

## **BIBLIOGRAPHY**

ALBADES, MARICHEL D. APRIL 2013. A Data Entry on the Farming Practices of Buguias Vegetable Farmers. Benguet State University. La Trinidad, Benguet.

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## **ABSTRACT**

The study was conducted to document the farming practices of Buguias, Benguet vegetable farmers. Specifically, the study aimed to determine the common farming practices of Buguias farmers in terms of crops planted and the stages of production; and the factors affecting the decision of farmers to adopt such farming method.

It also aimed to store the results in a simple website for information storage and retrieval.

The findings of the study showed that the farmers have the same practices on carrot, cabbage and potato production.

Respondents have the same preferences when it comes to varieties of carrot, cabbage and potato. Carrot and potato varieties were selected according to its compatibility with the soil, while in cabbage, the variety selected were based on the market price.



The study also found out that there were farmers still using Gramoxone despite it being banned. This herbicide was acquired by the respondents from vendors at the La Trinidad Trading Post.

The respondents identified their problems when it comes to farming; the lack of capital because of bankruptcy and the lack for irrigation system, especially during dry season. Thus, because of lack of water for irrigation during summer, some do not plant any crop. This is the major dilemma of the respondents from Bangao and Poblacion, except for the eastern part of Poblacion.

Carrot and potato were the planted vegetables this January to March with potato have the largest area which is 16.5 hectare and carrot with 15.5 hectares. Farmers in Buguias were inorganic growers since they used commercial fertilizers and sprayed chemicals on the crops. They also employ a certain cropping pattern which is crop rotation since it may control pests and diseases and to improve the quality of the soil. Results showed that the farming practices of the respondents which is inorganic method had been greatly influenced by parents.

The simple website was made for information storage and retrieval; and easy access. The URL was [www.buguiasfarmingpractice.weebly.com](http://www.buguiasfarmingpractice.weebly.com)

Based on the findings, it is recommended that government agencies should help the farmers for the solution of their problems. Moreover, a database on the farming practices may be developed by Information Technology experts in the university and other concerned agencies.



## RESULTS AND DISCUSSION

### Socio-Demographic Profile of the Respondents

Table 1 shows the distribution of respondents according to age, sex, civil status, educational attainment, years of farming experience, land ownership and the measurement of the respondents' farms.

*Age.* As shown in Table 1, the age bracket of 41-50 got the highest percentage of 48, followed by 20-30 with 24 %. On the other hand, 16% of the respondents belonged to the age range of 50 and above. These show that the respondents were adults while few were above the age of 50. Such results also imply that nearly half of the respondents were part of the labor force when using age as the basis.

*Sex.* Seventy percent of the respondents were males and the rest were females. It may imply that males were more active in farming because married women were more engaged in housekeeping. This case was also shown in the study of Lomiwes (2007) in Loo, Buguias, where women were more active in taking care of household chores and managing their sari-sari stores.

*Civil status.* Eighty-one percent of the respondents were married and only 16% were single. This shows that married couples were more engaged in farming.

*Educational attainment.* Forty-four percent of the respondents reached high school level and 42% reached elementary. Only one respondent never attended school.

This indicates that almost all of the respondents are literate.



Table 1. Socio-demographic profile of the respondents

PARTICULARS	FREQUENCY n=100	PERCENTAGE %
Age bracket		
20-30	24	24
31-40	12	12
41-50	48	48
50 and above	16	16
<b>TOTAL</b>	<b>100</b>	<b>100</b>
Sex		
Male	70	70
Female	30	30
<b>TOTAL</b>	<b>100</b>	<b>100</b>
Civil Status		
Single	16	16
Married	81	81
Separated	2	2
Widow/Widower	1	1
<b>TOTAL</b>	<b>100</b>	<b>100</b>



Table 1 continued...

PARTICULARS	FREQUENCY n=100	PERCENTAGE %
<b>Educational Attainment</b>		
Elementary Level	42	42
High School Level	44	44
College Level	13	13
Never Attended School	1	1
<b>TOTAL</b>	<b>100</b>	<b>100</b>
<b>Years of Farming Experience</b>		
3-10 years	19	19
11-20 years	25	25
21-30 years	38	38
31-40 years	18	18
<b>TOTAL</b>	<b>100</b>	<b>100</b>
<b>Land Ownership</b>		
Owner	62	62
Tenant	38	38
<b>TOTAL</b>	<b>100</b>	<b>100</b>
<b>Cultivated Area</b>		
Owner Cultivated	41.25 ha	66
Tenant Cultivated	21.25 ha	34
<b>TOTAL</b> 62.5 ha	<b>100</b>	



*Years of farming experience.* Thirty-eight percent of the respondents had been farming for 21-30 years followed by 11-20 years with 25%. However, most of the respondents claimed that they had been exposed to farming as early at the age of seven or eight when they helped their parents at the garden. This shows that at young age, most children were exposed to field works at the garden. The results also imply that the respondents have been involved in farming practices for several years already.

*Land ownership.* The table shows that majority (62%) of the respondents were land owners while the rest claimed that they were tenants. Findings were the same in the study of Lomiwes (2007), where majority of the respondents cultivated their own land. *Farm measurement.* All land owners were cultivating a total land area of 41.25 hectares while all tenants were cultivating a total of 21.25 hectares. Findings show that tenants were cultivating almost half of the cultivated measurement by the land owners. The same with the findings of Sacla (2007) in his study at Catlubong, Buguias where most of the respondents were land owners.

Table 2 shows that most (46%) of the respondents were cultivating .5 hectare while 29% of the respondents claimed that they were cultivating .25 hectare. These imply that all of the respondents cultivate a minimum of one-fourth hectare. This supports the finding in the study of Sacla (2007) where all of the respondents till less than a hectare.



