

ORGANIC FARMING METHODS USED IN THE PRODUCTION OF ORGANIC VEGETABLE

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Abstract Organic farming is a method of crop production through the natural process instead of using chemical-based pesticides and fertilizers. This study was conducted to identify the organic farming method used in producing organic vegetables in terms of the following: soil cultivation, animal husbandry, natural pesticides, biofertilizers, composting, crop rotation, cover crops, diversified crops, mulching, and seed treatments. Key Informant Interviews and surveys were used in data gathering, and descriptive statistics were used in data analysis. Results revealed that regardless of the farm size (small, medium, large), organic vegetable growers have practiced soil cultivation techniques such as ploughing, digging, furrowing, and hoeing. Other organic vegetable production practices, for instance, homemade organic pesticides, vermicomposting, crop rotation (legume/leafy), cover crops (grass), and mulching (dry leaves, plastic mulch) are commonly practiced among the three farm types. Moreover, only a few farms have practiced animal husbandry and biofertilizer application, while seed pelleting for seed treatment was obviously practiced by large farm types. Majority of the farms have diversified crops like lettuce, cabbage, eggplant, tomato, cauliflower, bitter melon, cucumber, and herbs. It is noteworthy that success in organic vegetable production is greatly dependent on the timely implementation of effective cultural/production practices which enable growers to minimize, or totally avoid risks, thus to improve crop yield, farmers should focus on optimizing production/cultural practices.

Keywords: *farming method, organic farming, organic vegetable, production practices*

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INTRODUCTION

Organic farming is a method of crop production through the natural process instead of using chemical-based pesticides and fertilizers. Engaging in organic farming mainly aims to develop a sustainable and eco-friendly enterprise. The organic vegetable production system uses natural materials to promote healthy crop growth to manage soil fertility, pest populations, and biological processes. It emphasizes the importance of biodiversity, especially the biodiversity of soil, and biological cycles. It is also a production technique to prevent or remove synthetic fertilizers (Sohail et al., 2021).

Sustainable agriculture offers a potential solution enabling agricultural systems to feed the growing global human population, predictable to expand to 9.3 billion by 2050. For successful organic farming, maintaining soil health by adding organic residues is necessary, because it helps keep carbon content in the soil. It also supports the balance between carbon and nitrogen, the most crucial factor determining nutrient availability. Moreover, organic farming sustains, preserves, and improves the quality of the ecosystem (Harinarayanan & Lakshmanan, 2021).

We can achieve Sustainable Development Goals (SDGs) by practicing organic agriculture. Organic agriculture creates opportunities for women

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(SDG5); provides economic opportunities, SDG 1; promotes health through unused synthetic chemicals, SDG 3; supports biodiversity and traditional knowledge by keeping traditional seeds and farming practices, SDG 15; and makes sure an equitable work standard, SDG 8 (IFOAM, 2020).

Moreover, it is found that extensive cropping practices and long-term use of synthetic fertilizers, pesticides, and other chemical inputs in vegetable production have resulted in a decline in soil conditions and loss of nutrients. With these results, the agricultural land area for vegetable production shows poor soil quality characterized by low content of soil organic matter, acidic and low levels of both micro and macronutrients. To address these issues, the Organic Agriculture Program of the Department of Agriculture encourages the use of organic fertilizer (ati.da.gov.ph).

The idea of organic production is not merely about avoiding the use of conventional chemical inputs, but rather it is a production process that promotes cultural practices that restrict or greatly remove the use of external and off-farm inputs.

Since organic farming practices could either increase farm productivity and profitability or repair decades of soil damage, the study has to identify the organic farming method used by the organic vegetable growers among selected organic farms in Bukidnon.

