriculture sector and eventually the country's economy. Considering that this phenomenon occurs continuously and is prolonged for sometime, the areas that are planted with vegetables and others cash crops would likely suffer from drought. These affected areas are anticipated to have higher incidence of pests such as insects and diseases. Hence, basic information on the outbreak of these pests in affected areas is at present considered a bottleneck because it is lacking or not yet available. To help mitigate this concern, a survey of these pests deems necessary to identify them as well as provide pertinent data on how to manage and prevent their further destruction to the vegetable industry.

Philippines is primarily an agricultural country and contributes 17% to Gross Domestic Product in the year 2010 (<http://countrystat.bas.gov.ph/>). However, cultivation of crops is heavily dependent on the use of fertilizers and pesticides which increased in recent years. The improper use of pesticides and fertilizers can contaminate water, affect human health and induce resistant in pests (http://www.ipen.org/ipepweb1/library/ipep_pdf_reports/4phi%20philippines%20country%20situation%20report.pdf).

Being one of the developing countries, vegetables in the Philippines is a vital component in a common family food and diet. In this manner, the demand for vegetables is expected to increase in the coming years due to increasing population growth. Though, crop injury due to pests and technology to effectively control pests have been a major problem in vegetable production. At present, only limited efforts in research and information dissemination is given to vegetable crop protection.

According to the survey on the Country Profile on Pesticide Persistent Organic Pollutants (POPs) in the Philippines which was conducted last July 2005 to April 2006, POPs pesticides such as DDT, Dieldrin, Endrin and Chlordane are still being used in a farming village in Bulacan despite the fact that these POPs pesticides have been banned in the country. Similarly, survey done in a banana plantation in Davao del Sur found out also that POPs pesticides are still being used in their areas, particularly lindane and endosulfan (http://www.ipen.org/ipepweb1/library/ipep_pdf_reports/4phi%20philippines%20country%20situation%20report.pdf).

Moreover, a survey was conducted in Brunei Darussalam, Cambodia, China, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam entitled Building Pest Awareness in Southeast Asia

with the aimed to create awareness in developing APEC economies to the problems caused by leafminer, whitefly, thrips and mealybug pests as constraints to productivity and trade. Also to outline the need to generate adequate plant health information necessary under the new global trading environment, and help improve rural livelihoods and reduce poverty of farmers through higher quality produce and better market access; improve skills among national plant protection and quarantine officers to detect the presence and extent of these pests in their country and to reduce the economic impacts caused by the outbreak of such pests; and Build capacity of and cooperation between member economies to implement pest surveillance programs for building information on the health status of vegetable and ornamental industries, particularly with respect to these pests, to maintain and secure market access (<http://www.cabi.org/default.aspx?site=170&page=1017&pid=3472#>).

On the other hand, G. E. Potutan, et. al., 1999 conducted a survey on The Profile of Vegetable Production, Consumption and Marketing in Cagayan de Oro City. It was found out that out of 100 vegetable growers as respondents, 90% used insecticides, 36% fungicides, 4% herbicides and 50% used natural control measures such as smudging, light trapping, handpicking, mechanical control, and botanical extracts. In addition, 49% of those who applied synthetic pesticides encountered ill-effects such as headache, nausea, and chest pain.

Furthermore, Central Luzon State University, Muñoz, Nueva Ecija (1993-1998) conducted a study that aimed in identifying the arthropod population profile in vegetable population (stringbeans and eggplant) within the crop growth stages. The arthropod profile is important in identifying critical stages when the crops are most susceptible to pest damage and in timing corrective measures or pest management intervention (pindex.ku.ac.th/file_research/Development32.36.pdf).

A similar study was also conducted by the University of Southern Mindanao, Kabacan, Cotabato entitled: Pest Profile of Industrial Crops (A Field Guide to Identifying Insect Pests of Cacao, Coffee, Oil Palm, Spices, Rubber and Jatropha) which is now available for use as a field guide for students, researchers, and farmers of said industrial crops. This also helps several stakeholders in basic identification of insect pests and their characteristic damage to help them in their pest management decisions. (http://www.usm.edu.ph/index.php?option=com_content&view=article&id=570%3Apicri-publishes-pest-profile-of-industrialcrops&Itemid=473&catid=146%3A).

Another related study was also conducted by the Bohol Agricultural Promotion Center, Dao District, Tagbilaran City, Bohol, Philippines on the Profiling of rice insect pest, natural enemies and diseases of rice at the Capayas irrigation project area in Ubay. They have identified seventeen groups of insect pests, thirteen groups of beneficial insects and spiders, three fungal pathogens and five rice diseases (<http://agris.fao.org/agris-search/search/display.do?f=2002%2FPH%2FPH02014.xml%3BPH2002001046>).

OBJECTIVES

- a. To survey the different pests in drought-affected vegetable areas of Negros island;
- b. To determine the extent of damage caused by insect pests and diseases on vegetables grown in drought affected areas particularly pinakbet, chopsuey and indigenous vegetables;
- c. To identify insect pests and diseases in drought affected vegetable areas.

METHODOLOGY

a. Construction and Validation of the Interview Schedule

The research instrument used in the study was interview schedule. It was formulated and constructed using Hiligaynon (local dialect) in anticipation for the respondents who speak mostly the local dialect. In addition, the interview schedule was so constructed to gather information on the demographic profile of the respondents, the vegetables grown in the area and the pest (insects and diseases) that are prevalent in the areas covered by the survey.

The first part of the interview schedule provides information about the respondents in terms of gender, age, civil status, household size, educational attainment, source of income and occupation. On the other hand, the second part deals with the respondents' size of farm, source of labor and the kind of vegetables grown in their farm.

The last part of the interview schedule provides basic information on insects categorized into borers, defoliators, sucking and underground. Likewise, information about diseases on vegetables was also incorporated in the interview schedule. Other relevant information such as crop protection measures including the frequency of pesticide spraying, the extent of damage caused by insects and pathogens and the growth stages of vegetables when these pests occur.

This was validated by the Bureau of Plant Industry La Granja NCRDC and Office of Provincial Agriculturist research team.

b. Identification of the Respondents

The choice of respondents was determined and identified through the list of nine vegetable areas provided by and in coordination with the Office of the Provincial Agriculture (OPA) and the Local Government Units (LGUs). Likewise, from the list given by OPA and respective Agriculture Offices of cities and municipalities covered by the survey random sampling was done among vegetable farmers taking into account that the respondents identified belong to the 20% of the population from each area. A total of 275 vegetable growers from five cities and municipalities of Negros Island served as the respondents during the conduct of the study. The breakdown of total number of vegetable growers in each area is presented in Table 1.

c. Survey

Using the interview schedule as data gathering instrument, the survey was conducted in nine vegetable growing areas of Negros island namely: Sipalay, Kabankalan City, Hinoba-an, Moises Padilla, Pulpandan, Valladolid, San Carlos City, Canlaon City, and Escalante City.

As additional tool in data gathering, illustrated insects and diseases associated with vegetables grown in the surveyed areas were provided to the respondents for them to easily recognize the pests (Attached appendices) during the survey.

d. Collation and Interpretation of data

Data gathered and other pertinent informations during the survey conducted were consolidated, tabulated and interpreted using the descriptive analysis.

RESULTS AND DISCUSSION

Respondents of the study



The respondents of the study who came from the different vegetable growing areas in Negros Island are found in Table 1. The areas covered by the survey conducted comprised of five cities and four municipalities representing the eastern, western, northern and southern portions of Negros Island. A total of 275 vegetable growers from nine vegetable- growing areas served as the respondents in the duration of the survey. Among nine vegetable areas conducted, Canlaon City and San Carlos City had the biggest respondents with 105 and 48 vegetable growers equivalent to 38.18 and 17.46 percent, respectively. Furthermore, the municipality of Hinoba-an which is situated in the south of the provincial capital has the third biggest respondents of 38 equivalent to 13.82 percent of the total vegetable growers.

Table 1. Distribution of respondents as to nine vegetable growing areas.

Vegetable-growing areas	Frequency	Percentage (%)
1. Sipalay City	19	6.91
2. Kabankalan City	12	4.36
3. Pulpandan	9	3.27
4. Valladolid	18	6.55
5. Moises Padilla	14	5.09
6. San Carlos City	48	17.46
7. Hinoba-an	38	13.82
8. Escalante City	12	4.36
9. Canlaon City	105	38.18
TOTAL	275	100.00

Demographic profile of the respondents

Data on the demographic profile of the respondents of this study are presented in Table 2. Moreover, the demographic profile of the same was grouped according to age bracket, gender, civil status, highest educational attainment, household size, source of income and their occupation.