Table 2. Area cultivated by the respondents

PARTICULARS	FREQUENCY n=100	PERCENTAGE %
Area Measurement		
.25 hectare	29	29
.5 hectare	46	46
.75 hectare	7	7
1 hectare and above	18	18
TOTAL	100	100

#### Vegetable Crops Grown by the Respondents

Table 3 shows that there were four major crops being planted by the respondents namely, potato, carrot, cabbage, and Chinese cabbage. Sixty-seven percent were planting carrot, 53% with cabbage, 50% with potato and 39% with Chinese cabbage. Other vegetable crops grown by the respondents were lettuce, broccoli, cauliflower, beans and garden peas. These show that the crops grown by the farmers in Bangao and Poblacion were varied.

#### Common Farming Practices of Poblacion and Bangao Farmers

Farming practices were categorized into three which were: pre-production practices, production practices and harvesting practices. The Pre-Production practices included seed selection and land preparation. The Production practices included ways of planting, fertilizer application, pests and diseases management, weeds control, and irrigation. Under the harvesting practices are: the maturity basis, months of the crops before harvesting and the considerations of farmers before harvesting.



Table 3. Vegetables crops grown by the respondents

PARTICULARS	FREQUENCY n=100	PERCENTAGE %
Vegetables		
Carrot	67	67
Cabbage	53	53
Potato	50	50
Chinese Cabbage	39	39
Lettuce	23	23
Beans	19	19
Broccoli	8	8
Garden Pea	7	7
Cauliflower	4	4

\*multiple response

#### Pre-Production Practices

Cabbage. Two processes were considered in the pre-production of cabbage: seed selection and land preparation.

Seed selection. Almost all (99%) of the respondents claimed that they selected the seed varieties that were suitable to the soil type of their farms and the season. Only one respondent selected seed variety as recommended by other farmers since the respondent has a minimal experience in farming. All of the respondents bought the seeds they planted from farm supplies. This shows that all respondents acquired seeds they needed from farm supplies.





Cabbage varieties selected by farmers is shown in Table 4. Seventy-four percent of the respondents planted the variety RB (*Rareball*), followed by *Lucky Ball* variety with 43% and the *Scorpio* variety with 27%. These three varieties were said to mature easily within two and a half months according to some of the respondents. Scorpio was chosen by other respondents because during marketing, this variety had the highest market price than the others. Other varieties being selected by the respondents were *Condor*, *Sigma*, *Green Coal*, *Nong Woo Bio* and *Wonderball*. These varieties were rarely planted by the respondents because of low market price during marketing.

Results show that a farmer plants more than one variety of cabbage. Results also imply that farmers chose varieties based on the crop duration and the market price of the variety.

On the seed treatment, all of the respondents did not treat the cabbage seeds before planting. They said that the seeds were directly planted, and after some days, were uprooted for transplanting. Treatments were done when seeds were contaminated through mixing fungicides to the seeds.



Table 4. Varieties of cabbage commonly selected by the respondents

VARIETIES	FREQUENCY n=53	PERCENTAGE %
RB	39	74
Lucky Ball	23	43
Scorpio	12	27
Condor	6	11
Sigma	5	9
Green Coal	4	7
Nong Woo Bio	3	5
Wonder Ball	2	3

\*multiple response

*Land preparation.* In the land preparation, in Table 5, 70% cultivated and hilled up the plots then made bowl-likes (*tal-ukan*) side by side on the plots for the seedlings (Figure 2). Another practice was they cultivated and hilled up the plots and flattened it for transplanting.





Figure 2. Bowl-like dugs planted with cabbage seedlings

With the least percentage, some respondents cultivated and hilled up the plots, flattened it. They then applied chicken manure on the plots. They let the chicken manure to be composted for 15-20 days, cultivated it again and lastly, they made make bowl-like dug (*tal-ukan*) on the plots for the seedlings.

Table 5. Land preparation practices of the respondents on cabbage

PRACTICES	FREQUENCY n=53	PERCENTAGE %
Hilled Up and Flattened plots (ready for transplant)	9	17
Hilled up, flattened plots then made bowl-like dug for seedlings	37	70
Hilled up, flattened plots, applied and composted chicken manure, cultivated, then made bowl- like dug for seedlings.	7	13
TOTAL	53	100

Carrot. The same with cabbage, there were two processes in pre-production of carrot: seed selection and land preparation.

*Seed selection.* Farmers selected the seeds of carrots themselves based on their experience on the certain variety if it is suited for the soil and the season. As shown in

Table 6, carrot varieties that were mostly selected were; *Tokita, Takii's New Kuroda, Chun Hong, Kuroda, Makita* and *Hung Nong*. Other varieties were *Teracota, Akari, Firewedge, Condor* and *Nokia* seeds. In the study of Sacla (2007) in Catlubong, Buguias where Takii's and Tokita were the top two varieties selected by the respondents.

Most of the respondents bought the carrot seeds directly from farms supplies (93%) while some of the respondents acquired seeds through middlemen.

With regards to seed treatment, almost all (98%) of the respondents did not treat the seeds. Moreover, two of the respondents treated seeds before planting by adding fungicide. Treatment were done when seeds were infected.

Table 6. Carrot varieties commonly selected by the respondents

VARIETIES	FREQUENCY n=67	PERCENTAGE %
Tokita	41	61
Takii's New Kuroda	32	48
Chun Hong	25	37
Kuroda	20	30
Makita	12	18
Hung Nong	6	9
Akari, Firewedge	3	4
Teracota, Condor, Nokia	2	3

\*multiple response



*Land preparation.* For the land preparation, 59% of the respondents cultivated and hilled up the plots, flattened then furrowed it as shown in Table 7. Moreover, 28% cultivated and hilled up the plots, flattened the plots, applied chicken manure with the soil and let it be composted for 15-20 days, cultivated it again, flattened the plots and furrowed (Figure 3 and 4). With the least percentage is more likely the same with the latter practice, except that after the chicken manure were composted, the respondents sprayed it with fungicide before cultivating again.

