CHARACTERIZATION OF VEGETABLE PRODUCING COMMUNITY IN BAUKO, MOUNTAIN PROVINCE

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STATEMENT OF AUTHORSHIP

This is to certify that the study is original and was undertaken solely in fulfillment of the requirements for the degree Master in Community Development at the Open University, Benguet State University La Trinidad, Benguet.

It does not contain any work published elsewhere except in parts where reference is made.

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This thesis hereto attached, entitled “CHARACTERIZATION OF VEGETABLE PRODUCING COMMUNITY IN BAUKO, MOUNTAIN PROVINCE,” prepared and submitted by DONNALYNE A. MASILLEM in partial fulfillment of the requirements for the degree of MASTER IN COMMUNITY DEVELOPMENT, is hereby accepted.

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DONNALYNE A. MASILLEM

ABSTRACT

DONNALYNE A. MASILLEM, April 2012. Characterization of Vegetable Producing Community in Bauko, Mt. Province. Benguet State University, La Trinidad, Benguet.

Adviser: Marlowe U. Aquino, Ph.D.

Vegetable production in Bauko, Mountain Province is an old activity by the local residents. This describes the different production management practices and relationships including the different interventions used by the farmers. The ages of farmers of Bauko ranges from < 20 to 60 years old. The farming years ranges from < 5 to > 30 years by producing such as root crop, leafy vegetables, legumes, capsicum and other crops with 1 to 3 cropping's per year. The farm size of the respondents ranges from < 1,000 m^2 to > 10,500 m^2.

The farmers practice the conventional and organic farming with an income ranging from <PhP 10,000 to >PhP 50,000.Farm produce are sold in La Trinidad Trading Post, Hangar Market in Baguio City, and local markets in Bauko and La Trinidad, Benguet like the La Trinidad Organic Practitioners Market (LaTop).

The farming communities of Bauko are classified into hilly, sloppy, rolling and flat with elevation ranges from < 750 to > 2,000 meters above sea level. The sources of irrigation are spring, river and rain respectively.

The crop protection measures are synthetic and botanicals, including weed control using chemical, mechanical and fertilizers such as synthetic and organic from composts and chicken manure. The farmers are confronted with risky problems like soil erosion, pests and diseases, market prices, typhoons and high prices of inputs including high maintenance due to irrigation, excavation, terracing and high prices of farm inputs. The benefits derived by the respondents in vegetable production are increased in annual income, source of livelihood and community activities. These are affected by the presence of middlemen supported by pricing and commission derived by deductions per kilogram of produce ranging from 1 to 4 pesos or higher depending on the prices of commodities.

Most of the problems and constraints are related to lack of irrigation, poor crop protection practices, unstable marketing system, and high costs of transportation which affect the performance of current vegetable production management system.

Also, it is affected by membership to organizations wherein this provides access to loan, technologies and social growth. It is necessary

that current vegetable management practices must be changed in order to focus and utilize latest production technologies, address unpredicted weather and climate, and improve the control of pest and diseases and enhance the condition of the soil for more productive endeavor.

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Background of the Study

Farming is done in the soil in small rows or blocks, often primarily for consumption on the farm, with the excess sold in or traded to neighbors or nearby towns. It was only after the late 60's when vegetable farming became a lucrative business of the area. Due to the needs to market vegetables while fresh, vegetable gardening has high labor demands. Several economic models exist for vegetable farms: farms may grow large quantities of a few varieties of vegetables and sell them in bulk to major markets or middlemen, which requires large growing operations; farms may produce for local customers, which requires a larger distribution effort; farms may produce a variety of vegetables for sale through on-farm stalls, local farmer's markets, or direct market operations. This is quite different from commodity farm products like wheat and maize which do not have the ripeness problems and are sold off in bulk to the local granary. Large cities often have a central produce market which handles vegetables in a commodity-like manner, and manages distribution to most supermarkets and restaurants (Dingal and Conception, 2004).

The economy of the Philippines is driven by agriculture. In 2006, it directly contributed 18.7%, with flow-on effects about 75% of GDP as well as 40% of market transactions, and 70% of employment (Bureau of

Agricultural Statistics, 2007 & IBON, 2007). There are 4.8 million agricultural farms covering 9.7 million ha, with 1.9 million under1 ha and 2 million between 1.0 and 3.0 ha (2002 census data - BAS, 2007d).Average subsistence/household farm sizes is 2 ha, and a large proportion of farmers still use animal power for cultivation (IBON, 2007).

Most farms (79% = 8 million ha) are owned or partly owned, and 56% of farms (5.4 million ha) are divided into two or three blocks (BAS, 2007). Less than none-third of landowners own > 80% of agricultural land, with around 52% of farms (= 51% of farmland) under lease or tenure (IBON, 2007). To date, land reforms have had mixed success (Ballesteros & Cruz, 2006).

In addition to land ownership, another concern is the conversion of forest into vegetable farms. The Department of Environment and Natural Resources (DENR) reported that in the Cordillera Administrative Region (CAR) alone, an average of 220 hectares of forest land is being converted every year into vegetable gardens; this represents a serious threat for the province's approximately 200,000 hectares of forests (Cariño, 2007).

The vegetable industry contributes > 30% to total agricultural production, and a major component of GDP (UNDP, 2006). Production is based on highland and lowland cropping in the wet and dry seasons. Some new enterprises are focusing on intensive cultivation and/or

production under contract for export, processing, or for high-end retail and food industry markets. There are also focused initiatives to stimulate peri-urban horticulture (Holmer and Drescher, 2005;Holmer and Miso, 2006).

According to the Bureau of Agricultural Statistics (2005), the average vegetable yield in the Philippines was 10.65 t/ha. While this compares favorably with other countries in South East Asia there is considerable potential to increase yields through improved farm practices and investment in new technologies. While vegetables are produced extensively throughout the Philippines archipelago, the majority of commercial production is conducted on the main island of Luzon (73%) (Remotigue, 2005).

In Northern Philippines, Benguet and Mountain Provinces composed of 81, 594 farm households and covering 32,643 hectares produced 80% of the country's total vegetable production. Mountain Province shows great potential for development not only because of its abundant natural resources but more so because of its naturally pleasing and amazing sceneries, culture, and hardworking people who are open to new ideas and innovations and who ready partners are for progress. Crop production is the province's main economic activity. Agricultural crops are varied by geographic location. Currently, some 31,300 hectares are cultivated, producing over 471,200 tons per annum. While potato is the

most widely cultivated crop (8,120 hectares), cabbage, Chinese cabbage, carrots, chayote, beans, lettuce and broccoli are the other major vegetable crops produced (Dingal and Conception, 2006).

Accordingly, farmers usually harvest and sell their produce to assembler-wholesalers who transport the produce to the La Trinidad Vegetable Trading Post and Baguio City Market. The La Trinidad Vegetable Trading Post was established to thwart the practice of middlemen intercepting cargoes and directing them to non consignees who offered higher prices. As envisaged, the trading post has reduced the number of middlemen and increased the prices of the commodities, thus increasing the income of farmers. It is believed that some 8,840 farmers deliver their produce to the La Trinidad Vegetable Trading Post and 5,580farmers deliver produce to the Baguio City Market. Other farmers deliver their produce to nearby barangays, municipalities and to adjacent provinces such asLa Union, Pangasinan and Nueva Vizcaya during scheduled market days. The majority of fresh vegetables go directly to the metro Manila markets.

The municipality of Bauko, Mountain Province is gifted with a fertile soil within which farming and vegetable gardening is the major source of household income. About 85% of its total household heads/labor force is engaged in this occupation. Referring to the records of the Municipal

Agriculture Office, the approximate land area devoted for agriculture is about 6,705 hectares or 37.76% of the total land area of the municipality. From this figure, vegetable production area has the largest share in the pie covering 4,058.2 hectares followed by palay area of 1,116 hectares. The remaining portions of the agricultural lands are planted with fruit trees and other crops. Vegetable areas are mostly found in upper Bauko while palay, citrus and other crops are grown in Lower Bauko.

The vegetable industry has an important role in the community since it is the key asset for productivity improvement, export market development, income generation, and livelihood improvement in the community. Agriculture is receiving increasing attention as an instrument for growth, especially with the World Development Report (2008) titled "Agriculture for Development" (World Bank, 2007). In that report institutional innovations are seen as key to achieve not only agricultural growth, but also to include poor smallholders in this growth. These institutional innovations are expected to be able to overcome various market failures, including missing or incomplete input and output markets, factor markets (including financial markets) and insurance markets. The Report sees a particular important role for the "third sector"—communities, collective action, and NGOs— in overcoming some of the market and state failures, with special attention for producers' organizations (POs,

which can be defined as an agreement among farmers to coordinate some activities, such as jointly purchasing inputs or delivering produce to clients) as fundamental to reducing transaction costs in markets, achieving market power and raising farmers' voices in national and international policy forums. More pointedly, Dorward et al., (2005) argue that current emphasis in research and policy discussions on the institutional environment (such as property rights, regulations, policies, informal rules, etc.) in Africa is at the expense of sufficient attention to institutional arrangements. They call for more investigation of arrangements, especially for attention to those, such as producers' organizations, that do not fit the textbook model of competition and exchange among atomized market players.

Statement of the Problem

The presence of documented agricultural practices of Bauko concerns a lot in many development efforts. A recommendation to such development plans and programs will not be progressive without knowing the history of the area and the present farming systems being used in the production of agricultural products such as vegetables, root crops and other various commodities. Issues and concerns in this changing scenario of the vegetable industry should be examined to identify ways to improve

its performance not only in terms of efficiency but also in terms of equity where small scale producers have the chance to compete and prosper.

The characterization of farming systems in Bauko, Mountain Province will result to multiple gains as follows: (a) greater effectiveness of policies and programs in achieving development objectives; (b) greater efficiency in resource allocation and management; and (c) greater equity impact of policies, plans and programs.

Although the interrelationships between different and unpredictable variables are identified across different areas of Bauko, there are still important factors to be considered. The study therefore, attempted to answer the following questions:

1. What is the condition of the vegetable producing communities of Bauko, Mountain Province?

2. What are the factors affecting the vegetable production management practices of the farmers in terms of the following:

a. Knowledge on vegetable production management;

b. Attitude towards vegetable production management;

c. Skills on the vegetable production management;

d. Level of adoption of technologies provided by government or non-government institutions;

e. Benefits on the vegetable production; and

f. Constraints experienced on vegetable farming.

3. What is the relationship between the farmers' characteristics and current vegetable production management in the development of Bauko, Mountain Province?

Objectives of the Study

The study aimed to determine the following:

1. Describe the condition of the vegetable producing communities of Bauko, Mountain Province.

2. Determine the factors affecting the vegetable production management practices of farmers in terms of the following:

a. Knowledge on vegetable production management;

b. Attitude towards vegetable production management;

c. Skills on the vegetable production management;

d. Level of adoption of technologies provided by government or non-government institutions;

e. Benefits on the vegetable production; and

f. Constraints experienced on vegetable farming.

3. Analyze the relationship between the farmers' characteristics and current vegetable production management in the development of Bauko, Mountain Province.

Importance of the Study

Many times, the whole production process focuses on the prevailing price such that unpredictability of crops to be planted always happens. Other farmers observe the planting season for potato falls in the months of August to September and harvest it on December. The factor that is almost stable is the temperature of Bauko. Temperature sensitive crops are divided into upland and lowland condition. Upland crops including crucifers, potato, garden peas, carrots and lettuce are observed in high elevation areas of Bauko. The enumerated crops are rotated and can be observed throughout the year in the respective areas. Lowland crops such as rice cannot be observed in vegetable-producing areas. Mid-elevation areas are planted with bell pepper, cucurbits and some upland vegetables. Knowing these different variables thru careful analysis with the aid of proper and systematic documentation resulted to an enhanced and precise decision in coming up an accurate and detailed crop programming or crop zoning in Bauko, Mountain Province.

It is important that key players and stakeholders be identified especially when they have influence in policy – making so that crop programming or zoning will be included. The regulation of vegetable production will increase the profitability of farmers especially when the supply of vegetables will not exceed the demand of the market. The

regulated supply of vegetables and utilization of what crops are suited for planting in different places will also ensure continuous marketing of products thus can be translated into continuous income for farmers. The adoption of policies, including a focus on high-valued vegetables coupled with trade and market reform, could contribute substantially to several of the plan's socio-economic targets.

Results of the study may provide development planners' especially the LGU of Bauko Department of Agriculture, information relevant to crop zoning and programming or sustainable development program/project formulation for the study area; help farmers realize better profits; give project implementers' ideas in properly monitoring and evaluating programs being implemented; and serves as reference for students, professionals and researchers in relation to the same study on the vegetable production management system.

Scope and Delimitation of the Study

The study focused on selected vegetable producing communities of Bauko namely: Sinto, Monamon Sur, Monamon Norte and Sadsadan. The data focused on the problems, condition of the vegetable producing communities of Bauko, Mountain Province; the factors affecting the vegetable production management practices of the farmers in terms of the

knowledge, attitudes, skills, level of adoption of technologies, benefits gained and constraints experienced on the vegetable production management; and the relationship between the farmers' characteristics and current vegetable production management practices in the development of Bauko, Mountain Province.

REVIEW OF LITERATURE

Farming Systems

A farming system is defined as a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate. Depending on the scale of the analysis, a farming system can encompass a few dozen or many millions of households (Food and Agriculture Organization, 2011). The classification of the farming systems of developing regions has been based on the following criteria: (a) available natural resource base, including water, land, grazing areas and forest; climate, of which altitude is one important determinant; landscape, including slope; farm size, tenure and organization; and (b)dominant pattern of farm activities and household livelihoods, including field crops, livestock, trees, aquaculture, hunting and gathering, processing and off-farm activities; and taking into account the main technologies used, which determine the intensity of production and integration of crops, livestock and other activities (FAO, 2011).

Cropping systems vary among farms depending on the available resources and constraints; geography and climate of the farm; government policy; economic, social and political pressures; and the philosophy and culture of the farmer (Acquaah, 2002 & UNFAO,2002).

Shifting cultivation (or slash and burn) is a system in which forests are burnt, releasing nutrients to support cultivation of annual and then perennial crops for a period of several years (Chrispeels & Sadava, 1994). Then the plot is left fallow to re-grow forest, and the farmer moves to a new plot, returning after many more years (10-20). This fallow period is shortened if population density grows, requiring the input of nutrients (fertilizer or manure) and some manual pest control. Annual cultivation is the next phase of intensity in which there is no fallow period. This requires even greater nutrient and pest control inputs.

Vegetable – Producing Communities

In the high – elevation areas of Bauko, Mt. Province, vegetable production was introduced. Semi – temperate crops such as carrots, cabbage, Chinese cabbage, lettuce, potato, sweet pepper, garden peas, and broccoli are planted. Today, further industrialization lead to the use of monocultures when one cultivar is planted on a large acreage. Because of the low biodiversity, nutrient use is uniform and pests tend to build up, necessitating the greater use of pesticides and fertilizers. Multiple cropping, in which several crops are grown sequentially in one year, and intercropping, when several crops are grown at the same time are other kinds of annual cropping systems known as polycultures (Chrispeels and Sadava, 1994).

In other semi – temperate environments near and similar to Bauko, condition, all of these cropping systems are practiced. Also, the timing and extent of agriculture may be limited by rainfall, either not allowing multiple annual crops in a year, or requiring irrigation. In all of these environments perennial crops are grown (coffee, chocolate) and systems are practiced such as agroforestry. In temperate environments, where ecosystems were predominantly grassland or prairie, highly productive annual cropping is the dominant farming system (Chrispeels and Sadava, 1994).