Seventy four of the respondents belong to the age bracket of 41-50 years old, followed by 51-60 years old with 64 respondents. On the other hand, 59 respondents comprised 31- 40 years old while 47 of the respondents belong to 21 – 30 years old. Thirty respondents are 61 years old and above.

Based on the information gathered about the gender of the respondents, 147 vegetable growers are male while 128 are female.

As to civil status, married vegetable growers occupied the biggest number of respondents with 246 followed by single and widow with 13 and nine, respectively. The respondents under the live-in category comprised only six of the vegetable growers.

One hundred forty seven of vegetable growers have finished elementary, while 89 are high school graduate. Similarly, 12 respondents are graduate of four-year course. On the other hand, 11 respondents have reached college level while 13 are graduates of vocational course. Only one respondent has attained a post degree course.

One hundred eighty six respondents have family members of five and below. Vegetable growers who have six to 10 members comprised 84 of the respondents. Only five respondents have family members of 11 and above.

From the survey conducted, 246 of the respondents depend on farming as their means of livelihood. On the other hand, 29 of the vegetable growers from nine areas surveyed rely on various sources of income as their means of living other than farming.

It's quite obvious but majority or 257 respondents are farmers, seven are government employees while 11 have different occupations aside from being a farmer.

Table 2. Demographic profile of the respondents.

Variable	Category	Frequency	Percentage (%)
Age bracket	20 and below	1	0.36
	21 – 30 years old	47	17.09
	31 – 40 years old	59	21.46
	41 – 50 years old	74	26.91
	51 – 60 years old	64	23.27
	61 years old and above	30	10.91
Gender	Male	147	53.46
	Female	128	46.55
Civil status	Single	13	4.73
	Married	246	89.46
	Widow	9	3.27
	Widower	1	0.36
	Separated	0	0
	Live-in	6	2.18
Highest educational attainment	None	1	0.36
	Pre-school	1	0.36
	Elementary	147	53.46
	High school	89	32.36
	College level	11	4
	Vocational	13	4.73
	Graduate of 4 year course	12	4.36
	Post degree	1	0.36
Household size	5 and below	186	67.64
	6 to 10	84	30.55
	11 and above	5	1.82
Major Source of income	Farming	246	89.46
	Farming and others	29	10.55
Occupation	Farmer	257	93.46
	Government employee	7	2.55
	Farmer and others	11	4

Distribution of respondents as to size of vegetable farm

It could be noted that the size of vegetable farms in nine vegetable growing areas ranged from 0.20 ha – 2.01 ha and above, majority of the respondents or 178 own vegetable farms that ranged from 0.20-0.50 ha while 65 respondents have 0.51-1.00 ha farm size. On the other hand, vegetable farms ranging from 1.10 ha-1.50 ha and 2.1 ha and above are owned by 12 respondents each.



Table 3. Distribution of respondents as to size of vegetable farm.

Size of vegetable farm	Frequency	Percentage (%)
0.20 ha-0.50 ha	178	64.73
0.51 ha-1.00 ha	65	23.64
1.10 ha-1.50 ha	12	4.36
1.51 ha-2.0 ha	8	2.91
2.01 ha & above	12	4.36

Distribution of respondents as to vegetables grown in nine areas



Data on various vegetables grown by the respondents in nine areas are enumerated in Table 4. The survey shows that eggplant, squash, ampalaya, okra and tomato also identified as pinakbet vegetables have been grown in nine areas. Eggplant, squash, sitao and ampalaya are among pinakbet vegetables commonly grown by the farmers in the areas. On chopsuey vegetables, cabbage, pechay, cauliflower, broccoli, sweetpeas, carrots and pepper have been planted continuously by vegetable growers. On the other hand, malunggay, alugbati and saluyot that belong to the indigenous vegetables were also planted in the area.

Other vegetables that were not grown continuously but still being considered as sustainable crops are onion, radish, baguio beans, chayote, sweetpotato, cucumber, upo and lettuce.

Table 4. Distribution of respondents as to vegetables grown in nine areas.

Category	Vegetables	Frequency	Percentage (%)
Pinakbet	Eggplant	92	33.46
	Sitao	82	29.82
	Squash	86	31.27
	Ampalaya	60	21.82
	Okra	52	18.91
	Tomato	56	20.36
Chopsuey	Cabbage	69	25.09
	Pechay	91	33.09
	Cauliflower	3	1.09
	Broccoli	15	5.46
	Sweet peas	6	2.18
	Carrots	76	27.64
	Pepper	49	17.82
Indigenous vegetables	Malunggay	58	21.09
	Alugbati	84	30.55
	Saluyot	38	13.82
Others	Onion	74	26.91
	Mungbean	5	1.82
	Patola	8	2.91
	Upo	12	4.36
	Radish	40	14.55
	Cucumber	12	4.36
	Baguio beans	32	11.64
	Potato	3	1.09
	Chayote	20	7.27
		Celery	1
Lettuce		15	5.46
Green peas		3	1.09
Sweetpotato		16	5.82
Kangkong		3	1.09
	Gabi	4	1.46
	Lupo	1	0.36
	Lemongrass	1	0.36
	Winged bean	1	0.36
	Amaranth	2	0.73

Distribution of respondents as to source of labor

A total of 146 or 53.09 % respondents claimed that the members of their family were the ones doing the activities and operations of their vegetable farms since they lack capital/budget to pay for the hired labor. On the other hand, 120 or 43.64% respondents stated that combination of hired labor and members of the family have been their common practice in vegetable production whenever there was a need to hire to facilitate some urgent field operations. On the contrary, only eight or 2.91 % respondents from nine vegetable growing areas can afford to hire labor in their vegetable farm operations.

Table 5. Distribution of respondents as to source of labor.

Source of labor	Frequency	Percentage (%)
a. Family members	146	53.09
b. Hired labor	8	2.91
c. Combination of A & B	120	43.64

Respondents' distribution as to prevalence of insects that infests vegetable areas during drought period

The prevalence of insects as identified during the course of the survey is enumerated in Table 6. From the areas surveyed, insects that inflict damage on vegetables by boring on the different parts of vegetables were as follows: fruit and shoot borer (*Leucinodes orbonales* Guenee) as identified by 71 respondents, pod borer (*Maruca vitrata* Geyer) was noted by 58 respondents affecting their produce while tomato fruit worm (*Helicoverpa armigera* Hubner) was identified by 55 respondents having damaged fruits of their tomato crops.



On insects that destroy the vegetable leaves or the defoliators, semi-looper (*Chrysodeixis chalcites* Esper), armyworm (*Spodoptera mauritia* Basidural) and cutworm (*Spodoptera litura* Fab.) were identified by 108, 106 and 89 respondents, respectively.

As far as insects that inflict damage on vegetables by sucking their sap, aphids (*Aphis* sp.) were identified by 126 respondents as the most destructive among the sucking group attacking most of their vegetables. Whitefly (*Bemecia tabaci* Gennadius) was likewise identified by 44 respondents as one of the prevalent insects that consistently damaging their vegetables and eventually resulting to the wilting

and death of their crops. Similarly, bean bug (*Anoplocnemis phasiana* F.) and planthopper (*Stenocranus bakeri* Muir) were identified by 31 and 29 respondents, respectively that contributed yield losses in vegetable production. Other sucking insects like mealy bugs (*Planococcus* sp.), green soldier bug (*Nezara viridula* Linn.) and mites (*Tetranychus* sp.) were also identified by some of the respondents but having attributed only minimal losses in vegetables.

As to underground insects that destroy vegetables by feeding on their roots, mole cricket (*Grylotalpa* sp.) and June beetles (*Leucopholis irrorata*, Chev.) were identified by 36 and 14 respondents, respectively.

Table 6. Distribution of respondents as to prevalence of insects during drought period.

Category	Insect	Frequency	Percentage (%)
Borer	Pod borer	58	21.09
	Fruit and shoot borer	71	25.82
	Fruit fly	5	1.82
	Tomato fruit worm	55	20.00
Others	Squash vine borer	2	0.73
Defoliators	Cutworm	89	32.36
	Webworm	47	17.09
	Diamond back moth	47	17.09
	Grasshopper	15	5.46
	Leafminer	53	19.27
	Semi-looper	108	39.27
	Armyworm	106	38.55
	Leaf folder	26	9.46
	Lady beetle	70	25.46
Others	Pumpkin beetle	5	1.82
Sucking	Aphids	126	45.82
	Mealybugs	19	6.91
	Mites	13	4.73
	Scale insects	3	1.09
	White fly	44	16.00
	Green soldier bug	18	6.55

	Bean bug	31	11.27
	Plant hopper	29	10.55
	Leaf hopper	1	0.36
	Thrips	3	1.09
	Squash bug	1	0.36
	Cotton stainer	1	0.36
	Rice bug	2	0.73
Underground	Beetle	14	5.09
	Termite	3	1.09
	Mole cricket	36	13.09
	White grubs	1	0.36

Prevalent diseases in nine areas



Different diseases that infect vegetables of nine vegetable-growing areas in Negros island are presented in Table 7. Among the diseases shown to the respondents during the survey, bacterial soft rot was identified by 124 vegetable growers as the most infectious disease especially during the rainy season. In addition, damping-off and anthracnose were likewise pointed out by 65 and 81 respondents to cause reduction of their vegetable yields. Likewise, cercospora leaf spot and phomopsis blight of eggplant were reported by 53 and 44 respondents as prevalent also during the rainy season. Mosaic and late blight of tomato were also prevalent among vegetables according to other respondents.