Table 7. Land preparation practices of the respondents on carrot

PRACTICES	FREQUENCY n=67	PERCENTAGE %
Cultivated and hilled up the plots, flattened then furrowed	40	59
Cultivated and hilled up the plots, flattened and applied and composted chicken manure, cultivated again, flattened and furrowed the plots	19	28
Cultivated and hilled up the plots, flattened and applied and composted chicken manure, sprayed fungicide, cultivated again, flattened and furrowed the plots	8	13
TOTAL	67	100

*Potato.* Pre-production of potato have two processes: seed selection and land preparation.

*Seed selection.* On the seed selection practices, most of the respondents chose the variety based on their experiences. The consideration was the soil type of their gardens. The variety chosen of almost all the respondents is the Granula variety and with the least percentage





was *Ranyag* variety. The results are same with the study of Baniaga (2008) where majority of the respondents selected the Granula variety.

Figure 3. The plots are flattened ready for furrowing

Figure 4. A farmer is furrowing the plots for the carrot seeds Most of the farmers bought the germinated potato tubers they planted from other farmers. Some of the respondents said that they have their own planting materials. Others also bought potato cuttings from Benguet State University, and with much capital, they bought imported planting materials from farm supplies.

Most of the respondents did not treat the planting material before planting; only eight respondents treated the germinated potato tubers by spraying fungicides. The respondents

said that application of pesticide to the germinated potato tubers was done especially if it was attacked by pests because if they will not apply pesticides, the potato tubers will not grow since the pests had already eaten the germinated leaves.

Land preparation. On the land preparation, all of the respondents practiced the cultivation and hilling up of the plots, flattening it then furrowing at the center of the plot.

These imply that the respondents practiced only one way in land preparation for potato.

### Production Practices

Cabbage. There were five processes in the cabbage production: planting, fertilizer application, controlling pests and diseases, controlling weeds and irrigation.

Ways of planting. All of the respondents practiced transplanting in cabbage. In transplanting the seedlings, distance was observed by the farmers. Seventy percent allotted seven to eight inches, and some allotted nine to 10 inches distance of the seedlings in transplanting. Distance was observed for the growth of the heads of the cabbage.

Fertilizer application. In fertilizer application, as shown in Table 8, 57% of the respondents claimed to use only one NPK (Nitrogen-Phosphorus -Potassium) fertilizers, the T16 (16-16-16) and the T14 (14-14-14). T14 was the widely used fertilizer with 64%, followed by Urea (46-0-0) and T16. This indicates that the respondents used only three types of NPK fertilizers. NPK fertilizers were applied by all of the respondents to the cabbage seedlings through top dress then side dress the plots (Figure 5).



All of the respondents used chicken manure. This shows that chicken manure is a primary fertilizer in cabbage production. The same with the finding of Polagis (2009) in her study at Poblacion, Buguias where all of the respondents used chicken manure. Eighty-seven percent of the respondents applied top dress in applying the chicken manure; the remaining 13% did the basal application. Top dress is a fertilizer application method wherein a fertilizer was spread thinly in the soil surface.



Figure 5. Side dressing of cabbage was done by one of the respondents



Table 8. Fertilizers applied and application method on cabbage

PARTICULARS	FREQUENCY n=53	PERCENTAGE %
NPK Fertilizers		
T14 (14-14-14)	34	64
T16 (16-16-16)	19	36
Urea (46-0-0)	23	43
NPK Fertilizer Application Method		
Top Dress	53	100
Chicken Manure		
	53	100
Chicken Manure Application Method		
Top Dress	46	87
Basal	7	13

\*multiple response

Farmers applied these fertilizers in different number of days after planting. Table 9 shows that majority applied complete fertilizers 19-23 days after transplanting the seedling. Majority also applied chicken manure five to six days after transplanting. These indicated that fertilizer and chicken manure applications were made after the new roots of the seedling grew. After the application of the NPK fertilizers, the farmers applied sidedressing.



Table 9. Fertilizer and chicken manure application after planting

PARTICULARS	FREQUENCY n=53	PERCENTAGE %
<b>NPK Fertilizers</b>		
10-14 days	4	7
15-18 days	11	21
19-23 days	36	68
24-26 days	2	4
<b>TOTAL</b>	<b>53</b>	<b>100</b>
<b>Chicken Manure</b>		
5-6 days	37	70
7-8 days	9	17
15 days before transplanting	7	13
<b>TOTAL</b>	<b>53</b>	<b>100</b>

*Pests and diseases management.* On the pests and disease, cutworm had the highest percentage on the pests and club root on the diseases with 64% and 40%, respectively. Other pests and diseases that the respondents encountered mostly were beetles, diamond back moth larvae, armyworms, leaf miners, slugs and leaf spots.

All the respondents controled these pests with chemical pesticides. This supports the research of Medina (1987) on the pesticide use of farmers in Loo, Buguias.

Table 10 shows the pesticides used by farmers to control pests. Findings show that farmers use more than ten insecticides and five fungicides. This supports the findings of Gayaso



(2010) that farmers relied almost exclusively on chemical pesticides in their desire to meet the growing demands of consumers for high quality vegetables.

Majority of the respondents sprayed pesticides two-three times in a month during summer and four to five times during the rainy season. These imply that the season affects the times where the farmers sprayed pesticides.