Furthermore, the last 20 years has seen the intensification, concentration and specialization of agriculture, relying upon new technologies of agricultural chemicals (fertilizers and pesticides), mechanization, and plant breeding (hybrids and GMO's). In the past few decades, a move towards sustainability in agriculture has also developed, integrating ideas of socio-economic justice and conservation of resources and the environment within a farming system. This has led to the development of many responses to the conventional agriculture approach, including organic agriculture, urban agriculture, community supported agriculture, ecological or biological agriculture, integrated farming and holistic management, as well as an increased trend towards agricultural diversification.

Conventional Agriculture

Crop alteration has been practiced by humankind for thousands of years, since the beginning of civilization. Altering crops through breeding practices changes the genetic make-up of a plant to develop crops with more beneficial characteristics for humans, for example, larger fruits or seeds, drought-tolerance, or resistance to pests. Significant advances in plant breeding ensued after the work of geneticist Gregor Mendel. His work on dominant and recessive alleles gave plant breeders a better understanding of genetics and brought great insights to the techniques utilized by plant breeders. Crop breeding includes techniques such as plant selection with desirable traits, self-pollination and cross-pollination, and molecular techniques that genetically modify the organism (Sere, Steinfeld, and Groeneweld,1995). The Green Revolution popularized the use of conventional hybridization to increase yield many folds by creating "high-yielding varieties". For example, average yields of corn (maize) in the USA have increased from around 2.5 tons per hectare (t/ha) (40 bushels per acre) in 1900 to about 9.4 t/ha (150 bushels per acre) in 2001. Similarly, worldwide average wheat yields have increased from less than 1 t/ha in 1900 to more than 2.5 t/ha in 1990. South American average wheat yields are around 2 t/ha, African under 1 t/ha, Egypt and Arabia up to 3.5 to 4 t/ha with irrigation. In contrast, the average wheat yield in countries

such as France is over 8 t/ha. Variations in yields are due mainly to variation in climate, genetics, and the level of intensive farming techniques (use of fertilizers, chemical pest control, growth control to avoid lodging (Ruttan, 1999).

Pesticide use has increased since 1950 to 2.5 million tons annually worldwide, yet crop loss from pests has remained relatively constant (Pimentel, et al., 1996). Pesticides select for pesticide resistance in the pest population, leading to a condition termed the 'pesticide treadmill' in which pest resistance warrants the development of a new pesticide.

Vegetable Production Management System in Bauko, Mt. Province

According to the Bureau of Agricultural Statistics (2005), the average vegetable yield in the Philippines was 10.65 t/ha. While this compares favorably with other countries in South East Asia, there is considerable potential to increase yields through improved farm practices and investment in new technologies.

Cabbages and tomatoes are planted all over the country (Digal and Concepcion, 2004). The Cordillera Autonomous Region (CAR) in Northern Luzon is the major producer of cabbages and is responsible for 73 percent of cabbage production in the Philippines.

The Bureau of Agricultural Statistics (2000) stated that there are two types of agricultural production practiced by the Cordillera's peasantry: production for self-subsistence and production for commerce. All peasant communities engage in crop production for commerce to some degree. But not all communities still engage in crop production for self-subsistence. Some 45,000 peasant households derive their wherewithal solely from the commercial production of temperate-clime crops – mostly vegetables plus a few fruits and flowers. These include the majority of peasant households in the most highly elevated municipalities of the Cordillera: practically all of those in the municipalities of La Trinidad, Tuba, Tublay, Atok, Kibungan, Bakun, Mankayan, and Buguias in the province of Benguet; most of those in the municipalities of Sabangan and Bauko in the Mountain Province and Tinoc in the province of Ifugao; about half of those in the municipality of Tadian, Mountain Province, and several of those in Kiangan, Ifugao.

Vegetable Marketing

Around 75-85 percent of vegetables in the Philippines are sold through thetraditional supply chain, where the wet markets and vegetable traders play major roles. Farmers are generally price takers, accepting whatever price the traders give them in a spot market. While spot market

trading is highly risky for the farmers and even the traders, it can also be highly profitable (Digal and Concepcion, 2004).

Digal, et al., (2006) showed that there was an increase in the price of vegetables along the chain at each stage of transfer. The margins however, were generally higher at the retail stage. Value-adding activities like cleaning, sorting and packaging did not add significantly to the costs, but by performing these activities, intermediaries were able to achieve a higher value. Not unexpectedly, retailers have the highest margin, but they also incur the highest costs in handling and product loss.

Farmers usually harvest and sell their produce to assembler-wholesalers who transport the produce to the La Trinidad Vegetable Trading Post and Baguio City Market. The La Trinidad Vegetable Trading Post was established to thwart the practice of middlemen intercepting cargoes and directing them to non-consignees who offered higher prices. As envisaged, the trading post has reduced the number of middlemen and increased the prices of the commodities, thus increasing the income of farmers. It is believed that some 8,840 farmers deliver their produce to the La Trinidad Vegetable Trading Post and 5,580farmers deliver produce to the Baguio City Market. Other farmers deliver their produce to nearby barangays, municipalities and to adjacent provinces such as La Union,

Pangasinan and Nueva Vizcaya during scheduled market days. The majority of fresh vegetables go directly to the Metro Manila markets.

Conceptual Framework

Figure 1 shows the variables of the study. There are three factors involved in the study namely; the crops, farmers and their practices. Crops planted determine the practices the farmer should cultivate. It also determines the farm whether it is upland, lowland, etc. Crops require various climatic and weather parameters aside from farming practices. Lowland rice for example needs elevated temperature and satiable irrigation, while cabbage requires low temperature and enough moisture but the soil should be well – drained.

Farmers are the ones directly involved in agricultural activities. They are the ones responsible in applying cultural practices suitable to the crops they are raising. In upland vegetable farming, from land preparation to harvesting for a certain crop may differ from lowland vegetable farming. Farmers used to upland vegetable farming will have difficulty when brought to lowland condition and vice versa.

Cultural practices influence the crop. Proper management practices employed for certain can increase yield parameters that can be translated

to profit. In contrast, improper crop management may result to undesirable yield and can be translated to decreased profit.

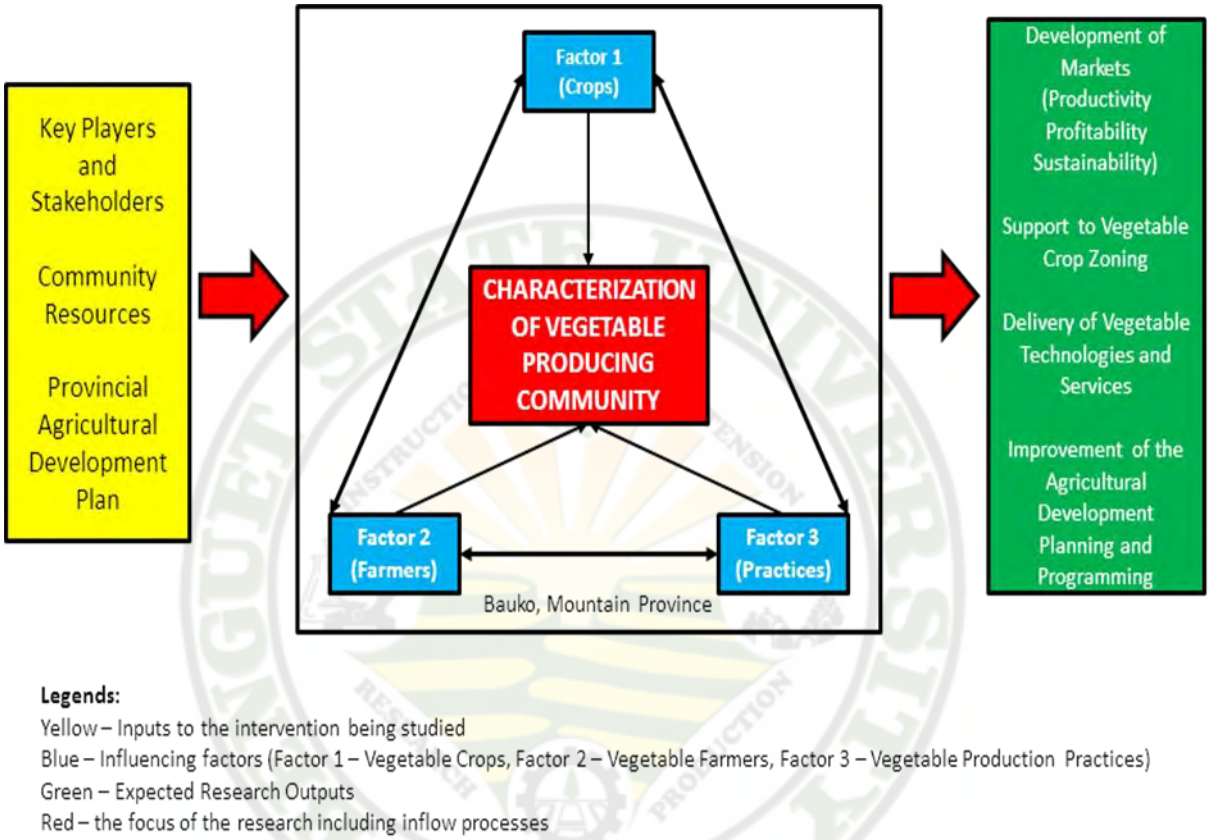

Figure 1. Conceptual framework of the study

Various crops require varied cultural practices and it takes several years of trial and error experimentation by farmers before perfecting the exact practices at a given crop on a given time.

The identification of key players and various stakeholders with the present community resources basing from the Provincial Agricultural Development Plan will have primary impact on the crops planted or production scheme will regulate over production or supply of commodities to prevent economic loss due to less marketability of the products or due to loss of profits. The identification of crops suitable in one location or rotation of crops from one place to another can resolve the extreme production of corresponding commodities. This can lead to a profitable production when the supply does not exceed the demand. The farmers will also be identified in relation to their places and they will be equipped with the technologies provided by the Municipal Agricultural Office. Cultural practices for every crop will also be reviewed to enhance the farmers' skills and capacities.

Furthermore, the study looks into the development of markets for the commodities produced in the area in terms of the sustainability of best yield and profitability of each product harvested. One output will be the recommendation of crop zoning to regulate over production of one crop and less production of other crops that can cause extreme prices of the commodities. The planning and programming for agricultural development will be looked upon so that further improvement will be sought if there are gaps to be addressed or lapses that needs attention.

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will be looked upon so that further improvement will be sought if there are gaps to be addressed or lapses that needs attention.

Operational Definition of Terms

The following terms are defined according to how they are used in the study:

Agricultural development planning and programming are series of activities or actions programmed to be accomplished on a given span of time that is designed to advance the capacities of farmers in terms of farm production with the use of innovations and other interventions and increase yield or production per unit area of land.

Characterization is a term that is used to describe the personal profile, socio - demographic profile, cultural practices, and needs assessment of farmers in Bauko, Mountain Province.

Community resources are the community assets such as land and water relative to agriculture, funds and farmers' income on a particular cropping.

Crop zoning refers to one of the many strategies that can be used to limit over production of one crop. Over production of one crop can reduce the marketability of the product in terms of exceeding the demand. This will be translated into less farmers' income due to low price of the corresponding commodity.

Development refers to the improvement of the farmers' social and economic status is the primary objective of development projects. Development then is the increase of farm income as attributed to technologies and innovations introduced that can improve and increase yield or production per unit area of land.

Key players refers to individuals such as the politicians of both the municipal and Barangay level that are have influence on constituting and implementing policies and laws in the community.

Markets refers to places where the vegetable crops are sold so that tons of harvested vegetable crops are exchanged into money. There are small town markets where various vegetables are sold for every day consumption, but bulk of the production are sold in the La Trinidad Vegetable Trading Post where institutional buyers and big – time vegetable merchants are purchasing vegetables to be delivered in different regions of the country.

Provincial agricultural development plan this is a plan for development used by the Provincial Agriculture office to boost the production of vegetables in Bauko, Mountain Province. This includes improvements like farm to market roads, agro – technologies and linkages that can impact on increasing farmers' income which can be translated as increase in the economic status of the farmers.

Stakeholders are organizations, groups of farmers or associations that have an influence to the farming community of Bauko. In some extents, big – time farmers with several laborers and appreciable wide track of lands are included in this category. Some organizations or associations have an impact of the marketing system of the area.

Technology refers to products and services utilized by the farmers in vegetable production management practices such as seeds, fertilizers, pesticides and others.

Vegetable crops refers to the varieties of particular semi – temperate plants cultivated by farmers in Bauko. Examples of these are potato, cabbage, Chinese cabbage, Lettuce, Broccoli etc.

Vegetable farmers are the individuals directly involve or practitioners of vegetable production in Bauko. These farmers are doing the farm activities from seedling to harvesting stage regardless of age and gender.

Vegetable producing community Bauko, Mountain Province is identified as vegetable community in the sense that throughout the year, vegetable production is always the occupation of majority of the farmers in the area. In other words, semi – temperate vegetables are the main products of the community.

Vegetable production practices refers to the cultural practices applied in vegetable – producing town of Bauko. In the production of vegetables, series of activities should be done to ensure desirable growth and development of plants. This includes land preparation, irrigation, and crop protection practices in the whole duration of the cropping season.

Vegetable- related services refers to services provided by government or non – government institutions to farmers like infrastructures like packing house where postharvest practices and services are done, linkages and marketing systems to boost the economic status of farmers.

Vegetable Technologies are innovations that are introduced in Bauko, Mountain Province. Source may be from the offshoot of farm researches provided by both the government or non – government institutions.

METHODOLOGY

Locale of the Study

The study was conducted in Bauko, Mountain Province. Itlies on the southwestern part of Mountain Province bounded on the north by Besao and Sagada municipalities; on the south by the municipality of Hungduan, Ifugao; on the east by the municipality of Sabangan, Mountain Province and on the west by the municipality of Tadian, Mountain Province.

The municipality is composed of 22 Barangays strategically situated from north to south and within the longitude of 16°15' to 17°04' north and latitude of 120° 50' west to 120° 56' east. The municipal government is located at Barangay Abatan about 121 kilometers from Baguio City, about 34 kilometers from Bontoc, the seat of the Provincial Government, about 8 kilometers to Tadian Municipal Hall, about 19 kilometers to Sabangan Municipal Hall and about 32 kilometers to the Municipal Hall of Buguias, Benguet as its adjacent neighboring municipalities. Bauko is known to be the center of semi – temperate vegetable crop production of Mountain Province as it possesses cool temperature and favorable microclimate parameters conducive to farming and agricultural development.