Table 7. Distribution of respondents as to prevalence of diseases in the areas.

Diseases	Frequency	Percentage (%)
Bacterial soft rot	124	45.09
Anthracnose	65	23.64
Damping-off	81	29.46
Cercospora leaf spot	44	16.00
Phomopsis blight	53	19.27
Bacterial spot	15	5.46
Mosaic	28	10.18
Bacterial wilt	8	2.91
Late blight of tomato	19	6.91
Bean blight	10	3.64
Blossom end rot	7	2.55
Black rot of cabbage	10	3.64
Sclerotinia rot of carrots	5	1.82
Leaf spot of tomato	1	0.36
Celery blight	1	0.36
Early blight of tomato	2	0.73

Distribution of respondents as to estimated percent damage of insects to vegetables grown in nine areas

The estimated percent damage of insects in nine vegetable areas of Negros island is shown in Table 8. In Sibalay City, the estimated percent damage caused by insects during the dry season was more than 30% based on nine respondents. Likewise, more than 30% damage was also estimated by four respondents in the wet season. On the contrary, two respondents during the dry season and three respondents during the wet season believed that less than 10% was estimated percent damage by insects.



Table 8. Distribution of respondents as to percent damage of insects in nine vegetable growing areas of Negros Island.

Season	Sipalay City	Kabankalan City	Pulupandan	Valladolid	Moises Padilla	San Carlos City	Hinoba-an	Escalante City	Canlaon City	Total
Dry										
a. Less than 10%	2	2	2	12	7	6	20	4	51	106
b. 11-20 %	3	6	5	3	3	11	6	3	24	64
c. 21-30%	4	3	1	2	2	5	4	2	9	32
d. More than 30 %	9	1	2	4	2	25	8	2	19	72
Wet										
e. Less than 10%	3	4	1	4	3	22	9	4	39	89
f. 11-20 %	3	2	1	5	3	12	7	2	30	65
g. 21-30%	2	2	1	2	2	12	4	2	7	34
h. More than 30 %	4		1		5	12	11	1	23	57

Observations in Kabankalan City show that the estimated percent damage by insects reached 11-20% as stated by the six respondents in the dry season while less than 10% was estimated by four respondents during the wet season. Similarly, five respondents from Pulupandan had the same observation as in Kabankalan City with 11-20% damage caused by insects in the dry season. Valladolid, on the other hand observed that insect damage caused only 10% based on 12 respondents during the dry season but the insects caused damage 11-20% in the wet season according to five respondents. In Moises Padilla, seven respondents believed that less than 10% damage was caused by insects in the dry season, however, five respondents declared that more than 30% damage in the wet season was caused by insects.

In San Carlos City where most of the vegetable growers in Negros island are found, the damage caused by insects reached more than 30% during the dry season as observed by 25 respondents,. On the other hand, the damage caused by insects was only less than 10% according to 22 respondents in the wet season. Twenty respondents from Hinoba-an reported that insects caused estimated damage only less than 10% during the dry season while respondents observed that more than 30% damage was caused by insects. Similar observations from Escalante City that the

damage caused by insects was only less than 10% on four respondents each in the dry and wet seasons. As one of the vegetable suppliers in Negros island, 51 respondents of Canlaon City believed that only less than 10% damage by insects was observed in the dry season and 39 respondents declared that less than 10% damage was caused by insects in the wet season while 30% respondents admitted that the damage by insects could cause damage up to more than 30%.

Breakdown of respondents as to identification of pests

Based on the information that was gathered from the vegetable growers in nine areas, majority or 230 respondents assured that they could identify the pests whenever they are infesting in the fields. However, 30 respondents admitted that they could not identify or recognize the pests that are damaging their vegetable fields. In like manner, 15 respondents accepted that they are not certain on what pests are infesting their fields.

Table 9. Breakdown of respondents as to identification of pests.

Category	Sipalay City	Kabankalan City	Pulupandan	Valladolid	Moises Padilla	San Carlos City	Hinobanan	Escalante City	Canlaon City	Total
a. Yes	16	10	9	17	12	31	30	9	96	230
b. No	2	2		1	2	8	7	2	6	30
c. Not all	1					9	1	1	3	15

Breakdown of respondents as to utilization of pesticides



It is very alarming that during the course of our survey conducted in nine vegetable growing areas, the use of pesticide has been very rampant as a form of control measure in combatting the prevalence of pests in the areas. In fact, out of 275 respondents, 260 of them have been utilizing pesticide to control insects and diseases that damage their vegetables from seedling stage up to harvest time of their crops. Unfortunately, only 15 of the respondents declared that they employed control measures other than using synthetic pesticide as their crop protection against insects and diseases.

Table 10. Breakdown of respondents as to utilization of pesticides.

Variable	Sipalay City	Kabankalan City	Pulupandan	Valladolid	Moises Padilla	San Carlos City	Hinoba-an	Escalante City	Canlaon City	TOTAL
a. Yes	17	10	9	16	10	48	37	10	103	260
b. No	2	2		2	4		1	2	2	15



Distribution of respondents as to frequency of pesticide spraying in nine vegetable growing areas

Data on the frequency of pesticide spraying in nine vegetable areas are presented in Table 11. Spraying of pesticide in Sipalay City was done once a week based on five out of 15 respondents interviewed during the survey. Only four respondents sprayed pesticide on vegetables every two weeks. However, one respondent from the same area sprayed pesticide as frequent as twice a week. In like manner, spraying of pesticide once a week was also practiced by five respondents of Kabankalan City in controlling pests of vegetables while two respondents declared that they resorted to spray pesticide only when needed. In Pulupandan, seven out of 10 respondents utilized pesticide once a week while two respondents employed pesticide spraying every two weeks. On the other hand, only one respondent did not spray pesticide or whenever needed only. From 15 respondents of Valladolid, six of them sprayed pesticide on vegetables once a week, while the three practiced spraying pesticide every two weeks. In fairness, four respondents sprayed pesticide only when needed. Four out of 10 respondents from Moises Padilla opted to spray pesticide whenever needed. On the contrary, spraying of pesticide once a week still practiced by three respondents.

In San Carlos City where 48 vegetable growers served as the respondents, 22 of them admitted that they sprayed pesticide on vegetables once a week. Worst of all 11 respondents declared that they sprayed pesticide on vegetables as frequent as twice a week. The rest of the respondents sprayed pesticide every two weeks, and only when needed.

Once a week pesticide spraying on vegetables was reported by 17 respondents of Hinoba-an while six of them practiced two times a week spraying. On the other hand, three respondents believe that pesticide spraying against pest damage was applicable only when needed. Farther north, out of 10 respondents in Escalante City, once a week pesticide spraying has been a practice by four vegetable growers against pest. Two respondents accepted that they sprayed pesticide

depending upon the infestation of insects. A total of 45 out of 105 respondents from Canlaon City practiced pesticide spraying once a week as control measure against pest of vegetables grown in the area. Twenty two respondents sprayed pesticide twice a week while 19 respondents practiced pesticide spraying every two weeks. On the other hand, five respondents reported that they sprayed pesticide only once a month and one when needed.

Table 11. Distribution of respondents as to frequency of pesticide spraying in nine vegetable growing areas.

Variable	Sipalay City	Kabankalan City	Pulupandan	Valladolid	Moises Padilla	San Carlos City	Hinobanan	Escalante City	Canlaon City
1. Once a week	5	5	7	6	3	22	17	4	45
2. Every 2 weeks	4		2	3	1	6	4		19
3. Once a month		2		2	2	3	2	2	5
4. Others									
2x a week	1					11	6	1	22
When needed	1	2	1	4	4	2	3		1
Every after harvest	1								
2x a month	1						2	1	1
3x a month									1
Once throughout cropping season	2								
Depends upon insect infestation								2	
Every 15 days									1
4-5 days interval									2
Every 3 weeks						2			
5 days interval									1
7x a month									1
Every 3 days									4

Other crop protection practices employed by nine vegetable growing areas

Control Measure	Sipalay City	Kabankalan City	Pulupandan	Valladolid	Moises Padilla	San Carlos City	Hinoba-an	Escalante City	Canlaon City	Total
Biocontrol	1	-	1	-	1	5	-	1	-	9
Mechanical control	-	2	1	3	2	3	5	2	7	25
Resistant varieties	5	2	-	1	1	14	5	2	20	50
Others	9	2	-	6	8	-	18	1	10	54

It is very alarming that pesticide appeared the most “favorite” among the crop protection practices employed by nine vegetable growing areas in Negros island. However, in Sipalay City five of the respondents used resistant varieties while only one practiced biocontrol. On the other hand, other control measures such as indigenous knowledge were utilized by nine respondents.