Most of the respondents claimed to have sprayed pesticides before the increase of pests in the crop and some sprayed the crop before the attack of pests. Respondents who used Fenus, Sumicidine and Lorsban said that these were the most effective insecticides, especially for Lorsban since it is newly introduced and it contains stronger chemical. Lorsban is an insecticide used to eliminate insect pests such as diamond back moth, cutworms and armyworms.

*Weed control.* Weeds control practices of the respondents were manual weeding (100%) and 24% used herbicides.

Herbicides used by the respondents were shown in Table 11 with Afalon leading it. Afalon is an herbicide which eliminates weeds through inhibiting photosynthesis; and do not persist on soil. Respondents said that they used Afalon because it is not toxic to their crop since it is a green labeled herbicide.



Table 10. Pesticides sprayed by the respondents on cabbage

PARTICULARS	FREQUENCY n=53	PERCENTAGE %
<b>Insecticides</b>		
Fenus	21	40
Sumicidine	17	32
Lorsban	15	28
Success	14	26
Karate	11	21
Siga	11	21
Bida	11	21
Prevaton	7	13
Padan	7	13
Selecron	7	13
Magnum	6	11
Penant	4	7
<b>Fungicides</b>		
Dithane	17	32
Manager	16	30
Mancozeb	9	17
Score	7	13
Vondozeb	4	7

\*multiple response



Table 11. Herbicides sprayed by the respondents

HERBICIDES	FREQUENCY n=13	PERCENTAGE %
Afalon	9	69
Gramoxone	7	54
Power	4	30
Clearout	3	23
One Side	2	15
Sencor	2	15

\*multiple response

Other herbicides used by the respondents were Gramoxone, Power, One Side, Clear Out and Sencor. These results imply that there were farmers who are still using Gramoxone despite that it being banned in Malaysia, Argentina, Philippines and in many European countries. This herbicide has been proven to cause blurred vision, kidney and skin damages, intestinal illness, breathing difficulties, and death due to lung injury (Heal Toxics, 2012). Some of the respondents who were using Gramoxone said that they bought the herbicide from vendors selling farming tools at the La Trinidad Vegetable Trading Post.

However, respondents using Gramoxone claimed that they used it only if the weeds surrounding their farms are hard to eliminate by weak herbicides. Respondents using Gramoxone said that when spraying the herbicide, they wore protective gears such as face masks, boots, plastic gloves and overcoats to avoid skin contact with the chemical.

*Irrigation.* With regards to irrigation, all of the respondents used sprinklers in irrigating their crops. Shown in Table 12 were the times the respondents irrigated their cabbage in a



month. During the wet season, majority (58%) irrigated their crops two to three times while during dry season, 74% irrigated the cabbage six to seven times. These show that during wet season, cabbages are rain-fed mostly.

Carrot. Production of carrot has five processes: planting, fertilizer application, controlling pests and diseases, controlling weeds and irrigation.

*Ways of Planting.* All of the respondents planted the seeds directly. The distances of the furrows vary from three, four and five inches. The distance was observed by the respondents to ensure the growth and development of the tubers.

Table 12. Times of irrigating cabbage in a month

PARTICULARS	FREQUENCY n=53	PERCENTAGE %
Wet Season		
2-3 times	31	58
4-5 times	22	42
Dry Season		
6-7 times	39	74
8-9 times	14	26
TOTAL	53	100

*Fertilizer Application.* Fertilizers (Nitrogen-Phosphorus-Potassium) being applied by the respondents is shown in Table 13 with T-14 (14-14-14), Urea (46-0-0) and T-16 (16-16-



16). Fifty one percent usually mixed the Urea with the T-14 while 49% used one fertilizer only, either T14 or T16. The same with the results in the study of Sacla (2007), almost all of the respondents used chicken as the primary fertilizer, except for one respondent who used compost instead of chicken manure.

With regards to the application of these fertilizers, the NPK fertilizers were applied through band/row application (100%) while the chicken manure were mostly applied in two ways, basal and band/row application. Band/row is a fertilizer application where the fertilizer is put on following the lines between the furrows of the carrots. Basal application is a method where the fertilizer is mixed with the soil.

The results imply that some of the respondents applied the chicken manure the same with the way they applied the NPK fertilizers.

Respondents who applied band/row method of the chicken manure claimed that they usually did the basal method. However, when the price of chicken manure increased, they shifted to band/row method because they used less chicken manure. These imply farmers preferred to use method that does not require expensive input.

NPK fertilizers were mostly applied after the thinning (Figure 6). Thinning was applied to provide enough space needed by the carrot in their growth. After one month and one week, most of the respondents applied NPK fertilizers, and then applied side dressing. Some did fertilizer application one month and one and a half month after planting. This is in contrast with the finding of Sacla (2007) where majority of the respondents applied fertilizer a week after the application of chicken manure.





Figure 6. Thinning of carrots was done one month after planting

Chicken manure were mostly applied right after planting, it serves as the covering of the seeds.

Forty two percent applied chicken manure 15-20 days before planting by mixing it with the soil and the remaining applied 10-15 days after planting.

These imply that most respondents applied chicken manure after planting. Some claimed that it is more practical because they used less chicken manure than in basal application. They related that chicken manure's price is continuously increasing.