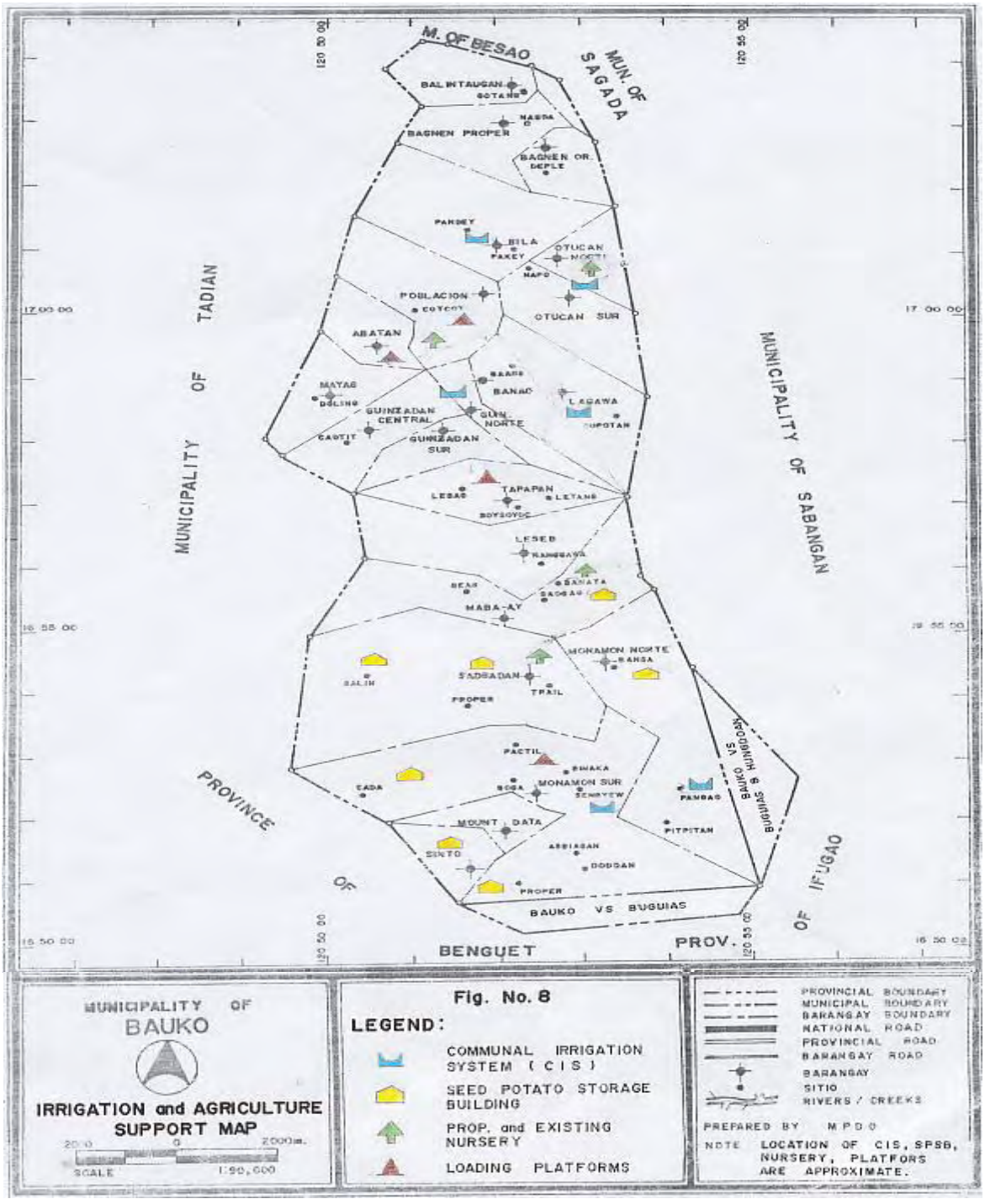

Figure 2. The location of the study area
(Source: MPDO, Bauko, Mountain Province)

Barangays of Bauko adjacent to high – elevation areas of Benguet like Sinto, Monamon Sur, Sadsadan, Pactil and other areas experience the same weather conditions like that of Atok, Mankayan, Buguias, Bakun, Tublay, and Kibungan in the province of Benguet.

The study covered the most populous number of farmers in the municipality. There were four (4) identified barangays namely: Sinto ,Monamon Sur, Monamon Norte and Sadsadan. These barangays were chosen because they are the major producers of commercially grown vegetables in the municipality.

The data were gathered from November to December 2011. Personal interviews with the farmers were very administered to support the findings of study. Field visitation and documentations were done to observe the actual farming practices of farmers.. Photo documentation was done to complement the data collected to emphasize site descriptions and crops grown.

Respondents of the Study

The stratified purposive sampling technique was used to obtain the number of respondents of the study in the identified Barangays of Bauko, Mountain Province. The study was administered through survey questionnaires to at least 40 percent of the vegetable farmers of the

community representing the whole farming community of Bauko, Mt. Province.

Research Methods

The study used the descriptive and normative survey methodto present actual and current situations of the research area during the time of the study. Also, the data gathered were summarized and reduced to meaningful values in order to describe the characteristics of the sample used in the study.

Structured survey questionnaires were used to facilitate an organized means of extracting useful information from the farmer. It guides the enumerator in communicating with the farmers a systematic flow of questions that can collect reliable answers from the farmers.

For objective number one, the description of vegetable – producing communities of Bauko, Mt. Province was obtained using the designed interview questions. It was arranged in textual and tabular models and analyzed using the frequency and Chi – square test. For objective two and three, regression analysis, factor analysis, and multiple regression analysis was used to analyze the data.

Instrumentation

The survey questionnaire is the main instrument used in data gathering. The parts of the questionnaire are the following; Part I are the characteristics of the respondents; Part II are the farming condition of the respondents; Part III are the factors affecting the production of the respondents; Part IV are the benefits derived from farming; and Part V are the constraints experienced in farming. The questionnaire was supported by interview.

Data Collection and Analysis

Pertinent data were collected through, interviews were administered to respondents in selected barangays of Bauko. Aside from primary information obtained from interviews, secondary data were gathered or reviewed from the official reports filed in the Municipal and Provincial Agriculture Offices to suffice and back up the lacking and needed information.

Appropriate statistical methods were utilized to obtain information or data for descriptive and quantitative interpretation. Stratified random sampling was used in selecting the respondents, and textual and tabular models were used in tabulation of the data and analysis.

The following statistical tools were used to analyze and interpret the data/variables: Chi – square (x^2) test equal distribution; ANOVA, equal frequency of related samples; regression analysis to account for the factors affecting the dependent variable; factor analysis, a data reduction process, to identify variables that have significant relationship to the study; multiple regression analysis, to measure the extent of the contribution of the independent variable to the dependent variable.

RESULTS AND DISCUSSION

Socio – Demographic Profile

Table 1 presents the socio – demographic profile of the respondents such as age, gender, marital status, and educational attainment, and years in farming experience.

Age. Significant results were observed in the age distribution of the respondents in the four Barangays of the study. The age distribution of the respondents is very wide but it appears it follows a trend. The farmers in Barangays Sadsadan Proper, Sinto and Monamon Sur are younger with ages 21 – 30 compared to the farmers of Monamon Norte. In Barangay Sinto 18 respondents (72%) ages from 21 – 30 are already engaged in farming. Only three respondents age 51 – 60 are engaged in farming activities compared to or 16% farmers from Monamon Norte.

Gender. Statistical analysis reveals no significant differences among the respondents though it can be observed that in all of the Barangays, more males are involved in the farming activities. Highest number of males with 92% respondents is observed at Sadsadan Proper while lowest with 72% respondents is found in Monamon Sur. For the female respondents, highest number involved in farming with 28% is observed at Monamon Sur while lowest with 8% respondents is in Sadsadan Proper (Table 1).

Table 1. Socio – demographic profile of the respondents

PROFILE	BARANGAY							
	Monamon Norte		Monamon Sur		Sadsadan Proper		Sinto	
	No.	%	No.	%	No.	%	No.	%
Age (year)								
< 20	2	8	5	20	3	12	2	8
21 – 30	2	8	8	32	13	52	18	72
31 – 40	4	16	6	24	6	24	2	8
41 – 50	13	52	5	20	2	8	2	8
51 – 60	4	16	1	4	1	4	1	4
Sub - total	25	100	25	100	25	100	25	100
							$X^2c = 0.00^{**}$	
Gender								
Male	20	80	18	72	23	92	21	84
Female	5	20	7	28	2	8	4	16
Sub - total	25	100	25	100	25	100	25	100
							$X^2c = 0.357^{ns}$	
Marital Status								
Single	2	8	3	12	3	12	5	20
Married	23	92	22	88	22	88	20	80
Sub-total	25	100	25	100	25	100	25	100
							$X^2c = 0.736^{ns}$	

** – highly significant/^{ns} – not significant

Table 1. Continued . . .

PROFILE	BARANGAY							
	Monamon Norte		Monamon Sur		Sadsadan Proper		Sinto	
	No.	%	No.	%	No.	%	No.	%
Educational Attainment								
Elementary level	2	8	0	0	2	8	0	0
Elementary graduate	3	12	5	20	4	16	6	24
High school level	3	12	8	32	8	32	4	16
High school graduate	10	40	9	36	3	12	10	40
Vocational	2	8	0	0	2	8	3	12
College level	1	4	3	12	4	16	2	8
College graduate	4	16	0	0	2	8	0	0
Sub - total	25	100	25	100	25	100	25	100

$X^2c = 0.101^{ns}$

** – highly significant/^{ns} – not significant

Marital status. All of the Barangays showed almost similar marital status of the respondents as shown in Table 1. Almost all of the respondents were male with 92% in Barangay Monamon Norte, 88% in Barangay Monamon Sur and Sadsadan Proper and 80% in Barangay Sinto. No respondents were widows or widower.

Educational attainment. Wide distribution of educational attainment were obtained from the farmers which were statistically analyzed that showed no significant differences among the distribution of the respondents of the four Barangays, it can be observed that most of the

respondents attained either high school level or high school graduate. From the total respondent of the four Barangays, only 24% farmer respondents graduated from college. However finishing from college did not mean escaping the farm activities. Based on the interviews conducted, farmers went back to farming because of lack of employment and lesser salaries provided by the institution they used to work.

The result on the socio-demographic profile of the respondents implies that there is significant difference in age level of farmers which means that there are different characteristics and attitudes of farmers as regard to vegetable farming is concern and not much in the gender, marital status and educational attainment which is no significant difference among the four study areas.

Farming Condition of the Respondents

Years in farming. Statistical analysis reveals significant number of years of active farming by the respondents (Table 2). The wide distribution of years of active farming by the respondents is affected by the age of the participants. From the previous table, older age of the respondents is proportional to their active engagement to farming. The younger the age of the respondents, the lesser engagement and exposure to farming activities. Majority of the respondents have 5 – 20 years of active farming

while the remaining respondents have less than five years or more than 21 years of farming exposure.

Crops planted. Table 2, Plate 1, 2 & 3 shows the crops grown by the respondents. It shows that in the four study areas there are various crops planted categorized as to root crops (Potato, Carrots and Radish); leafy vegetables (Chinese Cabbage, Cabbage, Lettuce and Celery); legumes (beans and peas); and other crop is pepper. It shows in the table that Barangay Sinto showed the highest various crops planted followed by Barangay Monamon Sur and Norte the least crop variation planted in Sadsadan Proper.

Plate 1. Potato plantation in Sinto, Bauko, Mountain Province

Plate 2. Carrots plantation at vegetative stage (Monamon Sur)

Plate 3. Husband & wife respondents harvesting carrots at Monamon Sur

Plate 4.Leafy vegetable plantation (cabbage)

Plate 5. Mr. Jhonuel Tocnang, harvesting cabbage in Monamon Norte Barangay

Table 2.Farming condition of the respondents

PROFILE	BARANGAY							
	Monamon Norte		Monamon Sur		Sadsadan Proper		Sinto	
	No.	%	No.	%	No.	%	No.	%
Years in Farming								
< 5	4	16	4	16	1	4	2	8
5 – 10	2	8	9	36	3	12	18	72
11 – 15	2	8	6	24	10	40	2	8
16 – 20	10	40	4	16	6	24	1	4
21 – 25	3	12	1	4	1	4	1	4
26 – 30	3	12	1	4	3	12	1	4
> 30	1	4	0	0	1	4	0	0
Sub – total	25	100	25	100	25	100	25	100
								$X^2c = 0.001$**
Crops Planted								
Root Crops	31	44.28	41	46.06	23	58.97	48	50.52
Leafy Vegetables	26	31.14	23	25.84	12	30.76	26	27.36
Legumes	12	17.14	25	28.08	2	5.12	21	22.10
Others: Pepper	2	2.85	0	0	2	5.12	0	0
Sub-total (MR)	70		89		39		95	
Farming Approach								
Conventional	20	80	23	92	22	88	16	64
Organic	5	20	2	8	3	12	9	36
Sub-total	25	100	25	100	25	100	25	100
Market Outlet								
Trading post	18	40.90	23	85.18	22	61.11	16	59.25
Hangar market	5	11.36	2	7.40	3	8.3	5	18.51
DM - Bauko	0	36.36	0	0	2	5.55	0	0
DM - La Trinidad, Beng.	16		0	0	6	16.66	0	0
LaTOP	5	11.36	2	7.40	3	8.88	6	22.22
Sub-total (MR)	44		27		36		27	

Table 2. Continued . . .

PROFILE	BARANGAY							
	Monamon Norte		Monamon Sur		Sadsadan Proper		Sinto	
	No.	%	No.	%	No.	%	No.	%
Farming Income								
< 10,000	5	20	4	16	3	12	2	8
10,000 – 20,000	11	44	14	56	17	68	7	28
21,000 – 30,000	6	24	3	12	2	8	5	20
31,000 – 40,000	2	8	2	8	1	4	7	28
41,000 – 50,000	1	4	2	8	1	4	2	8
> 50,000	0	0	0	0	1	4	2	8
Sub - total	25	100	25	100	25	100	25	100
								$X^2c = 0.195^{ns}$
Geographical Location								
Hilly	4	16	3	12	5	20	3	12
Sloppy	8	32	1	4	8	32	1	4
Rolling	6	24	3	12	7	28	5	20
Flat	7	28	18	72	5	20	16	64
Sub - total	25	100	25	100	25	100	25	100
								$X^2c = 0.001^{**}$
Elevation of the Farm								
< 750	6	24	0	0	0	0	0	0
751 – 1,000	2	8	1	4	13	52	0	0
1,001 – 1,250	9	36	1	4	5	20	2	8
1,251 – 1,500	3	12	2	8	3	12	3	12
1,501 – 1,750	4	16	3	12	4	16	6	24
1,751 – 2,000	1	4	17	68	0	0	13	52
> 50,000	0	0	1	4	0	0	1	4
Sub - total	25	100	25	100	25	100	25	100
								$X^2c = 0.957^{ns}$

Legend: ** – highly significant; ^{ns} – not significant;
(MR) – Multiple Response

The frequency of the data per crop obtained has a multiple responses maybe because of the wide experience of the farmers to highland agriculture. Most of them are knowledgeable to the crops they cultivate such that they do not specialize in one crop only but with several crops that suitably grow in their respective areas. Example, farmers plant potato on the month of September and then harvest it on December. After potato, they plant cabbage, and after cabbage, they plant carrots and so on. After exhausting their farm with the corresponding crops, they again rotate the crops and follow another cropping pattern.

Farming approach. Furthermore, it can be noted that most of the respondents are involved in conventional farming. Only 5, 2, 3 and 9 farmers are practicing organic agriculture in Monamon Norte, Monamon Sur, Sadsadan Proper and Sinto, respectively. According to the interview, the reason why few farmers engaged in organic farming is due to high cost of farm inputs and more time devoted to care and maintenance practice and market problems most especially if there are no market outlet.

Market outlet. There are nine respondents in Barangay Sinto out of 25 respondents are sold to organic agriculture. This translates to 36% of the farmers of the Barangay and 9% percent of the respondents in the four Barangays of the Municipality excluding the organic farmers of Monamon

Norte, Sur and Sadsadan Proper. In all, 19 respondents are practicing organic agriculture. This is about 19% of the total number of respondents in the interview. In the market outlet, conventional farmers usually bring their product to the trading post where their produce is accepted. Only those organic produce were disposed in the La Trinidad Organic Practitioners (LaTOP). Other market outlets were also mentioned but most of the outlets are based in La Trinidad, Benguet such that the respondents have to bring their product to the place at every harvest season.

Farmers' income. Statistical analysis showed insignificant results of the income of farmers in the four Barangays of the municipality. Most of the time, prices of the commodities are affected by the supply of the corresponding produce. Aside from middlemen who dictates the price, weather has a bearing on the quality of the products that are delivered to the market. According to the respondents, when there is oversupply of one crop like cabbage, price goes down in just a short time. On the part of the farmer, this will cause tremendous decrease in their income and the capital will also be compromised. There are also times when the prices are up such that their income is thrice to four times their capital. In other words, it is very hard to stabilize the prices of the commodities. In the organic practitioners, they claim that the prices of their products are already established such that there is no rushing of harvesting especially

that they have a direct market. According to them, a small parcel of land can match hectares of land when devoted to organic agriculture. From the table, it can be observed that most of the participants have less than 10,000 to 40,000 income per cropping. Only in Sinto where seven participants claimed that their income per cropping ranges from 31,000 to 40,000 but there are also farmer respondents have income higher than 50,000.