Out of 18 respondents in Kabankalan City only six of them have been using resistant varieties and mechanical control as control measures against pests of vegetables aside from using pesticides. None of the respondents employed biocontrol in controlling pests. In Pulupandan, the rampant use of pesticide was noted because out of 11 respondents only one utilized biocontrol and one practiced mechanical control as a control measure to control pests other than pesticides. On the other hand, 10 out of 18 respondents in Valladolid also employed other crop protection practices. Likewise, in Moises Padilla 12 out of 14 respondents also practiced other control measures. In San Carlos City, only five respondents employed biocontrol as control measure against pests of crucifers. However, 14 respondents practiced the use of resistant varieties as a control method in protecting pests of vegetables. In the case of Hinoba-an, no respondents employed biocontrol to combat vegetable pests. However, 18 of the respondents accepted that they employed some indigenous knowledge in eliminating pests in their vegetables other than conventional methods. In Canlaon City, 20 respondents resorted to plant resistant varieties as form of controlling pests in their vegetable farms. On the other hand, smudging and tuba are some of their crop protection practices employed to control pests.



Suggestions/recommendations of nine vegetable growing areas in Negros Island to improve and sustain vegetable production

The suggestions/recommendations solicited from vegetable growers in nine areas of Negros island are enumerated in Table 13. One of the

suggestions/recommendations coming from the respondents during the survey to improve and sustain vegetable production in the areas was to conduct trainings and seminars for vegetable growers. In addition, some of the respondents expressed their initiative to gain technical knowledge and information about new vegetable growing technology in their respective areas.



On the other hand, where spraying of pesticide has been the usual practice in controlling pests, the respondents from San Carlos City suggested to campaign against this crop protection practice. However, the respondents from Canlaon City recommended to continue spraying for reasons that they could not get any harvest from their vegetables if they stop using pesticide to control pests. Some of the respondents from

Kabankalan City, Moises Padilla, Escalante City, and Canlaon City suggested to have appropriate training on how to control pests. On the other hand, provision of seeds, fertilizers, planting materials and other inputs by the government was one of the suggestions by the respondents from Sibalay City, Kabankalan City, Pulpandan, San Carlos City, Escalante and Canlaon City. In like manner, financial assistance from the government was also suggested by the respondents from Canlaon City, Hinoba-an, Escalante City, and Kabankalan City.

Proper cultural practices about vegetable production were among the suggestions that cropped up during the survey from the vegetable growers of Sibalay City, Kabanakalan City, Pulpandan, Valladolid, Moises Padilla, San Carlos City and Hinoba-an. The respondents from Canlaon City suggested further from the government to provide them irrigation with hose. Similarly, they also suggested to practice organic farming, organize association for production outlet to control middlemen. Likewise, the respondents



from San Carlos City suggested to organize farmers association, provide marketing assistance to control market price and to implement organic farming. The respondents from Pulpandan, Moises Padilla, Hinoba-an, and Canlaon City recommended to plant and use new and good varieties of vegetables.

Table 13. Suggestions/recommendations of nine vegetable growing areas in Negros Island to improve and sustain vegetable production.

Respondents	Suggestions/Recommendations
1. Sipalay	Source of seeds and fund support for fertilizer and pesticide.
	Conduct of trainings and seminars for farmers.
	Proper application of fertilizer.
	Training on pest control.
	Consultation to city agriculturist.
2. Kabankalan	Conduct of training on pest control.
	Proper cultural practices.
	Provision of inputs like seeds, fertilizers and pesticides.
	Financial support from the government.
	Continuous planting of vegetables.
	Spray insecticide.
3. Pulpandan	Use of new varieties of vegetables.
	Technical knowledge and fund support in terms of seeds and fertilizers.
	Proper application of fertilizers.
	Synchronized planting.
	Availability of pesticide.
4. Valladolid	Correct planting and proper care of the plants.
	Enough irrigation.
	Apply compost.
	Seeds and financial support from the government.
	Practice crop rotation and soil rehabilitation.
	Additional information about vegetable farming.
5. Moises Padilla	Proper timing of vegetable grower.
	Timing of planting.
	Continuous planting of vegetables.
	Appropriate control of insect pests.
	Availability and use of insecticides.
	Proper cultural management.
	Application of foliar fertilizer.
	Use of good variety.
6. San Carlos City	Proper care of vegetables and proper application of fertilizer and pesticides.
	Practice crop rotation.
	Technical information and good market price of vegetables.
	Provision of irrigation and capital.
	Government subsidy on fertilizer and pesticides.
	Organize farmers in planting vegetables/synchronize planting.
	Use compost together with inorganic fertilizer.
	Training of farmers; updated seminar; diversified farming.
	Marketing assistance/system.
	Control of market price.
	Government campaign against pesticide usage.
	Availability of seeds.
	Continuous planting of vegetables.
	Seminar on new technology about vegetable growing.
	Continuous spraying of pesticides.

7. Hinoba-an	Seminar/training on proper pest control.
	Spray pesticides to control pest, apply fertilizer and use of good seeds.
	Continuous planting and use of certified seeds.
	Technical information.
	Proper cultural management.
	Have capital to purchase insecticides and fertilizers.
	Practice crop rotation.
	Seminar on vegetable production.
8. Escalante City	Availability of inputs such as seeds and fertilizers.
	Technical knowledge on how to control insect pest.
	Financial assistance from the government.
	Continuous planting of vegetables.
	Information about pest control.
	Close monitoring and supervision of vegetable farming.
9. Canlaon City	Continue spraying and apply fertilizer especially compost.
	Continue planting of vegetables and provision of irrigation with hose.
	Practice crop rotation and appropriate crop protection control.
	Proper care and management of vegetables.
	Availability of pesticides and fertilizers.
	Organic farming and financial assistance.
	Use organic pesticides.
	Choose vegetables suited for wet and dry season.
	Monitor regularly and practice prevention rather than control.
	Organize association for production outlet as well as to control middlemen.
	Use good variety.
	Practice organic farming.
	Technical information, price control of inputs/vegetables.
	Financial assistance from the government.
	Price protection control for vegetable grower.
	Practice sustainable farming.
9. Canlaon City	Pray and ask God for guidance and success of vegetable production in the province.
	Technical knowledge on how to control pest.
	Provisions of seeds/planting materials.
	Have enough capital.

SUMMARY

A total of 275 vegetable growers from nine identified areas of Negros island served as the respondents in the duration of the study. The areas covered by the survey comprised of five cities and four municipalities namely: Sipalay City, Kabankalan City, Hinoba-an, Pulpandan, Valladolid, Moises Padilla, Escalante City, San Carlos City and Canlaon City. Questionnaire used in the study includes the

demographic profile of the respondents taking into consideration their age, gender, civil status, educational attainment, household size, source of income and occupation. On the other hand, vegetables grown in nine areas were also emphasized in the questionnaire giving preference on pinakbet, chopsuey and indigenous vegetables. Similarly, pests like insects and diseases that are prevalent were given priority importance since they could be one of the factors associated with the reduction on yield of vegetables grown in the area. Moreover, the extent of damage done by insects and diseases was also noted both in wet and dry seasons based on the respondents. Furthermore, insects and diseases were likewise identified in the duration of the survey to determine their prevalence in the areas affected by drought. In like manner, data on crop protection practices employed by the respondents were also recorded. On the other hand, the frequency of pesticide usage was likewise noted in nine vegetable-growing areas. Lastly, for the improvement and sustenance of vegetable production in Negros island, suggestions and recommendations from the respondents themselves were solicited.

CONCLUSION AND RECOMMENDATION

The results of the survey conducted in nine vegetable growing areas of Negros Island reveal that insects categorized as borers, sucking, defoliators and underground were indeed prevalent and identified as seriously damaging their vegetables.

In addition, diseases like bacterial soft rot, damping-off, and anthracnose were found infecting various vegetables grown in the area especially crucifers. On the other hand, the extent of damage caused by insects and diseases on vegetables grown in affected areas ranged from less than 10% to more than 30%. As a consequence, most of the respondents utilized and relied on pesticides as their first priority in controlling these pests for reasons that they could not harvest anything if they opted to employ alternate control measures other than chemicals.