Table 13. Fertilizers applied and application methods on carrot

PARTICULARS	FREQUENCY n=67	PERCENTAGE %
<b>NPK Fertilizers</b>		
T14 (14-14-14)	44	66
T16 (16-16-16)	26	34
Urea (46-0-0)	34	51
<b>NPK Fertilizer Application Method</b>		
Band/Row	67	100
<b>Chicken Manure</b>		
		100
<b>Chicken Manure Application Method</b>		
Band/Row	39	58
Basal	28	42

\*multiple response

*Pests and diseases management.* Pests and diseases that were mostly encountered by the respondents were cutworms, crickets, leaf miner, slugs, chicken maggots, blight and powdery mildew. With these pests and diseases, all of the farmers used pesticides to control it. This supports what Polagis (2009) said that all farmers used pesticides to control pests. Shown in Table 15 were the pesticides being used by the respondents.



Table 14. Fertilizer and chicken manure application after planting

PARTICULARS	FREQUENCY n=67	PERCENTAGE %
NPK Fertilizers		
One month	8	10
One month one week	62	78
One and a half month	10	12
TOTAL	67	100
Chicken Manure		
After planting ( Seed Covering)	40	50
15-20 days before planting	33	41
10-15 days after planting	7	9
TOTAL	80	100

Lorsban, Bida and Magnum were the top three insecticides used by the respondents. These three were the most effective in eliminating insect pests according to the experience of the respondents. Moreover, respondents preferred Dithane and Mancozeb since it is green labeled which means that it is not toxic.

During the dry season, most of the respondents sprayed pesticides four to five times while during wet season they sprayed six to seven times. This indicates that the spraying of pesticides vary from the season and with the emergence of pests such as slugs and leaf miners.



Table 15. Pesticides used by the respondents on carrot

PESTICIDES	FREQUENCY n=67	PERCENTAGE %
<b>Insecticides</b>		
Lorsban	29	43
Bida	23	34
Magnum	22	27
Sumicidine	19	24
Karate	15	19
Rover	12	15
Fenus	11	14
Selecron	9	11
Success	9	11
Padan	8	10
Trigard	4	6
<b>Fungicides</b>		
Dithane	24	36
Manager	23	34
Hyper	13	19
Vondozeb	9	13
Rainfast	6	9
Pilarich	5	7

\*multiple response



*Weed control.* Farmers control weeds through manual weeding and use of herbicides. Herbicides being used by the respondents were: Afalon, Gramoxone, Sencor, One Side, Power and Clear out. Results indicate that a farmer uses more than one herbicide. The same results were observed in cabbage where most respondents use Afalon because as claimed by some of the respondents, it can eliminate the weeds but do not affect much the carrots. Carrots affected by Afalon turned the leaves yellowish but do not die.

Some of the respondents used herbicides since it is easier than manual weeding and it required less time in eliminating weeds.

*Irrigation.* All of the respondents used sprinkler method in irrigating. Carrot is seldom planted by farmers during the rainy season since carrot leaves were sensitive to typhoons. Most respondents planted during dry season and (48%) irrigated the crop five to six times per month.

Table 16. Herbicides sprayed by the respondents

HERBICIDES	FREQUENCY n=67	PERCENTAGE %
Afalon	56	84
Gramoxone	21	31
Power	15	22
One Side	12	18
Clear Out	8	12
Sencor	6	9

\*multiple response



*Potato.* There were five processes in potato production: planting, fertilizer application, pests and diseases control, weed control and irrigation.

*Ways of Planting.* The germinated potato tubers were planted directly with distances which vary from seven to nine inches and 10 to 12 inches distances. Most of the respondents observed the distance of the tubers with seven to nine inches because according to them, it is the ideal distance for potato planting. Respondents claim that seven to nine inches distance was good enough for the potato tubers to grow underground.

*Fertilizer Application.* Fertilizers used were the same with the cabbage and carrot; however there were differences on what fertilizer. As shown in Table 17, majority of the respondents used T14 (14-14-14). Half of the respondents claimed that they mixed up the Urea and the T14 while the other half used any of the T14 and T16. All of the respondents used chicken manure. Fertilizers and the chicken manure were applied through top dress method. Fertilizers were mostly applied after nine to 10 days after planting and the chicken manure was three to four days after planting when the potato leaves have grown.

*Pests and diseases management.* Pests and diseases encountered by the respondents were shown in Table 18. Thrips has the highest percentage on the pests and blight on the diseases. Thrip is a tiny sucking insect with four long thin wings with hairs; it feeds on the sap of plants. Blight is a plant disease, caused by bacteria, fungi, or viruses, in which symptoms range from brownish blotches on the foliage to withering of the entire plant without rotting.



Table 17. Fertilizers applied and application method on potato

PARTICULARS	FREQUENCY n=50	PERCENTAGE %
NPK Fertilizers		
T14 (14-14-14)	27	54
T16 (16-16-16)	23	46
Urea (46-0-0)	21	42
NPK Fertilizer Application Method		
Top dress	50	100
Chicken Manure		
	50	100
Chicken Manure Application Method		
Top dress	50	100

\*multiple response

This is in contrast of the finding of Baniaga (2008) in Bangao, Buguias where leaf miner is the major pest of potato.

Pests and diseases were controlled by the respondents by means of pesticides. This supports the statement of Mendoza (nd) that for almost three decades, farmers in the Philippines have been using chemical fertilizers, pesticides and growth regulators in their crop production strategies.

Shown in Table 19 were the pesticides used by the respondents in potato. The table implies that the respondents used more than two pesticides in pests and diseases control and they used more fungicides than insecticides. These show that potato was more infected by



fungal diseases. Times of spraying a month vary from eight to nine times and 10 to 11 times.

Top three insecticides used by the respondents were Lorsban, Rover and Karate. According to the respondents, these three were the most effective in eliminating the pests, especially for Lorsban because it was the newest on the three so it contains stronger chemicals. Lorsban were used to eliminate pests such as cutworms. Moreover, Manager, Leadonil and Dithane were the on top on the fungicides used by the respondents. The same with the insecticides used, the three were experienced by the respondents to be more effective to control fungal diseases.