Geographical location. There are four types of geographical locations in the Barangays of Bauko namely; hilly, sloppy, rolling and flat. In Monamon Norte, most of the farms are located in sloppy areas; Monamon Sur and Sinto, majority of the farms are located in flat surface since the area is in the summit with wide arable lands. In Barangay Sadsadan Proper, most farms are located in the back slope of Mount Data forest reserve because the farmers are located in the area.

Elevation of the vegetable farm. It can be observed that the distribution of respondents in the different elevations resulted to the significant statistical analysis. As highlighted in the previous table, Monamon Sur and Sinto are in the mountain summit where the farms are located at higher elevation. It is already known that high elevation areas posses cooler and favorable temperature and humidity conducive to production of highland crops. Also, it was noted that temperature is ideal

for vegetable production although pest and diseases are prevalence but controlled due to agro-chemical inputs..

Vegetable Production Management Practices

Knowledge on the Crops Planted

The vegetables managed by the farmers in the four Barangays of Bauko are categorized into roots crops, leafy vegetables legumes and others like bell pepper as shown in Table 3.

Table 3.Respondents' knowledge on crops planted

CROPS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No.	%
Root Crops								
Potato	17	50	22	61.11	25	75.75	24	57.14
Carrot	17	50	14	38.88	8	24.24	18	42.85
Sub - total	34		36		33		42	
Leafy Vegetables								
Chinese cabbage	8	23.52	3	13.04	2	7.14	4	15.38
Cabbage	16	47.05	19	82.60	25	8.92	21	80.76
Lettuce	8	23.52	1	4.34	1	3.57	1	3.84
Celery	2	5.88	0	0	0	0	0	0
Sub - total	34		23		28		26	

Table 3. Continued . . .

CROPS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No.	%
Legumes								
Bean	11	91.66	2	8	14	82.35	8	27.58
Peas	1	8.33	23	98	3	17.64	21	72.41
Sub - total	12		25		17		29	
Others								
Pepper	15	100	5	50	0	0	0	0
Radish	0	0	5	50	0	0	4	100
Sub - total	15		10		0		4	

(MR) Multiple Response

As mentioned earlier, farmers in Bauko have broad knowledge on highland vegetable production. It was noted, some farmers knew the production technique of several crops whogrew them simultaneously, especially those established farmers particularly those engaged in planting potato, cabbage, broccoli, carrots and garden pea at the same time.

Crop Management Practices

Table 4 presents the respondents' cropping per year, source of irrigation and availability of irrigation and other management or applications on the vegetable production of the selected four Barangays of Bauko.

Cropping per year. Significant statistical results are obtained in the source of irrigation and irrigation availability.

Based on cropping per year, almost all of the respondents have similar cropping per year regardless of the Barangay. Most of the respondents have two to three croppings in a year followed by more than three times for short term crops and only three out of the total respondents claimed that they only plant once in a year. Of course cropping season is dictated by the availability of irrigation and some other factors. It can also be observed that rain is the major source of irrigation of all the respondents in the research. This is because during rainy season, moisture is always available. In mountain summits like that of Monamon Sur and Sinto, rain is the main source of irrigation. In fact, farmers of the area schedule their cropping season during the onset of rainy season because they have no other source of water supply. Unlike other parts of Monamon Norte which is located at the back slope of the mountain that have springs. On the availability of irrigation, most of the respondents claimed that they have average to good source of irrigation that facilitates their crop cultivation and production as shown in Plate 6.

Table 4.Respondents management practices on crops planted

PARTICULARS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Cropping /Year								
1x	1	4	1	4	1	4	0	0
2 – 3x	22	88	22	88	23	92	21	84
> 3x	3	12	2	8	1	4	3	12
Sub - total	25		25		25		25	
								$X^2c = 0.957^{ns}$
Source of Irrigation								
Spring	21	42	6	24	4	16	4	16
River	4	8	4	16	2	8	3	12
Rain	25	50	15	60	19	76	18	72
Sub - total	50		25		25		25	
								$X^2c = 0.00^{**}$
Irrigation Availability								
Poor	0	0	2	8	3	12	4	16
Average	5	20	19	76	20	80	16	64
Good	20	80	4	16	2	8	5	20
Sub – total	25		25		25		25	
								$X^2c = 0.00^{**}$
Pesticides Application								
Insecticide	20	44.44	23	47.91	22	46.80	16	39.02
Fungicide	20	44.44	23	47.91	22	46.80	16	39.02
Botanicals	5	11.11	2	4.16	3	6.38	9	21.95
Sub – total	45		48		47		41	
Weed Control								
Mechanical	25	55.55	25	52.08	25	53.19	25	80.64
Herbicides	20	44.44	23	47.91	22	46.80	16	51.61
Sub – total (MR)	45		48		47		31	
Commercial Fertilizer								
Complete	18	56.25	23	43.39	22	42.30	16	45.71
Urea	8	25.00	23	43.39	22	42.30	16	45.71
Yara	6	18.75	7	13.20	8	15.38	3	8.57
Sub – total (MR)	32		53		52		35	

Table 4. Continued . . .

CROPS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No.	%
Method of Application								
Side dress	19	76	23	50	22	50	16	50
Basal	6	24	23	50	22	50	16	50
Sub – total (MR)	25		46		44		32	
Composts Application								
PCM	0	0	5	71.42	1	25	7	43.75
Vermi/compost	5	100	2	28.57	3	75	9	56.25
Sub – total	5		7		4		16	
Manure Application								
Chicken	20	100	23	92	22	88	16	64
Ruminant	0	0	2	8	3	12	9	36
Sub – total	20		25		25		25	

Legend: ** – highly Significant; ^{ns} – not significant;
(MR) – Multiple Response

Plate 6. Source of irrigation (river)

Plate 7. Rain burst application in watering the vegetable farm in Sinto, water hose directly connected from the creek

Crop protection. It can be noted that there are two groups of participants according to crop protection strategies. The respondents that observe conventional agriculture are using petro – based chemicals like insecticide and fungicide to control pests and diseases. Organic practitioners at the same time use botanicals instead of the agrochemicals mentioned.

This is also true with weed control. Conventional farmers use herbicides or weedicides while organic farmers use manual or mechanical weed control such as uprooting the weeds or timing of planting.

Commercial Fertilizer Application. Conventional farmers use complete, urea and yara specifically for side dress and basal application. Regardless of the Barangay, as long as they are conventional farmers, the practice is almost similar from planting, fertilization and crop protection. The total number of respondents that use the synthetic fertilizers are lesser than the total number of the respondents of the four Barangays of Bauko. The remaining 19 respondents practice organic farming which largely exclude the use of the synthetic fertilizers. They depend on natural fertilizer such as farm composts and animal manures as their source of plant-required nutrients and minerals.

Application of organic fertilizer. The organic fertilizers used by the farmers include processed chicken manure but the organic practitioners make use of Vermicompost and manures of ruminants. Only those conventional farmers make use of chicken dung which is processed as chicken manure (PCM) locally called “siglat” including Vermicompost derived from the compost made from composting process using earthworm like African night crawlers that feed on organic materials.

Characteristics of the Farm Cultivated by the Respondents

Area cultivated. It can be noted that majority of all the respondents cultivated varying farm area of less than one hectare. Only three out of all the participants possess more than 1.5 hectares. Unlike the farmers in lowland areas, wide tracks of land are obvious such that ownership can also be in several hectares. In the four Barangays of Bauko, seldom that farmers own very wide areas of land since the geographical terrain of Bauko mountainous.

Tenurial status. Furthermore, the respondents in Monamon Norte, Sur and Sinto, farms are located within the Barangay except three respondents in Sadsadan Proper. This means that in terms of distance from their farms to their homes accessibility is not compromised. Moreover, ownership of the land is majority among the participants. Only few of them were leasee and tenants at three and four respondents, respectively.

Table 5.Characteristics of area cultivated by the respondents

PARTICULAR	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
Area (x 1,000 m^2)	No	%	No	%	No	%	No	%
< 1	18	72	5	20	1	4	1	4
1.0 – 2.5	3	12	9	36	5	20	2	8
2.501 – 5.0	3	12	5	20	7	28	3	12
5.01 – 7.5	1	4	4	16	4	16	7	28
7.501 – 10.0	0	-	1	4	3	12	8	32
10.01 – 10.50	0	-	1	4	4	16	2	8
> 10.50	0	-	0	-	1	4	2	8
Sub - total	25		25		25		25	
							X^2c = 0.00**	
Location								
Within the Barangay	25	100	25	100	22	88	25	100
Outside Barangay	0	-	0	-	3	12	0	-
Sub - total	25		25		25		25	
							$X^2c = 0.065^{NS}$	
Manure								
Chicken	20	80	23	92	22	88	16	64
Ruminant	0	-	2	8	3	12	9	36
Sub - total	20		25		25		25	
							$X^2c = 0.065^{ns}$	
Distance to market (km)								
< 100	1	4	0	-	0	-	0	-
101 – 150	24	96	25	100	25	100	25	100
Sub - total	25		25		25		25	
							$X^2c = 1.00^{ns}$	

Legend: ** – highly Significant; ^{ns} – not significant

Table 5. Continued . . .

PARTICULAR	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Means of transport								
Jeep	2	8	1	4	1	4	1	4
Truck	25	92.5	24	96	24	96	24	96
Sub - total	27		25		25		25	
Road structure								
Concrete	25	89.28	25	92.59	25	100	25	92.59
Gravel	3	10.71	2	7.40	0	-	2	7.40
Sub - total	28		27		25		27	
Ave. travel time (hr)								
4 – 6	24	96	25	100	25	100	25	100
> 6	1	4	0	-	0	-	0	-
Sub – total	25		25		25		25	

$X^2c = 1.00^{ns}$

Legend: ** – highly Significant; ^{ns} – not significant

Accessibility to market. The common distance from the farms of the respondents to wholesale markets is 101 to 150 kilometers. The means of transportation is either jeep or truck passing through concrete pavements particularly the halsema highway prior to reaching the wholesale markets. The average travel time is 4 – 6 hours regardless of the Barangay where the participants are located.

Plate 8. Trucks of harvested cabbage ready for transport at the La Trinidad vegetable training post

Production Information for the Last Cropping

Crop produced. Table 6 presents the last crop produced by the respondent prior to the interview. Potato, carrot, cabbage, lettuce, celery, peas, pepper, and radish were the crops planted by the respondents.

Table 6. Last crop produced during the interview

CROPS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Root crop								
Potato	8	61.53	19	79.16	11	57.89	21	75
Carrot	5	38.46	5	8320.	8	42.10	7	28
Sub - total	13		24		19		28	
Leaf								
Cabbage	5	41.66	3	10	9	90	3	10
Lettuce	4	33.33	0	-	1	10	0	-
Celery	3	25	0	-	0	-	0	-
Sub - total	12		3		10		3	
Legumes								
Bean	4	80	2	40	0	-	4	66.66
Peas	1	20	3	60	1	100	2	33.33
Sub - total	5		5		1		6	
Others								
Pepper	5	100	0	-	0	-	0	-
Radish	0	-	0	-	2	100	0	-
Sub - total	5		0		2		0	
Area planted (1,000 m^2)								
< 1	23	92	2	8	1	14	9	36
1.0 – 2.5	2	8	23	92	24	96	16	64
Sub - total	25		25		25		25	
Area harvested (1,000 m^2)								
< 1	23	92	2	8	1	1	9	36
1.0 – 2.5	2	8	23	92	24	96	16	64
Sub - total	25		25		25		25	

$X^2c = 0.00$**

Legend: ** – highly Significant;
** - significant

Table 6. Continued . . .

CROPS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Quantity harvested								
< 2,500	13	52	2	8	12	48	19	76
2,501 – 5,000	6	24	6	24	9	36	1	4
5,001 – 7,500	3	12	8	32	2	8	3	12
> 7,500	3	12	9	36	2	8	12	45
Sub - total	25		25		25		25	
							$X^2c = 0.00$**	
Price (PhP)								
< 6	1	4	2	8	3	12	1	4
7 – 10	6	24	7	28	4	16	3	12
11 – 15	4	16	7	28	9	36	7	28
16 – 20	1	6	8	32	2	8	8	32
21 – 25	2	8	1	4	2	8	4	16
26 – 30	3	12	0	-	2	8	2	8
31 – 35	2	8	0	-	3	12	0	-
> 35	6	24	0	-	1	4	0	-
Sub - total	25		25		25		25	
							$X^2c=0.018$*	
Sales (PhP x 1,000)								
< 10	2	8	1	4	1	4	2	8
11 – 20	6	24	8	32	3	12	6	24
21 – 30	3	12	14	56	6	24	4	16
31 – 40	1	4	0	-	7	28	4	16
41 – 50	3	12	0	-	2	8	0	-
51 – 60	3	12	0	-	3	12	0	-
61 – 70	5	20	0	-	1	4	0	-
> 70	2	8	2	8	2	8	9	36
Sub - total	25		25		25		25	

Legend: ** – highly Significant;
** - significant

Based on the listed data, potato appears to be the majority crop that is planted by the respondents. From the interview, in the month of September, most farmers plant potato followed by five respondents each for carrots, cabbage snap beans, peas, pepper and lettuce, then celery and radish. In Monamon Norte, several respondents are located in the lower elevated portions of the barangay such that the crops are so much of the vegetable usually planted in high elevation areas. These are snap beans and pepper. The top three producers of potato are Sinto, Monamon Sur and Sadsadan Proper with 21, 19 and 11 respondents, respectively. For carrots, Sadsadan Proper and Sinto are the top producers at that time with eight and seven respondents, respectively.

Area planted. The total area planted, harvested and the quantity harvested by the participants is shown in Table 6. It can be noted that in Monamon Norte, 92% of the participants cultivate less than 1,000 square meters. On the other hand, majority of the participants of the other three Barangays cultivated land area ranging from 1,000 to 2,500 square meters.

Area. For the area planted, harvested and quantity harvested, significant statistical results were obtained. This means that the respondents from different Barangays have varied distributions on the corresponding subject. It can also be observed that the lesser area

cultivated, so is the quantity of the harvest. This case is true in Monamon Norte with 23 respondents cultivating less than 1,000 square meters harvested a corresponding quantity of less than 2,500 kilograms. Nevertheless, this case is not applicable to those farmers that planted peas, beans and pepper because the weight of the produce is much lighter when compared to cabbage, carrot, Chinese cabbage and the like.

Price. The price per kilogram of commodity planted by the respondents is also presented in Table 6. Statistical analysis showed significant differences on the prices of the commodities per barangay. This means that there are important differences of the price distribution obtained by the respondents upon marketing the commodities per barangay.

As mentioned earlier, the prices of vegetables are fluctuating. It is very difficult to stabilize the prices since there are lot of variables that dictates the price like middlemen, weather, supply, presence of pest and diseases, and importation. Farmers especially those that are practicing conventional agriculture are in the “hit and miss” system of planting and marketing. They plant their crops but they are not sure how much price does the market offer during the time of harvest.

Price per kilogram. Table 6 shows the total gross sales of the respondents during the last cropping. Statistical analysis revealed

significant differences on gross sales of the respondents per barangay. In all of the sales bracket, the respondents were unequally distributed which means some farmers have higher or lower income when compared to other respondents. Six farmer respondents claimed that their sales is less than P 10,000 while majority of the total respondents said that their sales ranges from P 21,000 to P 30,000. Next sales bracket with P 11,000 to P 20, 000 values were filled up by 23 respondents. Highest sales claimed by the respondents are more than P 70,000. Nine farmers from Sinto said they have that kind of sales during the last cropping. Only two each from the remaining Barangay have sales exceeding the P 70,000 mark.