Likewise, findings of the study also reveal that the indiscriminate application of pesticides using the wrong chemicals and dosages on vegetables grown in nine areas of Negros Island would possibly bring environmental problems associated with ground water pollution and vegetable supplies. Eventually, if this improper application of pesticides is not corrected these chemicals pose danger to human health and the ecosystem.

Based on these findings, it is recommended that only pesticides manufactured by the registered chemical company should be allowed for spray application on vegetables grown by the producers/farmers. Furthermore, the Local Government Units concerned should strengthen vegetable production in their respective areas by providing the respondents continuous training on crop protection as well as by keeping them updated about the latest vegetable production technology.

Further investigation of the study is recommended as the result of this survey appears limited due to time constraints hence still needs detailed informations to make profile of the pests appreciable and useful as future reference.

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APPENDICES

Appendix A. Survey Questionnaire

PEST PROFILE IN DROUGHT AFFECTED VEGETABLE AREAS OF NEGROS ISLAND

(A) Survey Questionnaire for Insect Pests

Direction: *Please encircle your answer indicated in the question below.*

Date of Interview _____

I. THE RESPONDENT PROFILE

Name: _____ Occupation: _____

Age: _____ Gender: Male__ Female ____ Household Size _____

Civil Status: _____ Highest Educational Attainment:

Major source of income: _____

II. FARM INFORMATION

1.a.Location/address of Vegetable Farm _____

b. Describe the surrounding vegetation _____

2. Size of Vegetable Farm (approximate in sq. m.) _____

3. Source of Labor a. Family members b. Hired labor c. Combination of a and b

4. What vegetables are you growing regularly?

PINAKBET a. Eggplant b. Sitao c. Squash d. Ampalaya e. Okra

f. Tomato g. Others _____

CHOPSUEY a. Cabbage b. Pechay c. Cauliflower d. Broccoli e. Sweet peas

f.Carrots g. Others (specify) _____

INDIGENOUS VEGETABLES a. Malunggay b. Alugbati c. Saluyot d. Others
(specify)___

5. How often do you grow these vegetables?

PINAKBET a. Monthly b. Every 2 months c. Every 3 months d. Every 4 months

e. Every 5 months f. Every 6 months g. Once a year h. Other (specify)___

CHOPSUEY a. Monthly b. Every 2 months c. Every 3 months d. Every 4 months

e. Every 5 months f. Every 6 months g. Once a year h. Others (specify)___

INDIGENOUS VEGETABLES a. Monthly b. Every 2 months c. Every 3 months

- d. Every 4 months e. Every 5 months f. Every 6 months g. Once a year
h. Others (specify)_____

6. In your observation, what vegetables grow well even during dry season?

7. In your observation, what vegetables grow well even in the rainy season?

8. What insect pests have you observed infesting your vegetables during drought period?

Borers; a. Pod Borer b. Shoot and Fruit Borer c. Tomato Fruit Worm d. Others (specify)_

Defoliators: a. Cutworm b. Webworm c. Diamond Back Moth d. Grasshopper
e. Leafminer f. Semi-looper g. Armyworm h. Leaf folder
i. Lady Beetle j. Others (specify) _____

Sucking: a. Aphid b. Mealybug c. Mites d. Scale insects e. Green Soldier Bug
f. Bean Bug g. White fly h. Others (specify)_____

Underground: a. Beetle b. Termite c. Mole Cricket d. Nematode e. Others (specify)_

9. Do you spray pesticides in controlling them? a. Yes___ b. No ___

If yes, how often do you spray pesticides in your vegetables?

a. Once a week b. Every two weeks c. Once a month

10. What other control measures do you apply aside from spraying pesticides to protect your vegetables?

a. biological control c. planting resistant varieties
b. mechanical control d. Others (specify)_____

11. From your observation, what insect pests are consistently damaging your vegetables in both wet and dry seasons?

Borers a. Pod Borer c. Tomato Fruit Worm
b. Shoot and Fruit Borer d. Others _____

Defoliators a. Cutworm d. Grasshopper g. Armyworm j. Others ____
b. Webworm e. Leafminer h. Leaf folder
c. Diamond Back Moth f. Semi-looper i. Lady Beetle

Sucking a. Aphid c. Mites e. Green Soldier Bug g. White fly

b. Mealybug d. Scale insects f. Bean Bug h. Others ____

Underground a. Beetle b. Termite c. Mole Cricket d. Nematode e. Others_____

12. Can you identify these pests when they are infesting your fields?

Yes___ No___ Not all _____

13. In your observation, in what season or period are these insect pests abundant?

- a. during rainy season
- b. during dry season
- c. during dry and wet seasons
- d. Only during drought or El Niño Phenomenon
- e. Others (specify)_____

14. In your observation, how long are these insect pests damaging your vegetables

(?)

- a. regularly occurring during growing period for the last 3 years
- b. only during wet season planting
- c. only during dry season planting
- d. only during El Niño Phenomenon
- e. others (specify)_____

and in what particular growth stage?

Seedling Vegetative Reproductive

15. In your estimate, how many percent damage is caused by these insect pests in your vegetable production?

Dry Wet

- a. less than 10%
- b. 11-20%
- c. 21-30%
- d. More than 30%
- a. less than 10%
- b. 11-20%
- c. 21-30%
- d. More than 30%

16. What do you suggest to improve and sustain vegetable production in the island?

Survey Questionnaire for Diseases

Direction: *Please encircle your answer indicated in the question below.*

1. What diseases have you observed infecting your vegetables?
 - a. Bacterial soft rot c. Damping-off e. Others (specify) _____
 - b. Anthracnose d. Cercospora leaf spot
2. What particular disease causes noticeable damage on your vegetables?
 - a. Bacterial soft rot c. Damping-off e. Others (specify) _____
 - b. Anthracnose d. Cercospora leaf spot
3. Can you identify or differentiate whether the disease is caused by insect pests, nutrient deficiency or pathogen based on its symptoms and signs.
 - a. Yes b. No c. Not all
4. At what stage of your crop have you observe the appearance of this particular disease?
 - a. Seedling stage c. Reproductive stage
 - b. Vegetative stage d. Others (specify) _____
5. Based on your observation, what kind of disease is infecting your vegetables particularly during
 - Drought period Rainy season
 - a. Bacterial soft rot a. Bacterial soft rot
 - b. Anthracnose b. Anthracnose
 - c. Damping-off c. Damping-off
 - d. Cercospora leaf spot d. Cercospora leaf spot
 - e. Others (specify) _____ e. Others (specify) _____
6. Do you spray fungicide in controlling them?
 - a. Yes b. No

If yes, how often do you spray fungicide to your crop throughout the growing period?

 - a. Once a week c. Once a month
 - b. Twice a month d. Others (specify) _____
7. What alternative measure do you apply aside from spraying of fungicide?
 - a. Spraying of botanical extracts c. Planting of resistant varieties
 - b. Use of biological control agents d. Others (specify) _____

8. What do you suggest to prevent or minimize disease infestation in vegetable crops?

Appendix C. Map of Negros Island



Appendix D. Survey Respondents

City/Municipality: **Sipalay City**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Cartagena	1. Magdalena Villa	0.25	Eggplant, Sitao, Ampalaya, Okra, Tomato, Pechay, Malungay, Onion, Pepper, Sweetpotato
Nauang	1. Fred Niepes	0.25	Squash, Tomato, Pepper, Pechay, Malungay, Alugbati, Sweetpotato
Mamabaroto	1. Alma Juele	1.00	Eggplant, Sitao, Ampalaya, Okra, Squash, Pechay, Malungay, Alugbati
	2. Nelly Tajonera	1.00	Eggplant, Sitao, Tomato, Pechay, Sweetpotato
	3. Amalia Tajonera	0.50	Sitao, Squash, Okra, Tomato, Alugbati, Saluyot
	4. Nilda Otañez	0.30	Eggplant, Sitao, Okra, Sweetpotato, Papaya
Gil Montilla	1. Daniel Labandilo	1.80	Eggplant, Sitao, Okra, Squash, Tomato
	2. Rudy Labandilo	0.25	Eggplant, Squash, Tomato, Alugbati, Kangkong, Sweetpotato
	3. Eduardo Nalilin	0.80	Eggplant, Squash, Pepper
	4. Rosemarie Labandilo	0.27	Eggplant, Squash, Malungay, Alugbati, Saluyot, Sweetpotato
	5. Emilio Magbanua	1.00	Eggplant, Sitao, Okra, Squash, Pepper, Malungay, Alugbati
	6. Vicente Villarico	0.60	Eggplant, Squash, Ampalaya, Alugbati, Malungay, Saluyot, Sweetpotato
	7. Segundo Agapito	0.40	Eggplant, Sitao, Squash, Ampalaya, Okra, Tomato, Alugbati, Saluyot
Cabadiangan	1. Rodito Melotindos	0.25	Eggplant
	2. Elizalde Sebua	3.00	Eggplant, Squash, Pepper
	3. Tita Piorque	1.50	Eggplant, Sitao, Squash, Tomato, Pechay
	4. Eduardo Dequillo	0.25	Eggplant, Squash
	5. Felix Jucaban	1.50	Eggplant, Squash, Pechay,