Table 18. Pests and diseases encountered in planting potato

PARTICULARS	FREQUENCY n=50	PERCENTAGE %
<b>Pests</b>		
Thrips	28	56
Cutworms	13	26
Leafminers	10	20
<b>Diseases</b>		
Blight	39	78
Blackleg	24	44
Anthracnose	14	28
Bacterial wilt	7	14
Soft rot	5	10

\*multiple response



Table 19. Pesticides used by the respondents in potato

PESTICIDES	FREQUENCY n=50	PERCENTAGE %
<b>Insecticides</b>		
Lorsban	30	60
Rover	17	34
Karate	17	34
Bida	15	30
Siga	12	24
Trigard	11	22
Selecron	7	14
<b>Fungicides</b>		
Manager	18	36
Leadonil	14	28
Dithane	11	22
Manzate	11	22
Vondozeb	8	16
Telgar	7	14
Rainfast	6	12
Daconil	6	12
Curazeb	3	6
Curazate	3	6

\*multiple response





*Weed Control.* On the weeds control, almost all employed manual weeding as well as some also used herbicides (42%). Herbicides mostly used were the same with the herbicides used in cabbage and carrot such as Afalon, Gramoxone, Clear Out, Sencor, Power and One Side. These imply that the weeds encountered by the respondents in carrot and cabbage were the same with the weeds encountered in potato. According to the respondents, the weeds they encountered in growing carrot and cabbage were the same with the weeds they encounter in potato, thus, they used the same herbicides.

*Irrigation.* All of the respondents used the sprinkler method in irrigating potato though the number of times of irrigating varies from 10 to 11 and 12 to 13 times a month. This indicates that the number of times of irrigating the crop is more frequent than the number of times they sprayed pesticides. The respondents said that the times of irrigating must be higher than the times of spraying so as to wash the pesticides sprayed for the chemicals not to stick on the potato leaves.

### Harvesting Practices

Cabbage. Harvesting cabbage were affected by two factors: consideration of the respondents before harvesting and the maturity basis of the cabbage.

*Consideration of respondents before harvesting.* Farmers harvested their cabbage with several considerations. Factors they considered were; cabbage price at the market; the maturity of the crop; and the availability of trucks to transport the produce to the market.



Market price of the crop at the market was the major consideration of the respondents because they wanted their investments to be returned and to avoid bankruptcy. This shows that vegetable price at the market affects the time of harvesting of the farmers.

*Maturity basis.* Respondents harvested cabbage based on the maturity with three months and its physical appearance, which includes heads were well-rounded and hard when pressed. Some of the respondents said that harvesting at the right maturity is better because buyers pay lesser price if the heads were over and under-sized.

Carrot. The same with the factors on cabbage, the consideration of the farmers and the maturity basis affect on when to harvest the carrot.

*Consideration of respondents before harvesting.* The considerations of farmers before harvesting were the vegetable price at the market, the maturity; and the availability of trucks to transport the produce to the market. Some also consider the weather because some buyers would not buy their produce if it is wet and muddy since buyers reasoned out that the tubers decay easily if it is wet.

Harvesting at the right maturity of the crop is the best according to the respondents considering the leaves and the tubers of the carrots because the lesser the leaves, the lesser also the price in the market; and the smaller the tubers, the lesser the price.

Maturity Basis. Farmers harvested the crop based on its maturity and the physical appearance such as leaves turning yellowish and tubers were big enough. This supports the finding in the study of Polagis (2009) where the farmers harvest of the crops according to its maturity and size.



Maturity was highly observed by the respondents because when the crop was stocked in the garden, the leaves turned yellow. The leaves fall then that leads to the decreased number of it, thus, buyers paid lesser.

Most of the respondents harvested carrot at three months. The maturity also depends on the varieties but majority of the respondents harvests carrot after three months.

Potato. Maturity basis and the consideration of the respondents were under the harvesting practices of the respondents. Processing is a post-harvest practice.

*Consideration of respondents before harvesting.* The respondents considered some factors before harvesting such as: the vegetable price at the market; maturity of the crop; some consider the availability of truck for the produce's transportation; and the availability of people to help harvest. Harvesting potato requires more people than other crops.

*Maturity basis.* Majority of the respondents harvest the crop based on the physical appearance and the maturity according to the months. After three months, most respondents harvested their potato already. Some of the respondents said that in potato, they considered much the market price before harvesting because potatoes can be stocked in the garden even until five months.

*Processing.* Eighty two of the respondents processed the excess produce or the tubers they did not sell. They stored the excess potato tubers for it to germinate and serve as their planting material the next season. Some of the respondents said that producing your own planting material for the next season is better than buying. This will decrease their expenses. Others would also store the excess produce to sell it to farmers who need germinated potato tubers.



### Marketing Practices

All of the respondents marketed their produce through middlemen except for one who sold his own produce at the La Trinidad Vegetable Trading Post (LTVTP). Some of the respondents said that even the middlemen have to get 10% of the gross income; they still let the middlemen sell their produce because they do not have knowledge on how to sell their produce.

Three percent claimed to sell their produce at the Abatan Public Market especially if their produce is less in volume. Three respondents sold their produce at the Nueva

Vizcaya Trading Post especially if the vegetable prices at the LTVTP were very low. This shows that majority of the produced vegetables is brought to the LTVTP.

Respondents said that bringing their produce to the LTVTP is better because it is nearer than the Nueva Vizcaya Trading Post; there were more buyers; and farm to market road is better than the road going to Nueva Vizcaya.

These support the finding of Sacla (2007) where the farmers bring their produce to La Trinidad Trading Post because of the availability of middlemen and buyers.