Attitude Towards Farming by the Respondents

Attitude. All of the respondents across the four study Barangays of Bauko claimed that farming is risky.

Types of risks. Majority of the respondents agree that these risks are erosion, pest and diseases, market prices, typhoons and high prices of inputs or a combination of both. Erosion is pronounced in the area because annual rainfall in towns nearby Benguet is high. In most cases, if there is a typhoon, erosion does happen. Pests and diseases continue to flourish in the area as stated by the respondents as shown in plate 9.

Plate 9. Occurrence of pest and diseases in the vegetable farm

The proliferation of pests and diseases in the area is a serious threat to their occupation, thus, adding risk to their livelihood. Another pressure aside from the unstable market value of their crops is the continued high prices of agricultural or farming inputs. The fast oil price hike continue to increase the value of farm inputs, thus, adding burden to conventional farmer practitioners. These scenarios made the respondents think that farming is risky.

Table 7.Respondentsattitude towards farming

ATTITUDE	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Is farming risky?								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
Types of risks								
Erosion	25	20	25	20	25	20	25	20
Pests and diseases	25	20	25	20	25	20	25	20
Market prices	25	20	25	20	25	20	25	20
Typhoon	25	20	25	20	25	20	25	20
High prices of inputs	25	20	25	20	25	20	25	20
Sub - total	125		125		125		125	
Farming is high maintenance ?								
Yes	20	80	23	92	22	88	16	64
No	5	20	2	8	3	12	9	36
Sub - total	25		25		25		25	
Causes								
Irrigation	25	29.41	25	26.59	25	25.77	25	34.44
Excavation	20	23.52	23	24.46	25	25.77	16	21.91
Terrace	20	23.52	23	24.46	25	25.77	16	21.91
High prices of inputs	20	23.52	23	24.46	22	22.68	16	21.91
Sub - total	85		94		97		73	

Maintenance. It can be noted that all of the conventional farmers agree that farming is high maintenance in contrast to the organic farmers that everybody disagree (Table 7).

Plate 10. Riprapping of the field to prevent further erosion

Causes. Results show that farming needs high maintenance through irrigation, excavation, terracing and high prices of inputs. Irrigation is needed by plants in all of the growth stages such that limited water may inhibit the plant growth and development of the plant. It should be sufficient to guarantee a good yield and harvest to the farmers.

Excavation on the other hand is very expensive. In places where rainfall is very high, erosion is pronounced such that excavation is likely to happen. Another factor that adds to excavation is when farmers expand their area cultivated. The terrain of Bauko is not flat such that terracing is needed not only to create flat surface but to prevent further erosion of the area.

Plate 11. Excavation/expansion of cultivated land

Skills and Level of Adoption of Technologies Provided by the Government and Non-government Institutions

The Potato Production Practices

Planting season. It can be observed that majority of all the participants from across the Barangays are aware that tubers are best at dry season during seedling stage. Only 12 respondents, nine in Sadsadan Proper and four in Monamon Norte are not aware of the latter. Statistical analysis revealed significant results on the variances of awareness and application of the awareness in potato production. In Monamon Sur and Sinto, all of the farmers are aware of the idea and they applied it in their farms. In Sadsadan Proper, 64% are aware while the remaining are not.

Planting distance. The awareness of the respondents on the plant optimum distance is presented in Table 8. Statistical analysis on the awareness and whether it was applied during the last cropping showed significant results. It can be observed that almost all of the respondents from the Barangays are aware of the optimum plant distance of 30 x 30 cm. Only 16 respondents (7 in Monamon Norte and 9 in Sadsadan Proper) are not aware of the proper planting distance. During the interview, the farmers are doing the proper distancing of potato seedlings which is 30 x 30 cm, this maybe because they observe it on their neighbors and apply it as a practice. On the other hand, some farmers

knew the proper distance of planting tubers but did not plant potato that made the inconsistent data results.

Table 8.Respondents attitude towards farming on potato at seedling stage

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No.	%	No.	%	No.	%	No.	%
A1.Tubers are best at dry season.								
Yes	21	84	25	100	16	64	25	100
No	4	16	0	-	9	36	0	-
Sub - total	25		25		25		25	
							X^2c = 0.000**	
A2. Used last cropping								
Yes	8	32	17	68	8	32	16	64
No	17	68	8	32	17	68	9	36
Sub - total	25		25		25		25	
							X^2c = 0.012*	
B1. Planting distance (30 x 30cm)								
Yes	18	72	25	100	16	64	25	100
No	7	28	0	-	9	36	0	-
Sub - total	25		25		25		25	
							X^2c = 0.000**	
B2. Used last cropping								
Yes	5	20	17	68	8	32	16	64
No	20	80	8	32	17	68	9	36
Sub - total	25		25		25		25	
							X^2c = 0.00**	
C1. Cuttings are good during dry season.								
Yes	6	24	12	48	16	64	20	80
No	19	76	13	52	9	36	5	20
Sub – total	25		25		25		25	
							X^2c = 0.002**	

Table 8. Continued . . .

AWARENESS		BARANGAY							
		MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
		No.	%	No.	%	No.	%	No.	%
C2. Used last cropping									
Yes	6	24	12	48	16	64	20	80	
No	19	76	13	52	9	36	5	20	
Sub - total	25		25		25		25		
								$X^2c = 0.416^{ns}$	
D1. Apply fertilizer following the RR									
Yes	13	52	18	72	14	56	13	52	
No	12	48	7	28	11	44	12	48	
Sub – total	25		25		25		25		
								$X^2c = 0.429^{ns}$	
D2. Used last cropping									
Yes	5	20	17	68	5	20	7	28	
No	20	80	8	32	20	80	18	72	
Sub - total	25		25		25		25		
								$X^2c = 0.000^{**}$	

**Highly significant; ns – Not significant

Planting stock. It was noted that the awareness of the respondents on the potato cuttings technology during the seedling stage is very high across the four Barangays. It appears that more respondents in Sinto (80%) are aware of the technology. This was followed by Sadsadan Proper with 64%, Monamon Sur with 48% and lastly Monamon Norte with 24% only. Despite their various level of awareness, the technology was not used during the last cropping. This is because farmers store their own potato seedlings that is why seedlings are readily available.

Fertilizer application. Table 8 presents the awareness of the respondents on the proper recommended rate of fertilizer application during the seedling stage. Respondents from the four Barangays differ on their awareness of the technology. Despite the differences observed across the Barangays, statistical analysis showed no significant results. However, statistical analysis showed significant differences across Barangays on whether the technology was applied during the last cropping season. Since farmers do not usually bring their soils for laboratory analysis, they split their application. The only thing that could affect their yield and practice is the quantity of fertilizers that they apply to the soil.

The Awareness on the Application of Pesticide to the Potatoes During the Vegetative Stage

Pesticide Application. Results show that farmers across the Barangays significantly differ in the pesticide application awareness. Farmers in Monamon Sur are 100% aware of the technology compared to Sadsadan Proper, with only eight spraying when pest and disease appear on potatoes. In terms of awareness distribution, the respondents in all the Barangays significantly differ on their awareness and their application during the last cropping. Specifically, organic agriculture respondents

agree to this technology and apply to their farms but not with the use of petro – based chemicals but with the use of botanicals.

Sanitation. Significant statistical results on the sanitation practices of organic farmers on the vegetative stage of potatoes are shown in Table 9. Almost all of the respondents, organic or conventional agree to practice sanitation. They believe that pest and disease are favored when the farmer does not apply sanitation, however, only a few of the respondents apply it for the reason that only less are practicing organic agriculture in the four Barangays and that their last crop is not potato.

Plate 12. Fertilizer application and hilling –up 45 days after transplanting

On the other hand, some of the conventional farmers do practice sanitation while others do not. The farmers that do not practice sanitation are those farmers that are tenants. Most of the time, when the tenants have much work to do, sanitation is compromised because they are dependent to pesticide.

Table 9. Potato production practices of the respondents at vegetative stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1.Spray pesticide following the RR								
Yes	15	60	25	100	8	32	14	56
No	10	40	0	-	17	68	11	44
Sub - total	25		25		25		25	
							X^2c = 0.000**	
A2. Used last cropping								
Yes	5	20	17	68	5	20	7	28
No	20	80	8	32	20	80	18	72
Sub - total	25		25		25		25	
							X^2c = 0.000**	
B1. Sanitation								
Yes	17	68	25	100	18	72	23	92
No	8	32	0	-	7	28	2	8
Sub - total	25		25		25		25	
							X^2c = 0.004**	

** – Highly significant

Table 9. Continued . . .

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
B2. Used last cropping								
Yes	4	16	2	8	8	32	9	36
No	19	76	23	92	17	68	16	64
Sub - total	25		25		25		25	
							$X^2c = 0.069^{ns}$	
C1. Hilling up base after 45 DAP								
Yes	12	48	25	100	16	64	25	100
No	13	52	0	-	9	36	0	-
Sub – total	25		25		25		25	
							$X^2c = 0.000^{**}$	
C2. Used last cropping								
Yes	2	8	17	68	8	32	7	28
No	23	92	8	32	17	68	18	72
Sub - total	25		25		25		25	
							$X^2c = 0.000^{**}$	
Irrigation needed								
Yes	23	92	25	100	25	100	25	100
No	2	8	0	-	0	-	0	-
Sub – total	25		25		25		25	
			$X^2c = 0.255^{NS}$					
D2. Used last cropping								
Yes	4	16	17	68	7	28	7	28
No	21	84	8	32	18	72	18	72
Sub - total	25		25		25		25	
							$X^2c = 0.001^{**}$	

** – Highly significant
ns – Not significant

Hilling up. Furthermore, respondents are awareness on hilling up

practice done at the plant base after 45 days from planting to cover the tubers from exposing against the sun. One hundred percent (100%) of the respondents in Barangays Monamon Sur and Sinto are aware of the technology while 16 and 12 out of 25 participants are aware in Barangays Sadsadan Proper and Monamon Norte, respectively. Also, they apply the technology during the last cropping if it is potato, if it is not potato, the farmers did not apply the technology. Other respondents claimed that they apply it in their farms but they are not aware of the purpose of the technology (Plate 12).

Irrigation. It can be noted that almost all of the respondents across the four barangays are aware of irrigating the plants when needed. This is because they believe that the plants will be stunted or delayed (*matiltil or makutiyeg*– local dialect) when water is not available during the cropping season or at times when moisture is needed by the plants during critical physiological plant stages. Only two respondents from Monamon Norte are not aware because they claimed that they just apply the water because they don't know when plants actually need moisture. Significant results are observed on the respondents whether they applied the technology or not. However, most of the potato farmers claimed that they did not used the technology since their cropping was done at rainy months

which mean water is always available and sometimes abundant so that farmers do not need to irrigate their potatoes.

The Awareness on the Maturity of Potatoes

Harvest tubers when vegetative parts start to dry. It can be noted that all of the farmers are aware when leaves start to dry (provided, the exact month of maturity of the potatoes is consumed), the tubers are ready. They can harvest and market depending on the market value. Other farmers claimed that even if the leaves does not wilt or dry, they will try to sample the tubers. If the size classification of the tubers is favorable to the farmer, they can harvest it especially when the price is high.

Tubers can be stored in the soil in high altitude areas where the temperature is low. All of the respondents across the barangays are aware of storing the matured tubers. This is why the high altitude (*kada* – local dialect) areas that can be farmed are invaded by the farmers because they can stock their tubers upto three months when the prices of potatoes drop. The farmers harvest the potatoes until the prices are favorable However, when the prices hike, it is the farmer's discretion to harvest and market potatoes. Compared to low – elevated areas, they cannot not store their tubers at longer times because the tubers may rot and must be dug and market them immediately.

Table10. Potato production practices of the respondents at maturity to harvest stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1.Harvest when vegetative parts start to dry								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
A2. Used last cropping								
Yes	4	16	17	68	11	44	6	24
No	21	84	8	32	14	56	19	76
Sub - total	25		25		25		25	
							X^2c = 0.002**	
B1. Tubers can be stored in soil in cool areas								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
B2. Used last cropping								
Yes	15	60	3	12	9	36	3	12
No	15	60	3	12	9	36	3	12
Sub - total	25		25		25		25	
							X^2c = 0.000**	

Legend: ** - Highly Significant

The Awareness on Cabbage, Chinese Cabbage and Lettuce Production During Seedling Stage

Seeds should be planted on seedbed to facilitate ease control over the plants when water is scarce. Significant results on the awareness of the respondents in planting cabbage, Chinese cabbage, broccoli or lettuce

seedbed during seedling stage can be seen in Table 11. This practice is to control or facilitate ease over the plants especially when water is scarce. Only in Monamon Norte where five respondents are not aware of the technology but they claimed that they apply it whenever they plant the crops. They observed pest and disease control derived from the training of farmers. It was noted that the technology was practiced decades ago, some of the farmers adopted the technology without understanding the rationale behind. During the interview, they do not know the application and use of planting the seeds on the seedbed first and then transplanting it when ready. They just apply and follow because they have seen and heard about it from other farmers as a usual practice.

Days from planting to transplanting. In higher elevation areas, the seedlings can be ready but in low elevation areas where the temperature is warmer, seedlings can be ready at 20 days (Table 11). Majority of respondents across the four Barangays are aware of the technology. Specifically, 100% of the respondents in Monamon Sur and Sadsadan Proper while 92% and 64% Barangays Sinto and Monamon Norte, respectively.

Table 11.Respondents attitude towards farming on cabbage, Chinese cabbage and lettuce at seedling stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1.Seeds should be planted on seedbed.								
Yes	20	80	25	100	25	100	25	100
No	5	20	0	-	0	-	0	-
Sub - total	25		25		25		25	
							X^2c =	0.004**
A2. Used last cropping								
Yes	15	60	3	13.04	9	36	3	17.64
No	10	64	20	86.95	16	64	14	82.35
Sub - total	25		25		25		25	
							X^2c =	0.001**
B1. This also allows pest and disease control.								
Yes	19	76	24	96	20	80	22	88
No	6	24	1	4	5	20	3	12
Sub - total	25		25		25		25	
B2. Used last cropping								
Yes	15	60	3	12	11	44	3	12
No	10	40	22	88	14	56	22	88
Sub - total	25		25		25		25	
							X^2c =	0.00**
C1. Seedling be ready at 30 days in cooler areas but 20 days in warm area.								
Yes	16	64	25	100	25	100	23	92
No	9	36	0	-	0	-	2	8
Sub - total	25		25		25		25	
							X^2c =	0.01**
C2. Used last cropping								
Yes	13	52	3	12	10	40	3	12
No	12	48	22	88	15	60	22	88
Sub - total	25		25		25		25	
							X^2c =	0.003**

** – Highly significant

Table 11. Continued . . .

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
D1. Planting distance (20 x 20cm)								
Yes	16	64	23	92	25	100	19	76
No	9	36	2	8	0	-	6	24
Sub - total	25		25		25		25	
							X^2c = 0.003**	
D2. Used last cropping								
Yes	13	52	3	12	11	44	3	12
No	12	48	22	88	14	56	22	88
Sub - total	25		25		25		25	
							X^2c = 0.002*	

** – Highly significant
* – Significant

Planting Distance. The awareness of respondent on the proper distancing of cabbage, Chinese cabbage and lettuce during the seedling stage is shown in Table 11. Statistical analysis revealed significant differences on the number of respondents among the barangays. In Sadsadan Proper, all of the respondents are aware of the technology. This was followed by Monamon Sur with 23 respondents, Sinto with 19 respondents and Monamon Norte with 16 respondents. When asked when it was used during the last cropping, there are farmers that did not answer “yes”. This is because their last crop is either potato, carrot or others that are not cabbage, Chinese cabbage and lettuce. Despite that their answer

is no, they still claim that they use the proper distancing of planting the seedlings. It can be observed that there are varying awareness across the four Barangays of Bauko. Significant statistical results revealed that respondents from Monamon Sur are aware of the technology. The least Barangay is Monamon Norte and Sinto. However, their awareness seems to be compensated by their application. The respondents claimed that they do not know the proper distancing in technical perspective but when they plant their seedling, they make use of 20 x 20 cm. They are also aware that when the spaces in between the seedlings are wider, so is the head to be bigger and heavier. The practice is followed based on their observation and lessons gained from other farmers.