			Alugbati, Saluyot
	6. Jared Pagonzaga	3.00	Squash, Malungay, Alugbati

City/Municipality: **Kabankalan City**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Camugao	1. Ariel Ariola	1.00	Eggplant, Squash, Pepper, Pechay, Upo
	2. Jabon Arroz	0.50	Eggplant
	3. Crisanto Cuenca	0.50	Eggplant, Squash
	4. Aron Aros	1.00	Eggplant, Sitao, Squash, Okra, Pechay, Alugbati, Malungay, Saluyot
	5. Francis Navales	1.50	Eggplant, Squash, Radish, Alugbati
	6. Randy Toreña	1.00	Eggplant, Sitao, Squash, Patola
	7. Rommel Casteñares	0.45	Sitao, Okra, Malungay, Alugbati
Hilamonan	1. Francisco Tianzon	1.00	Eggplant, Squash
	2. Rodolfo Bocol	0.80	Eggplant, Squash, Okra, Radish
	3. Hilda Tianzon	1.00	Eggplant, Squash, Radish
	4. Eufemia de Guzman	0.90	Eggplant, Squash, Radish
Orong	1. Generoso Baliguat	0.75	Eggplant, Sitao, Squash, Mungbean, Radish

City/Municipality: **Pulupandan**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Palaka Norte	1. Philip de los Santos	1.50	Ampalaya, Tomato
Mabini	1. Joselito Villar	1.00	Tomato
Crossing Pulupandan	1. Norberto Agustin	0.30	Eggplant, Squash, Ampalaya, Alugbati, Saluyot
Patic	1. Antonio Capelayo	3.00	Sitao, Squash, Okra, Alugbati, Saluyot
	2. Federico de la Cruz	1.50	Eggplant, Squash, Ampalaya, Alugbati, Saluyot Malungay, Okra, Upo, Pechay, lupo
Ubay	1. Lordita Villaflores	0.50	Squash

	2. Roberto Villamor	0.50	Squash, Okra, Upo, Malungay, Alugbati
	3. Alberto Miravalles	0.75	Eggplant, Squash, Okra, Pechay, Upo, Alugbati, Malungay, Saluyot
	4. Oscar de los Santos	1.00	Squash, Upo, Patola

City/Municipality: **Valladolid**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Guintorilan	1. Fernando Roquez	0.50	Sitao, Squash, Upo, Mungbean
	2. Ernesto Roquez	0.50	Ampalaya, Pepper
Sagua Banwa	1. Nena Arroyo	0.25	Sitao, Ampalaya, Patola, Saluyot
Paloma	1. Carmelita Perez	0.25	Eggplant, Alugbati, Saluyot, Pepper
	2. Raul Cortejo	1.00	Sitao, Ampalaya, Patola, Saluyot, Malungay, Alugbati
	3. Victoriano Flores	0.25	Sitao, Ampalaya, Alugbati, Saluyot
Alijis	1. Roberto Gregorio	0.40	Ampalaya
	2. Rosemarie Ruiz	1.00	Sitao, Ampalaya, Alugbati, Saluyot
	3. Jose Nagum	0.30	Ampalaya, Pechay, Upo
Pacol	1. Evangeline Graellos	2.50	Squash, Tomato, Alugbati
	2. Rustico Belches	0.50	Sitao, Okra, Alugbati, Saluyot, Pepper, Upo
Palaka	1. Willy Abuyon	0.40	Sitao, Ampalaya, Alugbati, Saluyot
	2. Gerry Panibawan	1.00	Sitao, Ampalaya, Patola, Alugbati, Saluyot
	3. Rosalinda Garcenela	0.40	Sitao, Alugbati, Saluyot, Sweetpotato
	4. Ma. Fe Tagle	0.50	Sitao, Ampalaya, Alugbati, Malungay
	5. Angelito Abuyon, Jr	0.50	Sitao, Ampalaya, Alugbati, Saluyot, Sweetpotato
	6. Jacob Gulmatico	0.40	Sitao, Ampalaya, Okra, Pepper, Pechay, Alugbati, Tugabang
	7. Sonito Tagle	0.30	Sitao, Ampalaya, Malungay, Alugbati, Saluyot

City/Municipality: **Moises Padilla**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Crossing Magallon	1. Nonito Sion	0.25	Eggplant, Squash, Ampalaya, Pechay, Radish, Alugbati
	2. Gerardo Espinosa	0.50	Eggplant, Sitao, Squash
	3. Wilfredo Buenafe	0.50	Eggplant, Sitao, Squash, Ampalaya, Okra, Saluyot, Malungay, Alugbati
	4. Abelardo Magbanua	0.22	Eggplant, Sitao, Squash, Okra, Saluyot, Alugbati, Malungay
	5. Armando Salinas	1.00	Eggplant, Sitao, Squash, Malungay, Alugbati
	6. Edwin Magbanua	0.30	Eggplant, Sitao, Squash, Okra, Malungay, Alugbati
Quintin Remo	1. Juvy Escobar	3.00	Eggplant, Sitao, Squash, Ampalaya, Okra, Gabi, Malungay, Alugbati
	2. Danilo Perolino	0.50	Eggplant, Sitao
Brgy 1, Poblacion	1. Filipe Solano	1.00	Eggplant, Sitao, Squash, Ampalaya, Okra, Upo, Mungbean, Lemongrass
Brgy 4, Poblacion	1. Felicidad Guevarra	0.22	Eggplant, Sitao, Squash, Malungay, Saluyot, Okra, Alugbati
	2. Gerald Villaflor	0.20	Eggplant, Sitao, Squash, Ampalaya, Upo, Alugbati, Kangkong
Magallon Cadre	1. Editha Gallardo	0.23	Eggplant, Sitao, Ampalaya, Tomato, Radish, Upo, Malungay, Alugbati, Kangkong, Amaranth
	2. Nona Racca	0.40	Eggplant, Sitao, Squash, Pechay, Radish
Brgy Inulingan	1. Danilo Gerabata	0.20	Eggplant, Sitao, Squash, Ampalaya, Okra, Saluyot, Malungay

City/Municipality: **San Carlos City**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Codcod			
Prk. Orchids	1. Paulina Bahinting	1.00	Radish, Onions
	2. Antonia Cambarijan	1.00	Onions
	3. Felomena Camanadi	1.00	Onions
Apog-apog	1. Alfredo Malaki	1.00	Cabbage, Pechay, Carrots

	2. Marivic Carandoy	0.25	Cabbage, Pechay, Carrots, Onions, Chayote
	3. Flaviano Balatria	0.50	Cabbage, Carrots
	4. Guilerma Antiquando	1.00	Sitao, Squash, Chayote, Onions
	5. Maricel Swerte	1.00	Squash, Cabbage, Pechay, Carrots, Chayote, Radish
	6. Sarah Tampepe	0.25	Carrots, Radish, Chayote
	7. Corazon Cajeis	10.00	Sitao, Squash, Ampalaya, Cabbage, Carrots, Baguio beans, Pepper, Potato
	8. Leonida Abendan	2.00	Cabbage, Broccoli, Carrots, Onions
	9. Anabel Dalocanog	1.00	Pechay, Carrots, Potato, Baguio beans, Radish, Pepper
	10. Marites Diosana	0.50	Squash, Cabbage, Pechay, Carrots, Radsih, Pepper
	11. Fernando Balatria	0.50	Ampalaya, Carrots, Baguio beans
	12. Julie Gicale	1.00	Eggplant, Cabbage, Radish
	13. Domingo Abella	0.50	Cabbage, Pechay, Carrots, Chayote, Radish
Nagalao	1. Prescilla B. Narca	1.00	Tomato, Baguio beans, Onions
	2. Levi Sarona	0.50	Eggplant, Squash, Tomato, Onions, Pechay, Carrots
	3. Loreto Esquarida	1.00	Eggplant, Onions, Cabbage, Pechay, Carrots, Radish
	4. Levy Nepoponio	1.00	Eggplant, Squash, Cabbage, Pechay, Carrots, Potato
	5. Lorenzo Tampepe	1.00	Pechay, Carrots, Alugbati
	6. Julie Ferolino	2.00	Cabbage, Pechay, Radish, Onions, Chayote
	7. Atanacio Caminade, Jr	2.50	Cabbage, Carrots, Radish, Onions
	8. Armando Nacilla, Sr.	1.00	Cabbage, Onions, Radish, Baguio beans
	9. Joemar Redoblado	1.00	Onions
	10. Roberto Perolino	0.40	Baguio beans, Onions
	11. Roger Baron	0.50	Pechay, Carrots, Radish, Pepper
	12. Pio Amaca	0.50	Radish, Onions, Chayote
	13. Jimmy Baron	1.00	Eggplant, Cabbage, Pechay, Chayote
Nagalao	14. Ariston Amaca	3.00	Squash, Cabbage, Onions, Pechay
	15. Grace Anaca	0.50	Cabbage, Pechay, Pepper
	16. Susana Gildore	0.75	Cabbage, Pechay, Radish, Onions