### Agricultural Experiences of the Farmers

Agricultural experiences of the farmers include problems encountered by the farmers; crops planted from January to March; crops last harvested from December to

February; cropping pattern, and; planting schedule of crops.



### Problems Encountered by Farmers in Farming

Problems encountered by the farmers were the lack of capital, lack of irrigation system, pests and diseases; vegetable importation; typhoons; queue at the Swamp area during marketing and the narrow and rugged farm to market roads.

High costs of inputs yet low vegetable prices leads to bankruptcy and lack of capital for the next planting season was one of the problems encountered by the respondents. Example cited by some of the respondents was the low price of carrot from December to February. Their investments was not returned so some did not plant again and others borrowed capital from the middlemen who sold their produce.

Lack of irrigation system was a problem of the respondents especially during summer. The sources of water they used in their crops were from creeks and canals but during summer, these sources were drained, therefore some do not plant. It was observed during the data gathering; only the eastern part of Poblacion has an irrigation system established by National Irrigation Administration or NIA.

Different pests and diseases were one of the major problems of the respondents. Most respondents said that pests and diseases attacked crops during the wet season and the more the occurrence of pest, the more number of times that they sprayed pesticides to control the pests.

Other problems identified by the respondents were typhoons that destroyed their crops. Super typhoons destroy the crops; example is carrot. During typhoons, leaves of carrots were destroyed, thus, during marketing; the price is affected because of the destroyed leaves.



The importation of vegetables leads to low vegetable prices, claimed by most of the respondents. Some respondents also said that imported vegetables have higher quality than their produce thus consumers preferred these over the locally-produced ones.

Narrow and rugged farm to market road and the queue at the Swamp Area before the trucks will enter the LTVTP was another problem identified by the respondents. Due to the narrow and rugged farm to market roads, trucks' speed is slower. And because trucks travel farm to market in an increased hour, mostly do not enter the LTVTP in the evening. Queue at the Swamp area worsens the quality of the vegetable because of the hours before the vegetable was brought to the trading post, the vegetables rot. The more was the damage of the vegetable, the lesser the gross income of the farmers.

Findings were the same with the findings of Sacla (2007) where lack of capital, high cost of inputs, occurrence of pests and diseases, narrow and rugged farm to market road and low vegetable prices were the problems identified by the farmers that they were encountering.

#### Crops Planted from January to March

As shown in Table 20, carrot was the crop most farmers planted this January to March, followed by potato and Chinese cabbage, respectively. Other crops planted were cabbage, lettuce and broccoli. In the total land area planted with, potato has the widest area, followed by carrot. With the hundred respondents, 34 did not plant any crop this quarter because of lack of water for irrigation.



Table 20. Crops Planted by the respondents from January to March

CROPS	FREQUENCY n=68	PERCENTAGE %	PLANTED AREA
Carrot	38	56	15.5 ha
Potato	30	44	16.5 ha
Cabbage	18	26	6.75 ha
Chinese Cabbage	23	34	6.5 ha
Lettuce	7	10	1.5 ha
Broccoli	5	7	1.5 ha

\*multiple response

#### Crops Last Harvested from December to February

Crops recently harvested from December to February by the respondents were shown in Table 21 with carrot with the highest number of respondents. Cabbage has the highest tons while lettuce has the lowest. On the vegetable price, only potato has a price that was more than Php.10. This indicates that the price of these vegetables for the last three months were low and some of the respondents claimed that they did not harvest their carrots, they let it rot on their garden to be composted since harvesting it would not return their investments because of low price. Some also claimed that they harvested their carrots but not sold.





Figure 7. Carrots that were not sold and left rotten in the common dumping area along the road

Table 21. Crops last harvested by the respondents

CROPS	FREQUENCY	KILOGRAMS (tons)	PRICE/kilo (mean)
Carrot	20	72.8 tons	Php. 2
Potato	10	34.5 tons	Php. 15
Cabbage	9	119 tons	Php. 6
Chinese Cabbage	7	53 tons	Php. 6
Lettuce	3	4 tons	Php. 7





### Cropping Pattern of the Respondents

Thirty-two percent of the respondents did not employ a certain cropping pattern while 68% employed the crop rotation of root crops and crucifers. Most of the respondents who employed this kind of pattern said that it would prevent the soil from diseases such as club root. This indicates that farmers knew ways on how to preserve the fertility of the land they till.

Crop rotation is growing different crops in succession: a system of farming in which a piece of land is planted with different crops in succession, in order to improve soil fertility and control crop pests and diseases (MS Encarta, 2009). This confirms the claim of the respondents and the finding of Baniaga (2008) in her study that crop rotation would avoid the occurrence of soil diseases.

### Planting Schedule of Crops by the Respondents

Six percent of the respondents did not have schedule on the planting of certain crop; they claimed that they would plant any that would have a high price in the estimated month of harvest.

The remaining 94% plant certain crops in different months. From October to December, 64% plant carrot followed by the months of January to March with 45% while the months of April to June is 27% only.

For cabbage, most of the respondents planted cabbage on the months of January to March with 45% followed by July to September with 38% while the months of April to June and



October to December has least percentages. These show that cabbage can be planted all year round.

Farmers who produced potato plant most on the last and first quarter of the year. Seventy two percent of the respondents plants potato on the months of October to December. Potato growers do not plant mostly during wet season because the leaves of the potato were very sensitive to rain and wind.

For the Chinese cabbage, 63% of the respondents planted most on the months of October to December followed by the months of January to March with 39% and the other months have low percentages.

Results show that crucifers can be planted all year round while tubers were mostly planted on summer days because the leaves of tubers were sensitive to typhoons according to the respondents.