The Awareness on the Vegetative Stage of Cabbage, Chinese Cabbage and Lettuce Production System

Fertilizer application. Nutrients are required by plant for growth and development. Without such, it would be very difficult for plant to perform well such that addition of fertilizers is a must. Hilling – up is done to apply fertilizer to the soil and topping it with little soil to cover the nutrients. In the Table, it can be observed that majority of the respondent hills up the soil two weeks after transplanting. Only 12 respondents from the total number are not aware. Significant results were obtained on whether the respondents applied the technology or not. It can be observed that there

are more respondents who did not apply the technology. The increased number of the respondents is contributed by the organic practitioners because they do not apply the synthetic fertilizers.

Irrigation. Results of analysis showed no significant differences on the awareness, but significantly different on whether the practice of the technology was applied. As mentioned earlier, there are farmers whose last crop is not cabbage, Chinese cabbage or lettuce that could be a factor in the differences. Another factor is that the weather was rainy during their last crop such that there is excess in moisture. Nevertheless, farmers still claim that they irrigate their crops as need.

Weeding. No significant differences were observed on the difference across the Barangays. This is because they are sold to the idea that weeds are competitors of plants. Weeds compete with the plants for water, space, nutrients and sunlight.

Water availability. Table 12shows the awareness of the respondents on the idea that water should always be available so that head hardening will not be disrupted. All of the respondents are aware of the idea such that no significant differences were observed. They usually concentrate or see to it that water is available at this stage to assure good and favorable head formation. As observed when head is not hardened, marketability and shelf life is affected.

Table 12.Respondents attitude towards farming on cabbage, Chinese cabbage and lettuce at vegetative stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1.Plants are hilled up with fertilizers 2 weeks after transplanting								
Yes	21	84	24	96	22	88	21	84
No	4	16	1	4	3	12	4	16
Sub - total	25		25		25		25	
							$X^2c = 0.550^{ns}$	
A2. Used last cropping								
Yes	12	48	3	12	11	44	3	12
No	13	8	22	88	14	56	22	88
Sub - total	25		25		25		25	
							$X^2c = 0.009^{**}$	
B1. Irrigation should be as needed.								
Yes	23	92	25	100	23	92	24	96
No	2	8	0	-	2	8	1	4
Sub - total	25		25		25		25	
							$X^2c = 0.769^{ns}$	
B2. Used last cropping								
Yes	13	52	3	12	9	36	2	8
No	12	48	22	88	16	64	23	92
Sub - total	25		25		25		25	
							$X^2c = 0.002^{**}$	
C1.Weeding should be done to avoid competition.								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
C2. Used last cropping								
Yes	13	52	3	12	10	40	3	12
No	12	48	22	88	15	60	22	88
Sub - total	25		25		24		25	
							$X^2c = 0.003^{**}$	

Table 12. Continued . . .

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
D1. Planting distance (20 x 20cm)								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
D2. Used last cropping								
Yes	13	52	3	12	9	36	3	12
No	12	48	22	88	15	60	22	88
Sub - total	25		25		25		25	

$X^2c = 0.003^{***}$

** – Highly significant
ns – Not significant

Attitude Towards Farming on Cabbage, Chinese Cabbage And Lettuce at Maturity Stage

All of the respondents believe that when cabbage, Chinese cabbage and lettuce will over mature cracking will take place. Farmers harvest their crops before they over mature to prevent the products from becoming non-marketable due to cracks and other mechanical damages as shown in table 13.

Table 13.Respondents attitude towards farming on cabbage, Chinese cabbage and lettuce at maturity stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1. Harvest when heads hardened or gained maximum maturity								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
A2. Used last cropping								
Yes	12	48	3	12	11	44	3	12
No	13	8	22	88	14	56	22	88
Sub - total	25		25		25		25	

$X^2c = 0.003^{**}$

** – Highly significant

The Beans and Pea Production at Seedling Stage

Seed selection. The awareness of the respondents in selecting their seeds prior to planting of beans and garden pea is shown in table 26. significant statistical results were observed on the difference of awareness of the respondents across the four barangays. It can be noted that in Sinto, all of the farmers are aware of the selection of seeds. In Monamon Norte, the least number of participants that were aware of the selection have only 21 participants. Despite the difference of aware and non – aware participants, majority of the farmers with a total number of 91 respondents(91%) are aware against only 9 (9%) that were not aware.

Table 14. Respondents attitude towards farming on beans and garden pea at seedling stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1.Select seeds that are not destroyed or deformed.								
Yes	21	84	23	92	23	92	25	100
No	4	16	2	8	2	8	0	-
Sub - total	25		25		25		25	
							$X^2c = 0.275^{ns}$	
A2. Used last cropping								
Yes	3	12	5	20	1	4	6	24
No	22	88	20	80	24	96	19	76
Sub - total	25		25		25		25	
							$X^2c = 0.198^{ns}$	
B1. Plant in plots thoroughly prepared.								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
B2. Used last cropping								
Yes	3	12	5	20	1	4	6	24
No	22	88	20	80	24	96	19	76
Sub - total	25		25		25		25	
							$X^2c = 0.198^{ns}$	
C1. Distance is 5-7 inch for pole beans; 10” for bush snap bean; 5” for sweet pea.								
Yes	22	88	21	85	20	80	17	68
No	3	12	4	6	5	20	8	32
Sub - total	25		25		25		25	
							$X^2c = 0.431^{ns}$	
C2. Used last cropping								
Yes	13	52	3	12	10	40	3	12
No	12	48	22	88	15	60	22	88
Sub - total	25		25		25		25	
							$X^2c = 0.198^{ns}$	
D1. Irrigate immediately after planting.								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
D2. Used last cropping								
Yes	3	12	5	20	1	4	6	24
No	22	88	20	80	24	96	19	76
Sub - total	25		25		25		25	
							$X^2c = 0.200^{ns}$	

Planting. All of the respondents thoroughly prepare the plots prior to planting. Accordingly, the leveling of the surface will help them plant in a more uniform depth. The equal depth allows more uniform germination and plant growth. Thus, putting trellises will be much easier as shown in Table 14.

Distance. Significant results were obtained in the distribution of respondents across the four barangays. It can be noted that in Monamon Norte, more respondents are aware of the 5 – 7 inches plant distance for pole beans; 10 inches for bush and snap beans; and 5 inches for sweet peas at seedling stage. This was followed by Monamon Sur with 21 respondents, Sadsadan Proper with 20 and Sinto with only 17, respectively. When asked why the others does not aware of the proper distance, some respondents just estimated the planting distance. During wet months, proper distancing is observed. When water is about to be scarce, some claimed that they make the distance of the plants closer or increase the density to conserve water.

Irrigation. Also, table 14 presents the awareness of the respondents in the application of water during seedling stage. All of the respondents are aware that the seeds should be watered immediately after planting to facilitate germination. According to them, when the seeds

are not germinated, there are possibilities that the seeds were eaten by ants and other soil organisms or the seeds are not good planting stocks.

The Beans and Garden Pea Production at Vegetative Stage.

Hilling up. All of the respondents agree that the plants should be hilled-up three weeks after emergence. According to them, this practice will help conserve water, provide mechanical anchorage, and control weeds while providing additional nutrient.

Table 15.Respondents attitude towards farming on beans and garden pea at vegetative stage.

AWARENESS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
A1.hill up three weeks after emergence.								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
A2. Used last cropping								
Yes	3	12	5	20	1	4	6	24
No	22	88	20	80	24	96	19	76
Sub - total	25		25		25		25	
							$X^2c = 0.198^{ns}$	
B1. For pole beans, put trellis .if the shoots start to emerge.								
Yes	25	100	25	100	25	100	25	100
No	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
B2. Used last cropping								
Yes	3	12	5	20	1	4	6	24
No	22	88	20	80	24	96	19	76
Sub - total	25		25		25		25	
							$X^2c = 0.198^{ns}$	

Table 15. Continued . . .

AWARENESS		BARANGAY							
		MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
		No	%	No	%	No	%	No	%
C1. Pesticide application 10 days before fruit picking									
Yes	25	100	25	100	25	100	25	100	
No	0	-	0	-	0	-	0	-	
Sub - total	25		25		25		25		
C2. Used last cropping									
Yes	0	-	5	20	1	4	6	24	
No	25	100	20	80	24	96	19	76	
Sub - total	25		25		25		25		
							$X^2c = 0.016$*		

* – significant
ns – not significant

Putting of trellis. The respondents are aware of putting trellis on pole beans when shoots start emerging which all of the respondents agree on the technique. Accordingly, ease or control over the plants are facilitated when trellis are provided early and that plant roots will not be damaged.

Pesticide application. The recommendation of pesticide application prior to fruit picking should not be less than ten days. It can be noted that all the respondents across the barangays agree to this standard.

The awareness of the respondents on fruit – picking of beans and peas during physiological maturity is shown in Table 15. As observed, all of the barangays have common idea on the fruits which should be

physiologically mature and desirable before harvesting. Also, immature fruits are light, easily damaged and have short shelf life. The common market is the La Trinidad Trading Post. Middlemen usually peg the price and physiological maturity. In most cases, only those that is desirable are marketable.

Table 16. Benefits in vegetable production practices of the respondents

BENEFITS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Annual income derived from farming (x 1,000).								
< 20	4	16	5	20	9	36	8	32
21 – 40	20	80	7	28	8	32	9	36
41 – 60	1	4	9	36	5	20	4	16
> 60	0	-	4	16	3	12	4	16
Sub - total	25		25		25		25	
							$X^2c = 0.200^{ns}$	
Annual income derived from other sources (x 1,000).								
< 20	23	92	8	32	19	76	3	12
21 – 40	2	8	12	48	3	12	19	76
41 – 60	0	-	5	20	3	12	3	12
Sub - total	25		25		25		25	
							$X^2c = 0.000^{**}$	
House improvements								
Renovation	9	36	5	20	4	16	4	16
Construction of new house	9	36	6	24	3	12	5	20
Construction of new house in other places	3	12	2	8	0	-	4	16
Sub - total	25		25		25		25	

Table 16. Continued . . .

BENEFITS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Appliances								
TV	20	44.44	16	39.02	8	24.24	9	26.47
Radio	25	55.55	25	60.97	25	75.75	25	73.52
Sub - total	45		41		33		34	
Equipment								
Water pump	3	12	6	24	1	4	8	32
Washing machine	2	8	3	12	0	-	3	12
Sub - total	25		25		25		25	
Vehicles								
Elf	3	12	7	28	3	12	9	36
Car	2	8	3	12	3	12	4	16
Sub - total	25		25		25		25	
Education of children								
Professional	2	10	6	27.27	3	8.33	8	36.36
College level	10	50	4	18.18	13	36.11	5	22.72
High school	4	20	7	31.81	11	30.55	6	27.27
Elementary	4	20	5	22.72	9	25	3	13.63
Sub - total	20		22		36		22	

** – highly significant
ns – Not significant

Benefits Derived by the Respondents
In Vegetable Production Practices

Results of statistical analysis revealed that there are differences on the annual income derived from farming and outside farming activities of the respondents. On the annual income of the respondents from farming, 80% of the respondents in Monamon Norte claimed that they earn PhP 21,000 to 40,000. Sixteen percent claimed to earn less than PhP20,000 a year and only one percent earn income of about PhP 41,000 to 60,000 a year. Highest annual income derived from farming can be noted in Monamon Sur and Sinto with more than PhP 60,000. Highest number of respondents with less than PhP 20,000 income a year can be observed in Sadsadan Proper. On the other hand, 23 out of 25 respondents in Monamon Norte claimed to have other sources of income other than farming with less than PhP 20,000 a year. Two (2) out of the 25 respondents have PhP 21,000 – 40,000 a year. Highest annual income from other can be noted in Monamon Sur with PhP 41,000 – 60,000. According to the respondents, these sources are accumulated labor from other farms that needed manpower, trucking, and hauling.

There are several benefits derived by the respondents in vegetable production namely; house improvements, purchase of appliances, equipment and vehicles. On house improvements, majority of the respondents constructed new houses out of vegetable farming.

This was followed by house renovation and finally, construction of new house in other places. Television and radio were also purchased by the participants to add convenience on their living. According to them, radio is more prioritized than television for them to monitor the prices and listen to commercials on new agricultural inputs or products. Aside from that, radio serves as a form of entertainment for themselves by listening to music both country and love songs as well as drama in real life which inspires them to work hard for their family.

The table also presents the equipment of the respondents. Water pump and washing machine are the equipment however, water pump according to the respondents is more necessary than washing machine. Other respondents claimed that they do not need water pump because they have a good source of irrigation. The vehicles of the respondents were either car or elf however, elf is more helpful to the respondents because it can aid in transportation of both farm produce and farm inputs.

Marketing of Produce

Table 17 shows the types of outlet of the respondents. There are four types of market outlet of the respondents in disposing their produce. They are wholesalers, retailers, wholesaler – retailer and assemblers. For all of the respondents wholesaler is the most popular buyer of their products.

Table 17. Types of market outlet of the respondents

OUTLETS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Outlets								
Wholesaler	25	80.64	25	78.12	25	86.20	25	71.42
Retailer	2	6.45	3	9.37	0	-	6	17.14
Wholesaler – retailer	2	456.	4	152.	4	44.44	4	11.42
Assembler	2	6.45	0	-	0	-	0	-
Sub - total	31		32		29		35	

From the interview, they claim that they dispose their products to wholesaler to make the transaction quick and they can go back home to do other farming activities. Some of the farmers especially those respondents practicing organic agriculture do not bring their products to the Trading post instead in market outlets like LaTOP. It can be noted further that respondents seldom bring their products to assembler.

Table 18 presents the method of sale and modes of payment applied by the respondents. It can be observed that on the method of sale, there are two identified methods, they are either delivered or picked up. All of the respondents delivered their produce to the market and according to them, they are paid in cash.

Table 18. Method of sale and mode of payment applied by the respondents.

MARKETING	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Methods of sale								
Delivered	25	100	25	100	25	100	25	100
Picked - up	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	
Modes of payment								
Cash	25	100	25	100	25	100	25	100
Credit	0	-	0	-	0	-	0	-
Sub - total	25		25		25		25	

The duration of the respondents' products to the market is shown in Table 19. Farmers sell their products to the market per Barangay for several years. Younger farmers, have shorter disposition of agricultural products. This means that the older farmers have longer duration of product disposition. Based on the table, it was observed that more respondents are in the bracket < 5 years to 15 years which means that age and active years of farming has a relationship to the duration of selling the products to the market.

Table 19. Duration of selling respondents products to the market

DURATION	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Years								
< 5	9	36	4	16	2	8	5	20
6 - 10	5	20	9	36	9	36	12	48
11 - 15	4	16	7	28	7	28	4	16
16 - 20	5	20	3	12	5	20	3	12
> 20	2	8	2	8	2	8	1	4
Sub - total	25		25		25		25	

Table 20 presents the presence of middlemen on product disposition. Statistical analysis showed significant differences on the presence of middlemen and maintained over the years to market their produce. Majority of the respondents across the four barangays go through middlemen. Accordingly, farmers practicing organic farming have a direct market like LaTOP compared to farmers practicing conventional agriculture who engage with middlemen. This is similar to the duration devoted in selling products to the market. Younger farmers have shorter duration to dispose their products compared to farmers engaged with middlemen. It was further noted that farmers do not go through middlemen to prevent cheating and non – payment of the products on time.