	17. Pablo Antepuesto	0.50	Cabbage, Carrots
	18. Remejio Sarona	1.00	Cabbage, Radish
	19. Cirila Entrina	0.25	Radish, Onions, Pechay
	20. Marcelino Sarona	0.25	Onions, Baguio beans, Carrots
	21. Mary Jane Nasilla	1.00	Sitao, Squash, Ampalaya, Cabbage, Pechay, Gabi, Malungay
	22. Remedios Caminade	1.00	Sitao, Cabbage, Pechay, Carrots, Alugbati
	23. Atanacio Caminade, Sr.	1.00	Cabbage, Carrots, Onions, Pechay
	24. Lamberto Cambarihan	3.00	Cabbage, Onions, Pechay
	25. Bonifacio Jalen	0.50	Cabbage, Radish
	26. Eleasar Baron	0.50	Cabbage, Pechay
	27. Mario Balansag	0.25	Pechay, Radish, Onion
	28. Jovincia Malansag	0.20	Pechay, Radish, Onions
	29. Genaro Sarona	0.25	Cabbage, Carrots, Onions
	30. Lamberto Gamborihaw	0.50	Onions, Cabbage
	31. Evangeline Gabutero	0.25	Cabbage, Radish, Onions, Chayote, Carrots
	32. Dionesio Pataganao	2.00	Squash, Cabbage, Carrots

City/Municipality: **Hinoba-an**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Asia	1. Esperidion Laureno	1.00	Eggplant, Sitao, Ampalaya, Okra, Mungbean, Malungay, Alugbati, Saluyot
	2. Charito Umbal	0.75	Eggplant, Ampalaya
	3. Salvador Pendon, Jr	0.25	Eggplant, Sitao, Okra, Tomato, Pepper
	4. Randy Artillaso	0.80	Sitao, Ampalaya
Bacuyangan	1. Rolly Artillazo	0.25	Eggplant, Sitao, Squash, Ampalaya, Okra, Pechay, Tomato, Alugbati, Saluyot
	2. Shernaline Perez	0.25	Sitao, Tomato, Pepper, Malungay, Patola, Winged bean
	3. Dialley Almaiz	0.25	Sitao, Ampalaya, Alugbati

	4. Larry Aretillaso	0.50	Eggplant, Squash, Ampalaya, Pechay, Alugbati
	5. Aurora Alvarez	0.20	Eggplant, Sitao, Squash, Ampalaya, Okra, Patola, Pechay
	6. Gena Mahusga	0.20	Eggplant, Sitao, Squash, Ampalaya, Malungay
	7. Leonida Almaiz	0.50	Eggplant, Sitao, Ampalaya, Malungay, Okra, Pepper
	8. Teresita Menaries	0.25	Eggplant, Sitao, Squash, Ampalaya, Okra, Pechay, Alugbati, Sweetpotato
	9. Rimmon Ibañez	0.50	Eggplant, Sitao, Squash, Okra, Pechay, Alugbati, Malungay, Saluyot
	10. Joemar Gaunera	0.20	Sitao, Squash, Ampalaya
Talacagay	1. Nesto Ibañes	0.50	Eggplant, Sitao, Ampalaya, Okra
	2. Willy Samido, Jr	0.75	Ampalaya, Radish
	3. Danilo Ibañes	0.25	Sitao, Ampalaya, Okra, Cucumber
	4. Emelita Esperina	0.50	Eggplant, Sitao, Squash, Ampalaya, Okra, Upo,
	5. Ronnie Bañez	1.00	Eggplant, Sitao, Squash, Ampalaya, Okra, Pechay, Malungay
	6. Letecia Gamutya	0.50	Eggplant, Sitao, Squash, Ampalaya, Okra, Pepper, Cucumber
	7. Josephine Vistar	0.20	Eggplant, Sitao, Squash, Malungay, Sweetpotato
	8. Bonifacio Jimenez	0.25	Eggplant, Sitao, Tomato, Malungay, Alugbati, Saluyot
Daug	1. Ricarido Ramira	0.25	Eggplant, Sitao, Squash, Ampalaya, Okra
	2. Melanie Jemenez	0.50	Eggplant, Sitao, Ampalaya, Okra, Tomato
	3. Alma Arroyo	0.25	Sitao, Squash, Okra, Tomato
	4. Amanda Ysatam	0.20	Sitao, Squash, Okra, Tomato, Pepper
	5. Nestor Balolot	0.50	Sitao, Tomato
	6. Alberto Mogelio	0.25	Ampalaya, Tomato
	7. Joel Elaco	0.50	Tomato
	8. Gene Grijaldo	0.25	Eggplant, Ampalaya, Okra, Cucumber, Tomato, Pepper
	9. Marilyn Mujilio	0.30	Eggplant, Sitao, Squash, Okra,

			Tomato, Saluyot, Malungay, Alugbati
	10. Generosa Mogenio	0.2	Squash, Okra, Tomato, Malungay, Saluyot
	11. Nilda Sardual	0.25	Okra, Malungay
	12. Nebuchadnezar Sarino	0.50	Sitao, Squash, Ampalaya, Okra, Tomato
	13. Vicente Laparan	0.25	Eggplant, Sitao, Ampalaya, Okra, Tomato, Carrots, Pepper
	14. Erene Calago	0.25	Sitao, Squash, Okra, Tomato, Pepper, Malungay, Alugbati
	15. Felicisima Arnaiz	0.25	Sitao, Tomato, Alugbati
	16. Ignacia Balalabo	0.25	Eggplant, Tomato, Alugbati, Pepper, Gabi

City/Municipality: **Escalante City**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Hda. Fe	1. Carmilino Luyao	0.36	Eggplant, Sitao, Squash, Ampalaya, Okra, Pechay, Alugbati
	2. Jeofrey Canillo	0.40	Eggplant, Ampalaya, Tomato
Alimango	1. Jun-jun Alimany	4.00	Eggplant, Squash, Ampalaya, Tomato, Papaya, Pechay, Pepper
Jonob-jonob	1. Elizabeth Señora	0.25	Eggplant, Sitao, Ampalaya, Okra, Alugbati, Saluyot
	2. Nicki Señora	0.50	Eggplant, Sitao, Malungay, Saluyot
	3. Eden Agabon	0.25	Eggplant, Sitao
	4. Riza Panolin	0.20	Eggplant, Ampalaya
	5. Maurecio Namion	0.30	Eggplant, Sitao, Squash, Okra, Alugbati, Saluyot
	6. Felipe Filibrico	0.30	Eggplant, Sitao, Ampalaya, Malungay, Saluyot
	7. Flordeliza Monija	0.25	Sitao, Okra, Alugbati
	8. Lorna Nameon	0.25	Eggplant, Ampalaya, Saluyot
	9. Leodegario de la Cruz	0.80	Eggplant, Sitao, Ampalaya, Okra, Alugbati, Saluyot, Squash, Malungay, Baguio beans, Pechay