### Farming Method of the Respondents

There were three farming methods used by the respondents; 96% inorganic; 3% organic, and a percent of the combination of the two.

Inorganic farmers reasoned out that: it is the method they know eversince (84%); chemicals are needed for the survival of the crops (20%), and they do not have enough knowledge to apply organic method (1%). This supports the claim of the respondents on the years of farming experience that they have been exposed to work at the garden at young age.



Organic farmers claimed that they just shifted from inorganic to organic to try if it is easier and better than inorganic. The respondents said that if they tested it and it is better, they would continue to use organic method. This shows that they want to experience the two farming method and figure out the easier and better method.

One respondent who claimed to employ a combination of inorganic and organic method stated that she composted plants and animals manure for fertilizers and applied chemical pesticides to control pests. The respondent said that composting is better than buying chicken manure since it decreased the expenses.

#### Factors Affecting the Decision of Farmers on the Farming Method Adopted

Ninety six percent of the respondents did not shift on the farming method they employed which is inorganic. They said that shifting is too difficult for them because it does not ensure the profitability of the method they will shift to. Another reason was that they do not have enough knowledge to shift to a certain method. Only four respondents shifted, one shifted from Organic to Inorganic and the remaining three shifted from Inorganic to Organic method.

The shifter from organic to inorganic reasoned out that when he started farming, he used organic method since he has a little knowledge on it. However, pest outbreak happened to his farm and that time he did not have enough knowledge to control it so he shifted to inorganic. This implies that in Organic farming, a farmer should be much knowledgeable on the method before adopting it.



The three shifters from inorganic to organic have only one reason in shifting, to test if it is better than inorganic. They said that they shifted this January and February.

They claimed that if organic method is better, they would adopt it.

Information Sources on the Farming Method Adopted

Table 22 shows that 88 of the 96 inorganic farmers claimed that they learned the method they are employing from their parents, family members or relatives. This shows that most of the inorganic farmers adopted the method their parents were employing. This supports the finding of Lomiwes (2007) that most of the farmers grew up experiencing works in the garden at young age.

Nineteen of the respondents acquired their knowledge on the farming method they employ from friends, neighbors and co-farmers. Most of them were lowlanders who decided to try farming in the highlands.

The information source of the organic farmers is radio and specifically to the BSU-on-the-air program of DZWT hosted by Dr. Silvestre Kudan. Only one respondent claimed that she attended a seminar hosted by Cordillera Highland Agricultural Research

Management or CHARM.

Table 22. Information sources of the respondents

PARTICULARS	FREQUENCY n=96	PERCENTAGE %
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Parents/Family members/Relatives	88	91
Friends/Neighbors/Co-farmers	19	20
Experience and Observation	12	12
Barangay/Government Officials	4	4
Mass Media (Radio)	4	4

\*multiple response

### Data Entry in a Website

A basic website on the results of the study was created for information storage and sharing.

The website was created using the Weebly Website Creator as recommended by Paul C. Garcia, Information and Communications Technology Director of Benguet State University. According to him, creating a website through Weebly is easy since it does not require highly technical skills and knowledge and on computer programming. He also stated that Weebly websites are accessible to anyone, thus increasing the possibility of sharing the gathered data by this study.

Weebly is a website creator that allows you to create pages with template skins and content widgets. Users can easily drag-and-drop content widgets like pictures, text, video and Google Maps (Crunchbase, 2012). They also have a new blogging platform that can be added to the navigation bar of your personal Weebly page.

The created website's Uniform Resource Locator or URL is <http://buguiasfarmingpractices.weebly.com> (Figure 8).



Figure 8. The home page of the website



## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

### Summary

Majority of the respondents belonged to the age range of 41-50 years old, were able to reach high school, had a farming experience of 20-30 years and owned the land they cultivate.

Based on the results, four crops were the top produced vegetables, which are carrot, potato, cabbage and Chinese cabbage.

With regards to the respondents farming practices on cabbage, potato and carrot, most of the respondents have the same practices on the seed selection, land preparation, ways of planting, fertilizer application, pests and disease management, weeds control, irrigation, marketing and processing for potato.

When it comes to the problems encountered, major problems identified were the low price of vegetables that leads to bankruptcy and lack of capital for the next planting season, and the lack of water for irrigation.

Majority of the respondents planted carrot (56%) and potato (44%) this quarter (January to March), with a total area of 15.5 ha and 16.5 ha, respectively.

Most of the respondents were inorganic farmers (96%) and did not shift to other farming method (96%). Majority of the respondents acquired the information they applied in farming from parent/family members and relatives.



## Conclusions

Based on the findings of the study, the following conclusions were derived:

1. Farmers depend on chemicals to control pests;
2. Some farmers still use Gramoxone even it is banned because of toxicity;
3. Farmers seldom plant vegetables during summer because of lack of water for irrigation;
4. Vegetable prices for the last three months were very low;
5. Alternate of crucifer and tuber is the main cropping pattern which the respondents claimed that it will avoid soil diseases, and;
6. Parents/family members/relatives had a great influence on the farming method employed by the respondents.

## Recommendations

Based on the finding of the study, the following recommendations were drawn:

1. The concerned government agencies may ensure the implementation in the banning of Gramoxone;
2. The National Irrigation Administration (NIA) may help the farmers for the solution of their problem on irrigation;
3. The Department of Agriculture may conduct intensive information dissemination on the Organic Agriculture Act since some respondents claimed that they do not have enough knowledge on organic farming to adopt such;





4. Concerned government agencies such as Department of Public Works and Highways or DPWH may focus infrastructure projects on rural areas, and;
5. A database on the farming practices may be developed by Information Technology experts in the university or other concerned agencies for further usage of the gathered data.



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