In Monamon Norte, 52% claimed that their middlemen deduct 1.50 pesos per kilogram of goods but majority of the respondents claimed that the cut deducted by the middlemen depends on the condition of the

product and market price. This is associated with fluctuating prices of the commodities which is closely related to various factors like weather, supply and demand.

Table 20. Presence of middlemen and duration to obtain existing prices of commodities.

PRESENCE OF MIDDLEMEN	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Do you go through middlemen								
Yes	20	80	23	92	24	96	16	64
No	5	20	2	8	1	4	9	36
Sub - total	25		25		25		25	
							$X^2c = 0.018^*$	
Years								
< 5	9	36	4	16	2	8	7	28
6 – 10	5	20	15	60	9	36	9	36
11 – 15	4	16	4	16	7	28	4	16
16 – 20	5	20	1	4	5	20	3	12
> 20	2	8	2	8	2	8	2	8
Sub - total	25		25		25		25	
							$X^2c = 0.022^*$	
Pesos/kg deducted by middlemen								
1.50	13	52	0	-	0	-	0	-
2.00	4	16	0	-	0	-	0	-
4.00	1	16	0	-	0	-	0	-
Depend	7	28	25	100	25	100	25	100
Sub - total	25		25		25		25	
							$X^2c = 0.000^{**}$	
Duration of information transfer (hrs).								
< 1	21	84	25	100	20	80	25	100
1 – 5	3	12	0	-	3	12	0	-
> 5	1	4	0	-	2	8	0	-
Sub - total	25		25		25		25	
							$X^2c = 0.050^{ns}$	

** – highly significant; * – significant; ns – not significant

On the other hand, transfer of information in obtaining the current or existing prices ranges from less than an hour to more than five hours. It can be noted that almost all of the respondents obtained prices less than an hour because of the presence of technology like cellular phones. Other respondents claimed that they sometimes depend on the radio for a more complete and precise listing of commodities in the La Trinidad Trading Post.

In addition, Table 21 presents the income of the respondents' income during the last cropping. Farmers, across the barangays have a distributed income. It was noted that the highest income from 15 respondents have PhP 11,000 to 20,000 in Sadsadan Proper, only one (1) respondent claimed that his income last cropping was more than PhP 40,000. Compared with other respondents, the highest total number of respondents across the barangays is 32% with PhP 11,000 to 20,000. Furthermore, the various income of the respondents is dependent on the existing price of various commodities the farmers' sell. However, it was noted that unstable pricing of the commodities is related with income instability ' encountered during the cropping season.

Table 21. Respondents' income during the last cropping

INCOME	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Pesos (X 1,000)								
< 10	12	48	12	48	2	8	1	4
11 - 20	5	20	7	28	15	60	5	20
21 - 30	5	20	8	32	4	16	12	48
31 - 40	2	8	2	8	2	8	5	20
> 40	1	4	4	16	3	12	2	8
Sub - total	25		25		25		25	

$X^2c = 0.001^{**}$

** – highly significant

Problems and Constraints

The problems and constraints experienced by the respondents in farming is presented in Table 22. There are three problems identified concerning irrigation, namely; low scarce and rain dependency. It was noted that farmers depend on rain for their farming activities. Without rain, the cropping per year could be reduced. Also, in view of this, rain affects the annual cropping during production because of in sufficient moisture and necessary irrigation for plant growth and development.

There are seven components of crop protection identified in the Table35. These are (1) high cost of farm inputs, (2) insect and disease resistance to chemicals, (3) low resistance of plants to pest and disease, (4) high incidence of pest and diseases, (5) soil pollution, (6) lack of

knowledge on crop production and (7) calamity which are identified and noted by the farmers.

This could be attributed to the occurrence of calamities as observed by organic and conventional farming practitioners. These were followed by the lack of knowledge and technical experiences on crop production.

Table 22. Problems and constraints experienced in farming by the respondents.

PROBLEMS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Irrigation								
Low	10	43.47	5	33.33	8	42.10	7	41.17
Scarce	9	39.13	8	53.33	2	10.52	6	35.29
Rainfed	4	17.39	2	13.33	9	47.36	4	23.52
Sub - total	23		15		19		17	
Crop protection								
High cost of farm inputs	20	15.50	23	15.54	22	14.37	16	13.22
Insect and disease resistance to chemicals	20	15.50	23	15.54	22	14.37	16	13.22
Low resistance of plants to pest and diseases	20	15.50	23	15.54	22	14.37	16	13.22
High incidence of pest and disease	20	15.50	23	15.54	22	14.37	16	13.22
Soil pollution	20	15.50	23	15.54	22	14.37	16	13.22
Lack of knowledge on crop production	4	3.100	8	5.40	18	11.76	16	13.22
Calamity	25	19.37	25	16.89	25	16.33	25	20.66
Sub - total	129		148		153		121	

Table 22. Continued . . .

PROBLEMS	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Marketing system								
Unstable prices of commodities	20	18.51	23	20	22	20	16	20
Perishability of the products	20	18.51	23	20	22	20	16	20
Over supply of commodities	20	18.51	23	20	22	20	16	20
Presence of middlemen	23	18.51	23	20	22	20	16	20
Problem on vegetable importation	25	23.14	23	20	22	20	16	20
Sub - total	108		115		110		80	
Transportation								
Unavailable	1	3.84	2	7.40	3	10.71	3	10.71
High transport cost	25	96.15	25	92.59	25	89.28	25	89.28
Sub - total	23		15		19		17	

Another issue is the marketing system that is applied when selling the products. It was identified that the markets are associated with issues like unstable prices of various commodities, perishability of the products, presence of middlemen and problem on vegetable importation influence the income of the farmer-respondents. Also, low prices of goods reduce income of the respondents associated with the perishability of the products which are damaged influencing the income because of increase

of non-marketable products. Other farmers mentioned that they sell their goods even if the prevailing price is low to prevent their products from rotting and degradation. On the other hand, over supply of commodities also affects the prices of goods. When the supply exceeds the demand, prices will drop such that the farmers income will again be reduced and farm capital were compromised. Importation of vegetable also affect farm income by increasing supply causing price reduction or less marketability of the goods especially when the imported products are often of better quality and the prices of the imported goods are cheaper than the local products.

One important factor affecting farm income is the availability of transportation. Unavailability of transportation can hamper immediate selling especially when the price is high or its absence can delay marketing and can increase postharvest losses to the products. High transport cost can reduce the income of farmers or respondents especially when they are transported via trucking or rents. The fare, rent or freight cost is deducted directly to the sales of the respondents.

Relationship of the Farmers and Current Vegetable Production Management Practices

Table 23 presents the membership of the respondentsto farmers' organization or groups. It was observed that respondents with membership to organization are found only in two barangays namely; Monamon Norte and Sadsadan Proper. The remaining barangays have no membership at all. There are five groups identified namely; farmer's supply, farmer's organization, organic farming, Buguias Land bank and Sinpangabong. Specifically, eight (8) respondents are members of farmer's supply. This was followed by organic farming (26.21%),Buguias Land bank(15.78%), Sinpangabong (10 .52%) and Farmer's Organization with 11.11% respectively. In terms of membership status, all of the participants in Monamon Norte and Sadsadan Proper are active members because they believe that they have access to technologies, credit loans, market and social purposes.

The perception of the respondents on farmers and current vegetable production management practices is shown in Table 24. It can be noted that two barangays (Monamon Sur and Sinto) have decided whether or not to change the current vegetable production system while the remaining two remained the same.

Table 23. Membership of the respondents to farmers organizations or groups.

MEMBERSHIP	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Type of group								
Coop	3	12	-	-	-	-	-	-
Organization	22	88	-	-	8	100	-	-
Sub - total	25		0		8		0	
Name of group								
Farmers supply	8	42.10	-	-	-	-	-	-
Farmers' organization	1	11.11	-	-	-	-	-	-
Organic farming	5	26.31	-	-	3	100	-	-
BuguiasLandbank	3	15.78	-	-	-	-	-	-
Sinpangabong	2	10.52	-	-	-	-	-	-
Sub - total	19		0		3		0	
Status								
Officer	0	-	0	-	0	-	-	-
Member	25	100	-	-	4	100	-	-
Sub - total	25		0		4		0	
Reasons for joining the group								
Access to technologies	25	31.25	-	-	4	100	-	-
Access to credit loans	25	31.25	-	-	4	100	-	-
Access to market	25	31.25	-	-	4	100	-	-
Social purposes	5	6.25	-	-	4	100	-	-
Sub - total	80		0		4		0	

The factors associated with changes are the (1) usual practice is obsolete, (2) need to upgrade technologies, (3) unpredicted weather and climate, (4) pest and disease resistance and (5) unproductive soil. Furthermore, it was noted that only two barangays, namely Monamon Norte and Sadsadan Proper have identified the reasons like what is the change in the current farming system.

Table 24. Respondents' perception on farmers and current vegetable management practices

PERCEPTION	BARANGAY							
	MONAMON NORTE		MONAMON SUR		SADSADAN PROPER		SINTO	
	No	%	No	%	No	%	No	%
Is there a need to change the current vegetable production management practices								
Yes	13	52	-	-	22	84.61	-	-
No	12	48	-	-	4	15.38	-	-
Sub - total	25		0		26		0	
Name of group								
Farmers supply	11	18.33	-	-	1	1.42	-	-
Farmers' organization	10	16.66	-	-	3	4.28	-	-
Organic farming	13	21.66	-	-	22	31.42	-	-
BuguiasLandbank	13	21.66	-		22	31.42	-	-
Sinpangabong	13	21.66	-	-	22	3142	-	-
Sub - total	60		0				0	

Relationship of Development Interventions on the Vegetable Production Management Practices in Bauko, Mountain Province

Figure 3 shows the improved framework derived out of the research study to show the relationship of the vegetable farming and the development of Bauko, Mountain Province. Vegetable production is a regular activity of the local residents in Bauko, Mountain Province. It has provided an arena of increased production and profitability especially on the different vegetable commodities marketed locally and which were transported to nearby towns and provinces. Because of these activities, the development of Bauko has tremendously improved through the different technologies that were introduced by local officials and partners in agricultural development including the shared knowledge, skills, attitudes and behavior of farmers and their communities.

The most interesting point observed during the conduct of the study is the transformation of the farmers to become more open to new development interventions particularly on agricultural technologies and the reforms the local government has instituted to improve the system of production management system of vegetable farmers and the local government officials in the conduct of agricultural development planning and programming.

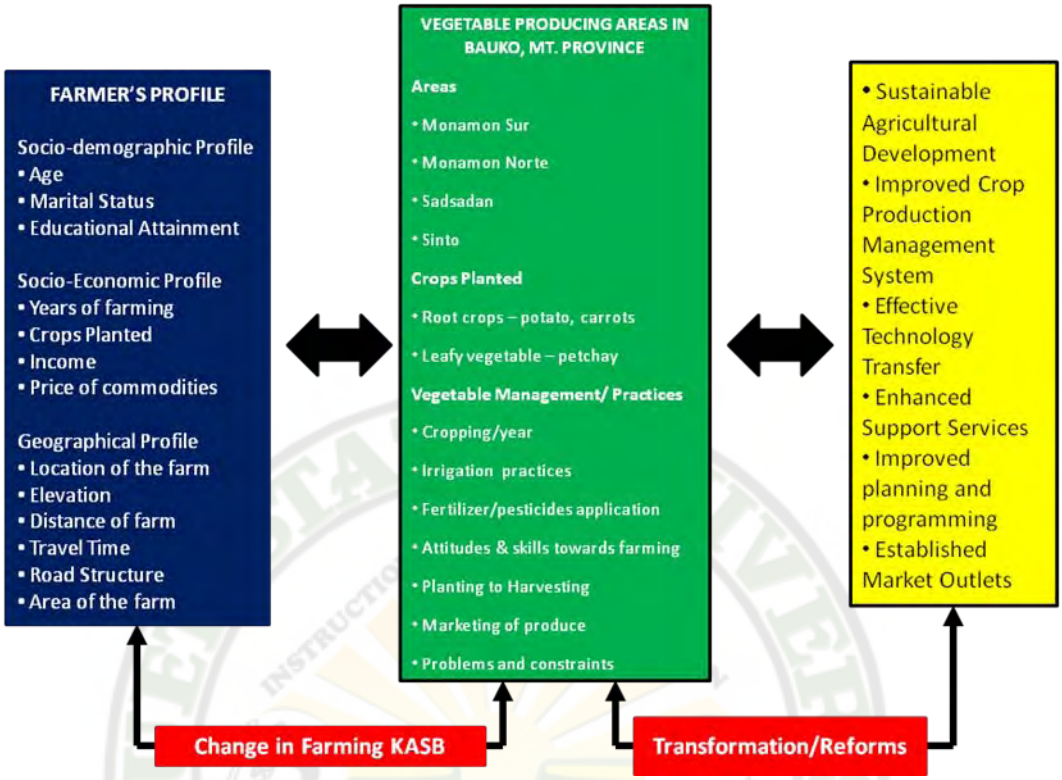

Figure 3. Improved framework showing the relationship of the Vegetable Farming and the Development of Bauko, Mountain Province (Masillem and Aquino 2012).

As a result, the cycle of interventions and improved processes has created a new dimension of agricultural development in the primary vegetable producing areas of Bauko, Mountain Province.

Furthermore, issues, constraints and problems are identified during vegetable production activities, these are immediately addressed by the farmers because they are assured with technological interventions coming from local development-oriented individuals and institutions.

In view of these, therefore, it is very important that vegetable producing communities must delineate and identify specific commodities to produce to avoid surplus or unbalanced distribution of products within and outside the municipality and nearby towns and provinces.

The research has provided a new direction in characterizing vegetable communities which could be replicated to other areas with similar conditions. If this will be operationalized, it is an assurance that communities can direct their agricultural development to the fullest without compromising the different and existing resources found in the area.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study sought to characterize the vegetable – producing communities of Bauko, Mt. Province. Specifically, it described the vegetable – producing communities, determined the factors affecting the production management practices and analyzed the relationship of development intervention on the vegetable production management practices in Bauko.

Interview schedule and secondary data were used to gather pertinent data. Data were tabulated and analyzed using descriptive statistics and hypotheses were tested using the t – test, chi square test, and Fishers exact test.

The relevant findings of the study are the following:

1. The farmers' age range from < 20 to 60 years old mostly male married and are high school graduate. They have been farming for more than 30 years but majority of the respondents are farming 5 – 10 years from the interview.
2. The farms of the respondents were classified as hilly, sloppy, rolling and flat with elevation ranging from < 750 to > 2,000 meters above sea level. The sources of irrigation are rain, spring and river. The

area cultivated by the respondents is less than 1.5 hectares. Few respondents cultivated an area of more than one hectare. It was also noted that ownership of the land is majority of the farmers and are located within the barangay.

The distance of farm to market by the respondents takes about 101 – 150 kilometers with 4 – 6 hours travel time in concrete pavement using jeepney's and trucks as a means of transportation.

3. The crops grown by the respondents are root crops, leafy vegetables, legumes and other crops such as pepper and radish. Based on the data, potato is the majority crop planted by the respondents namely; Monamon Sur, Sadsadan and Sinto.

The farmer-respondents are knowledgeable on the production of root crops, leafy vegetable and legumes conducted more than three times a year with proper management including crop protection measures and fertilization cultivated in an area ranging from < 1,000 m^2 to > 10,500 m^2 located within or outside the Barangay.

The quantity harvested ranges from < 2,500 – 7,500 with a significant differences of the prices of the commodities per Barangay. Their income ranges from PhP< 10,000 to >PhP 50,000

that depends on the price ranges of their respective commodities at the time they sold their produce.