City/Municipality: **Canlaon City**

Barangay	Name of Grower	Vegetable Area (ha)	Vegetables Grown
Lumapao	1. Julita N. Gildore	0.25	Pechay, Radish, Alugbati
	2. Pedro Vailoces	0.25	Cabbage, Broccoli, Radish, Sibuyas
	3. Eugenio Entrina	0.50	Cabbage, Pechay, Carrots, Radish
	4. Meldred Jabalde	0.20	Chayote, Onions, Malungay, Alugbati
	5. Zenaida Ponting	0.25	Cabbage, Pechay, Chayote, Malungay
	6. Esteban Ponting	0.50	Cabbage, Pechay, Carrots
	7. Roger Embudo	0.25	Carrots
	8. Teresita Calago	0.25	Cabbage, Pechay, Carrots, Radish
	9. Madeline Dionaldo	0.75	Cabbage, Broccoli, Carrots
	10. Nerissa Bacaro	0.20	Cabbage, Pechay, Broccoli, Carrots, Chayote, Onions, Malungay
	11. Maria Hillado	0.25	Cabbage, Pechay, Gabi
	12. Reygan Gabotero	1.00	Squash, Cauliflower, Broccoli, Malungay
	13. Alicia Osianas	0.50	Cabbage, Pechay, Malungay, Alugbati
	14. Gino Calago	0.25	Cabbage, Broccoli
	15. Cristoto Gildore	0.25	Eggplant, Cabbage, Pechay
	16. Rolando Brandia	1.75	Cabbage, Broccoli, Carrots
	17. Mario Nacal	0.50	Cabbage, Carrots
18. Jessie Bacaro	0.25	Cabbage, Pechay, Carrots, Hot Pepper, Radish	
19. Angelita B. Muyon	1.50	Squash, Carrots, Radish	
Masulog	1. Melba Segarino	0.50	Onions, cucumber, Malungay, Alugbati
	2. Jose Mahinay	0.50	Carrots, Onions, Alugbati
	3. Lilibeth Bustillo	0.50	Baguio beans, Tomato, Onions
	4. Raul Antolo	0.25	Carrots, Onions
	5. Winsar Binondo	0.50	Carrots, Onions, Baguio beans
	6. Benito Mordido	0.25	Eggplant, Baguio beans, Pechay, Carrots, Onions, Malungay, Alugbati
	7. Richelle Ballao	0.75	Squash, Onions, Sweet pepper, Carrots, Malungay, Alugbati
	8. Rolando Dinosapal	0.50	Onions, Baguio beans, Tomato
	9. Ponciano Sergio	1.00	Cabbage, Sweet pepper, Hot pepper, Onions, Carrots, Cucumber
	10. Vilmar Pomada	0.20	Baguio beans, Onions, Cucumber
	11. Jenelyn Sergio	0.35	Sweet pepper, Baguio beans, Onions, Cucumber

	12. Mike Rafols	0.50	Cucumber, Baguio beans, Onions, Tomato, Sweet Pepper
	13. Beltran Denosapal	0.25	Cabbage, Carrots, Hot pepper, Onions, Baguio beans, Cucumber
	14. Mirriam Anito	0.50	Cabbage, Onions, Malungay
	15. Rosito Anito	1.05	Cabbage
	16. Jesus Bustillo	0.50	Carrots, Baguio beans,
	17. Rotella Malabago	0.25	Squash, Onions, Carrots, Alugbati, Malungay
	18. Analie Anito	0.25	Cucumber, Onions, Baguio beans
	19. Jorypie de la Serna	0.50	Cucumber
Pula	1. Anastacia Morales	1.50	Carrots, Sweet pepper
	2. Adelaida Buenaflor	0.50	Carrots, Baguio Beans, Onions
	3. Emma Llena	0.60	Chicharo, Sweet peas, Tomato, Sweet pepper
	4. Antonia Abrigana	0.20	Carrots, Radish, Onions, Sweet pepper
	5. Jobelyn Morales	0.50	Lettuce, Onions
	6. Elvira Manait	0.50	Baguio beans, Onions, Sweet pepper
	7. Judito Magallano	0.25	Baguio beans, Green peas
	8. Maximo Vilarde	0.50	Lettuce, Green peas, Tomato
	9. Florenda Relativo	0.25	Carrots
	10. Bartolome Bahao	0.50	Carrots, Hot pepper, Green peas, Tomato
	11. Junalene Morales	0.50	Carrots
	12. Francisco Claro	0.50	Hot pepper
	13. Jemar Añero	0.50	Celery
	14. Rosemarie Mamac	0.25	Onions, Baguio beans
	15. Emilia Altubar	0.25	Hot pepper, Eggplant, Pechay, Carrots, Malungay, Alugbati
	16. Flora Mae Marcos	1.50	Eggplant, Tomato, Cucumber, Broccoli, Carrots, Baguio beans, Malungay, Alugbati, Saluyot
	17. Leonila B. Angana	1.50	Tomato, Lettuce, Cabbage, Pechay,
	18. Librit Tampepe	1.00	Tomato, Onions, Cabbage, Pechay, Carrots, Malungay, Alugbati
	19. Julian Labrador	0.50	Onions, Carrots, Baguio beans, Alugbati, Malungay
	20. Vergie Jimenez	0.25	Onions, Broccoli, Sweet pepper
	21. Mercedita Antipuesto	0.50	Baguio beans, Onions, Malungay, Alugbati
	22. Danilo Tampepe	0.50	Baguio beans, Carrots, Pechay, Cabbage, Onions, Alugbati
	23. Nelly B. Betchido	5.00	Squash, Okra, Tomato, Sweet pepper, Cabbage, Baguio beans, Onions, Spinach, Chayote, Radish,

			Alugbati
	24. Lucila Tabotabo	0.25	Baguio beans, Onions
	25. Isidoro Angana	1.50	Baguio beans, Hot pepper, onions, Lettuce
	26. Josephine Jimenez	0.25	Carrots, Baguio beans, Onions, Lettuce
	27. Noel Morte	0.50	Carrots, Cabbage, Onions
	28. Rolly Cagoscoc	0.25	Carrots, Onions, Baguio beans, tomato
	29. Zosima Torres	1.00	Carrots, Onions
	30. Trinidad Dayaganon	0.50	Cabbage, Broccoli, Carrots, Lettuce, Onions, Baguio beans
	31. Rosalinda Pat	0.25	Cabbage, Pechay, Carrots
	32. Marilyn Celino	0.25	Carrots, Onions, Baguio beans
	33. Rodolfo Dulla	4.00	Onions
	34. Celia Luardo	0.25	Carrots, Hot pepper, Onions, Baguio beans

City/Municipality: **Canlaon City**

Barangay	Name of Grower	Vegetable	Vegetables Grown
		Area (ha)	
Malaiba	1. Josefa Doriosa	1.00	Cabbage, Pechay, Carrots
	2. Rosenil Fajardo	0.25	Cabbage, Broccoli
	3. Mercedita Villamonte	0.25	Cabbage, Cauliflower, Carrots, Tomato
	4. Teddy Bayarcal	2.00	Sweet peas, Lettuce, Hot pepper
	5. Renato Guzman	0.50	Cabbage, Pechay, Sweet pepper
	6. Myrna Vergara	0.25	Pechay, Broccoli
	7. Liza Panerio	0.25	Cabbage, Pechay, Onions
	8. Generosa Panerio	3.00	Cabbage, Broccoli, Chayote
	9. Nelita Encepido	1.00	Cabbage, Carrots, Chayote
	10. Efren Embudo	0.50	Pechay, Broccoli, Radish
	11. Melca Pasinabao	0.25	Sweet peas, Carrots, Hot pepper, Lettuce
	12. Teresita Jenelyn Gaboc	0.25	Tomato, Cabbage, Carrots, Lettuce, Onions
	13. Rosemarie Velara	0.25	Sitao, Okra, Tomato, Pechay, Carrots, Lettuce, Patola, Hot pepper
	14. Arnel Gemina	0.25	Pechay, Carrots, Hot pepper
	15. Carlos Bayadog	0.50	Tomato, Eggplant, Pechay, Cauliflower, Carrots, Hot pepper
	16. Clarita Manimog	0.50	Tomato, Cabbage, Pechay, Carrots, Onions, Lettuce
	17. Salome Vergara	0.25	Tomato, Chayote

	18. Eleoterio Liarca	0.25	Cabbage, Pechay, Carrots
	19. Concordia Llanes	0.25	Eggplant, Cabbage, Pechay, Sweet pepper, Lettuce
	20. Rosa Libaton	1.00	Pechay, Onions, Chayote, Radish
	21. Jovencia Bayadog	0.50	Tomato, Pechay, Carrots, Alugbati
	22. Merlinda Vergara	0.50	Eggplant, Squash, Tomato, Pechay, Broccoli, Carrots, Alugbati
	23. Marivic Esconde	0.25	Eggplant, Sitao, Okra, Onions, Carrots, Chayote
	24. Ian D. Teleron	0.25	Cabbage, Pechay, Sweet peas, Carrots, Alugbati, Amaranth
	25. Vilma Luage	0.25	Onions, Pechay, Carrots, Alugbati
	26. Sofia Rosatasi	0.25	Tomato, Pechay, Malungay, Pechay
	27. Analyn Dumaboc	0.25	Squash, Lettuce, Pechay, Carrots, Chayote
	28. Joelito Tagacanao	0.30	Pechay, Carrots, Lettuce, Chayote
	29. Luzelme Neri	0.50	Pechay, Carrots, Lettuce
	30. Alberto Lara	0.25	Eggplant, Tomato, Pechay, Sweet peas
	31. Virginia Dumaboc	0.25	Tomato, Cabbage, Pechay, Carrots, Onions
	32. Rodrigo Erauda	0.25	Eggplant, Pechay, Tomato, Sweet pepper, Lettuce
	33. Vicente Tagacanao	1.00	Cabbage, Pechay, Carrots, Chayote