4. Difference in respondents' attitude towards production of potato, leafy vegetables, legumes and other crops from seedlings to maturity stage was obtained. The farming approaches used are conventional and organic and their produce was marketed mainly at the La Trinidad Vegetable Trading Post.
5. There were types of market outlets of the respondents. These are wholesaler, retailer, wholesaler – retailer and assembler. Products were delivered to the market and paid in cash. Presence of middlemen was also observed and deductions to respondents' sales were noted. Transfer of information to the respondents takes1 to 5 hours. Significant statistical results were obtained on the benefits derived by the respondents from other sources and the presence of middlemen on the marketing system of the respondents.

The respondents in all the Barangays claimed that and majority agrees that the risks to this farming activities are the following: erosion, pest and diseases, market prices, typhoon and high prices of farm inputs.

On the other hand, conventional farmers said that farming is high maintenance due to excavation, terracing, high farm inputs and

irrigation. The skills of farmers identified were awareness on the proper planting distance of vegetables, awareness on the proper planting of stocks, proper fertilizer application, correct timing of irrigation, pesticide application, hilling-up, sanitation, and correct timing of harvesting vegetables at maturity.

The benefits derived by the respondents in vegetable production practices revealed significant statistical differences on the annual income derived from farming and outside farming activities. Other benefits are house improvements, purchase of appliances, equipment and vehicles. Majority of the respondents constructed new houses from other places out of vegetable farming.

6. The problems encountered by the respondents in the study are irrigation, crop protection, marketing system and transportation. Fewer respondents are members of farmers' groups or organization. The perception of respondents' towards current vegetable management practices should be changed.

Conclusions

The farmer-respondents of Bauko, Mountain Province generally differs in terms of age, gender, educational attainment and years of active faming. They also differ in terms of crops they planted which are largely market – driven.

The farms are located in hilly, sloppy, rolling and flat areas of Bauko scattered within <750 to >2,000 meters above sea level elevation. The farm depends on spring, rain and river as source of irrigation. The respondents generally differ on the area cultivated and harvested.

The factors affecting the production management practices of the respondents generally differs in terms of skills on the production of root crops, leafy vegetables, legumes from seedling to maturity stage, and presence of middlemen on the marketing system of the respondents.

The problems encountered by the respondents are common. The irrigation problems, marketing system – presence of middlemen and transportation were known.

Recommendations

Based on the findings and conclusions, the following are recommended:

1. Since there is a significant difference on the farming communities of Bauko, Mt. Province particularly the source of irrigation and water availability, area cultivated and harvested, the local government should study the sources of water and how will these sources of irrigation will be conserved and made available to the more farmers. Ordinances to protect the watersheds should be fully implemented to add the volume of water for the growing population of farmers. The local government should also

invest on technologies on maximizing farm resources with efficient inputs to augment the income during lean season. Population grows so is the need for wider areas to cultivate. With the farms no longer expanding, the government may help in conducting seminars in management of resources so that income from the farm will be used economically and efficiently.

2. As suggested by the respondents, the government should also look into ordinances or laws to protect the farmers against the abuse of the middlemen. The deductions made by the middlemen should be regulated and the rise should at least be standardized so that the farmers' income will not be compromised. Crop zoning will also be a good milestone of the local government to prevent over supply of commodities so that prices will not be unstable in a given time.

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APPENDICES

Appendix A.

REQUEST LETTER TO CONDUCT STUDY

November 25, 2011

THE BARANGAY CAPTAIN
Sinto, Bauko
Mountain Province

Sir:

I have the honor to request your permission to float a questionnaire to all selected farmers in your barangay.

This is in connection with the gathering of data needed by the undersigned in the writing of her thesis entitled, “Characterization of Vegetable Producing Community in Bauko, Mountain Province in partial fulfillment of the requirements for the Degree Master in Community Development. Rest assured that all answers given in the questionnaire will be confidential. The result of the study will provide development planners especially the LGU’s of Bauko, information relevant to crop zoning and programming and other sustainable development project of the municipality. Your earnest approval to this request is highly appreciated.

Thank you and God Bless!

Very truly yours,

(Sgd) DONNALYNE APLATEN MASILLEM
Researcher

(Sgd). MARLOWE U. AQUINO
Adviser

Appendix B

SURVEY QUESTIONNAIRE

Date : _____
Province/Municipality : _____

1. Socio – Demographic Profile

A. PERSONAL PROFILE

Name : _____

Address : _____

Age : _____

Gender : ___ Male ___ Female

Marital status : ___ Single ___ Married

Highest education attained : _____

Years of active farming : _____

Crops grown : _____

Farming approach : ___ organic ___ conventional

Market of commodities : ___ Trading post___ Hangar Market (BaguioCity)

___ Direct Market Place : _____

Estimated income per cropping : _____

2. Condition of Bauko, Mountain Province

a. Geographical Locations/Elevation

___ Hilly ___ Slopy ___ Rolling ___ Flat

b. Elevation (MASL) Measure Above Sea Level:

____ Below 750 MASL ____ 751 – 1,000 MASL
____ 1,000 – 1,250 MASL ____ 1,251 – 1,500 MASL
____ 1,501 – 1,750 MASL ____ 1,751 – 2,000 MASL
____ 2,001 and above MASL

c. Annual rainfall:_____

d. Temperature:_____

CHARACTERISTICS OF THE FARM BY PARCEL

1. Basic characteristics of farms by parcel

Number of vegetable parcels:	Total area cultivated	Largest vegetable parcel				
		Normal yield attained during the past three cropping seasons (kg) :	Physical area *(sq. meters):*	Location *(Enter codes):*	Tenurial status *(Enter codes):*	Water Availability *(Enter codes)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)

CODES

Item (5) - LOCATION:
1 - W/n the barangay
2 - Outside the barangay, w/n the municipality
3 - Outside the municipality

Item (6) - TENURIAL STATUS:
1-Owner
2-Amortizing
3 Leasee
4-Tenant
5-Others (Specify)
_____

Item (7) WATER AVAILABILITY:
1 - Very poor
2 – Poor
3 - Average
4 - Good
5 - Very good

2. Accessibility to major wholesale markets

Distance to the nearest wholesale market (Km.):	Means of transportation *(Enter codes):*	Average one-way fare *(Peso)*	Road structure *(Enter codes)*	Average travel time *(Minutes):*
(1)	(2)	(3)	(4)	(5)

CODES

Item (2) - MEANS OF TRANSPORTATION:
1 – Jeep
2 – Tricycle
3 – Truck
4 - Others (Specify)
_____

Item (4) - ROAD STRUCTURE:
1 – Sand
2- Asphalt
3 – Concrete
4 - Gravel
5 - Others (Specify)
_____

V. PRODUCTION INFORMATION FOR LAST CROPPING

Vegetable Crop	Area planted (sq. Meters)	Area Harvested (sq. Meters)	Quantity harvested (in kilos)	Quantity sold (in kilos)	Price (per kilo)	Total Sales
(1)	(2)	(3)	(4)	(5)	(6)	(7)

1. Potato						
2. Cabbage						
3. Legume (Baguio Bean)						
4.						
5.						
6.						
7.						

e. Wind velocity: _____

3. Vegetable Production Management System

a. Knowledge on vegetable production management practices

1. Crops planted (Enumerate):

1.
2.
3.
4.

2. Production Practices

Land Preparation: _____ twice _____ 3x _____ 4x _____ 5x

Source of irrigation: _____ spring _____ river _____rainfed

Crop protection:

_____ Chemicals Insecticides Fungicides

_____ _____

_____ _____

_____ _____

Frequency _____ _____

_____ Botanicals kinds _____

Weed control

_____ Mechanical

_____ Herbicides _____ Kinds Pre-emergence Post emergence

_____ _____

_____ _____

*Fertilizers used:

Commercial (enumerate)_____

Amounts: _____ kgs. _____ bags

Method of Application: _____ side dressing _____ basal

Organic _____

Types: _____ compost _____Manure

_____ chicken dung

_____ cow manure

_____ commercial

3. Characteristics of farm.

Attitude towards vegetable production management system.

a. Farming is risky. _____ yes _____ no

If yes, what are the risks?

_____ erosion

_____ pest and diseases

_____ market prices

_____ Others

b. Farming is high maintenance. _____ Yes _____ No
If yes, what are the cause?
_____ enumerate:

b. Skills and level of adoption of technologies provided by government and non – government institutions.

Technology/Cultural Management Practices	Awareness		Used last cropping season?		
	Aware	Not aware	Yes	No	If No why? *(enter codes)*
	(1)	(2)	(3)	(4)	(5)
3.1 Potato					
3.1.1Seedlings					
1. Tubers are best at dry season.					
2. Plant optimum distance is 30x30 cm					
3. Cuttings are good during rainy season.					
4. Soaking with trichoderma as control for rotting					
Apply fertilizer following the recommended rate. If there is no analysis, split application of the fertilizer is recommended.					
Others, please specify					
3.1.2 Vegetative					
Spray pesticide following the recommended rate and apply before pest and disease appears. Prevention is better than cure as they say.					
For organic practitioners, always practice sanitation.					
Hill up the plant base after 45 days from planting to cover the tubers from exposing against the sun.					
4. Irrigation should be applied as needed.					
5. Others, please specify					
3.1.3 Maturity to harvest					
1. Harvest tubers when vegetative parts start to dry.					
In high altitude areas, the tubers can be stored in the soil up to two months, provided, temperature is very low.					
Others, please specify					
3.2 Cabbage/120Chinese cabbage/lettuce					
3.2.1 Seedlings					
Seeds should be planted on seedbed to facilitate ease on control over the plants especially when water is scarce.					
2. This will also allow pest and disease control.					
In higher elevation areas, seedlings can be ready at 30 days but can be planted by 20 days onwards on low elevated areas					
Plant distance is 20 x 20 cm. (the wider the space, the bigger the head)					
Others, please specify					
3.2.2 Vegetative					
Plants are hilled up with fertilizers at 2 weeks after transplanting.					
2. Irrigation should be done as needed.					

Weeding should be done to avoid competition by the weeds.					
At head formation stage, water should always be available so that head hardening will not be disrupted.					
Others, please specify					
3.2.3Maturity to harvest					
Harvest cabbage/Chinese cabbage when the heads hardened or gain its maximum maturity because if not, the heads will crack as a result of over maturity.					
3.3 Beans/garden pea					
3.3.1 Seedlings					
1. Select seeds that are not destroyed or deformed.					
2. Plant in plots thoroughly prepared					
Distance is 5-7 inch for pole beans; 10 inch for bush snap beans; 5 inch for sweet peas					
4. Irrigate immediately after planting					
5. Others, please specify					
3.3.2 Vegetative					
Thin leaves that are drying or those leaves that are old.					
2. Hill up plants at three weeks after emergence.					
For pole beans, put trellis if the shoots start to emerge.					
4. Apply pesticide 10 days before fruit picking.					
5. Others, please specify					
3.3.3 Maturity to harvest					
1. Pick the fruit at the desired physiological maturity.					
Codes (Item 5) Reasons: *1 –unavailability of inputs* *2 – limited information* *3 – high price of input* *4 – labor intensive/cumbersome* *5 - Others (specify):*_____					

c. Benefits in vegetable production system.

1. Annual Income derived from vegetable production
   - ____ Less than P 20,000
   - ____ P 21,000 – P 40,000
   - ____ P 41,000 – P 60,000
   - ____ P 61,000 – P 80,000
   - ____ P 81,000 – P 100,000
   - ____ Above P 100,000

2. Annual income derived from sources other than farming
   - ____ Less than P 20,000
   - ____ P 21,000 – P 40,000
   - ____ P 41,000 – P 60,000
   - ____ P 61,000 – P 80,000
   - ____ P 81,000 – P 100,000
   - ____ Above P 100,000

House improvements :___ Renovation
___ Construction of new house
___ Construction of additional houses in other places
Furniture/house wares purchased from farm gains/income
___ Appliances (___ TV ___Radio ___Oven; Others: _____)
___ Equipment like machineries (water pumps, etc..)
_____
___ Other investments like cars, elf etc. _____
Education of children : ___ professionals ___ College level
___ High School ___ Elementary

MARKETING OF PRODUCE	
1. Type/s of outlet *(Enter code/s)*	_____
2. Method/s of sale *(Encircle code/s)*	1 – *Delivered* 2 - *Picked up*
3. Mode/s of payment *(Encircle code/s)*	1 – *Cash* 2 – *Credit*
4. How long have you been selling to this/these outlet/s?	
5. Do you go through a middleman? *(Encircle code)*	1 Yes 2 No
6. If yes, how long have you been transacting with the middleman?	
7. How much premium does the middleman usually get?	
8. How long does it usually take you to obtain information about the prevailing selling price?	
9. How much profit (in pesos) did you earn last cropping?	
CODES FOR TYPE OF OUTLET: *1-Wholesaler* *2-Retailer* *3-Wholesaler-retailer* *4-Assembler* *5-Others (Specify)*_____	

d. Problems and constraints experienced in farming.

1. Irrigation _____ low _____ scarce _____ rainfed
2. Crop protection _____ high costs of farm inputs
_____ insect and disease resistance to chemicals
_____ low resistance of plants to pests and diseases
_____ high incidence of pests and diseases
_____ soil pollution
_____ lack of knowledge on crop production (technical know-how and trainings)
_____ calamity (typhoons)
3. Marketing system
_____ unstable prices of commodities
_____ perishability of products
_____ over supply of commodities
_____ presence of middlemen
_____ problem on vegetable importation
4. Transportation _____ unavailable
_____ high transport cost

4. Relationship of the farmers and the current vegetable production management practices

a. Membership to farmers' organization or groups.

____ Cooperative
____ Organization (name of organization); _____
____ Others (Specify). _____

Reasons for joining such organization:

_____ Access to technologies
_____ Access to credits or loans
_____ Access to market
_____ Social purposes

b. Status as member of coop or organization

____Officer
____ Member
____ Number of years in coop.

c. Farmers and current vegetable production management practices.

Is there a need to change the current vegetable production management practices?

_____ Yes
_____ No

If yes, why?

_____ Usual practice is obsolete
_____ Need to upgrade technologies and equipment
_____ Unpredictable weather and climate
_____ Pest and disease resistance
_____ Unproductive soil
_____ Others

BIOGRAPHICAL SKETCH

Everything has its humble beginnings. The researcher believes that life begun when her parents brought her to the world on January 27, 1974 at Sangilo Mines, Itogon, Benguet. She was the second child of Dr. Patrick B. Aplaten (+) and Mrs. Constancia Aplaten, both educators at the secondary level. In this home she had four playmates as she grew up, three brothers, and a sister where memories were imprinted some scenes of their days. Looking back on her early years, she remember herself as an active child who is always fascinated of all the things around her. Though life then is hard, she had a comfortable upbringing and enjoyed a normal, active childhood.

When education for the siblings is about to start, the family moved to Guinzadan Sur, Bauko, Mountain Province where she started to learn her ABC's in this little hometown. She continued her secondary education at Guinzadan National High School until she graduated in 1991. After

graduation, she was thinking of what to do next but then she was reminded of her father who used to play soil in the garden planting different kinds of vegetables for their consumption. Right at that moment, her heart is dedicated to nature.

Since many aspects of human life depends on agriculture, the researcher decided to take up Bachelor of Science in Agriculture at Benguet State University majoring in Soil Science and minor in Extension Education where she graduated in March, 1996.

She is married to James Paulino Masillem, a native of Besao and Mankayan, Benguet by whom they are blessed with three children: Michelle, Nicole and Kristhna Keziah. At present, she is working at Mountain Province State Polytechnic College – College of Forestry and Agriculture, Tadian campus as an Assistant Professor.

To her, education is a very precious tool in life. It is the knowledge of putting one's potentials to maximum use and cannot be measured by money, fame and other things. Education is the only treasure that one keeps and that which nobody can take away from us.