As such, this study, therefore, sought answers to this major objective: To identify the organic farming method used in the production of organic vegetables in terms of the following: (1) Soil Cultivation (2) Animal Husbandry (3) Natural Pesticides (4) Biofertilizers (5) Composting (vermicomposting, on-site composting, windrow composting, in-vessel composting) (6) Crop Rotation (7) Cover Crops (8) Diversified Crops (9) Mulching (10) Seed Treatments.

RESEARCH METHODS

Research Design

A descriptive research design was used in the study. The descriptive research method mainly concentrates on the precise nature of the demographic segmentation of the participants of the study, it does not focus on why a particular phenomenon occurs. Rillo and Alieto (2018) explained descriptive research as a purposive data collection process, classification, and tabulation of generally accepted conditions, trends, processes, methods, practices, and cause-effect relationships, then performing an accurate interpretation of data

with or without the support of statistical methods. Further, descriptive research aims to draw and classify a phenomenon (Nassaji, 2015). This study employed the descriptive method to identify the organic farming method used in producing organic vegetables.

Locale of the Study

This study was conducted in the province of Bukidnon. The province occupies the northern-central portion of Mindanao. It has a total land area of 10,498.59 square kilometers or 4,053.53 square miles. According to the 2020 census, Bukidnon is inhabited by 1,541,308 residents. This is 30.69% of the total population of Northern Mindanao, 5.87% of the entire population of the Mindanao Island group, or 1.41% of the country's overall population (PhilAtlas.com).

Only Lantapan, Malaybalay, and Manolo Fortich were chosen for this study among the municipalities of Bukidnon. These municipalities were chosen since they are identified to have grown organic vegetables for such a long time.

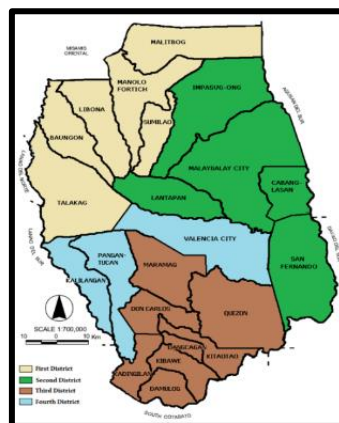


Figure 1 Bukidnon Provincial Map

Source: wikipedia.org

Instrument/s Used

The study used questionnaires as the primary instrument. It consisted of two parts: the socio-demographic of the respondents, and the organic vegetable production practices.

Data Gathering Procedure

The researcher wrote a formal letter request to the Organic Focal Person of the Department of Agriculture - Regional Field Office 10, Provincial Agriculture Office of Bukidnon, and the Municipal Agriculture Office of the respective Municipalities selected in the study. With the approved letter and the list of identified organic vegetable growers, the researcher proceeded to the field sites for data

gathering. The identified farms purposely sampled (with consent forms) were then made to participate in the study, especially, in answering the questionnaire.

Statistical Treatment

Descriptive summary statistics was used to identify the farming method employed in producing organic vegetables.

RESULTS AND DISCUSSION

This section presented and discussed the results of the study.

Table 1 Farming method used in the production of organic vegetables

Cultural/Production Practices	Small Farm	Medium Farm	Large Farm	Total
Soil Cultivation				
Ploughing	2	3	3	8
Tilling	3	-	1	4
Digging	2	3	3	8
Hoeing	2	3	2	7
Harrowing	3	1	2	6
Furrowing	3	3	2	8
Animal Husbandry				
Dairy Production	-	-	-	-
Poultry Production	-	3	2	5
Fish Production	-	1	-	1
Bee Production	-	-	1	1
Cattle and Sheep Production	-	-	-	-
Swine Production	-	-	-	-
Natural Pesticides Application				
Biochemical	-	-	-	-
Microbial Pesticides	-	-	-	-
Botanical Pesticides	-	-	-	-
Mineral Pesticides	-	-	-	-
Homemade Organic Pesticides	3	3	3	9
Biofertilizer Application				
Rhizobium strains	-	-	-	-
Azotobacter	-	-	-	-
Azospirillum	-	-	-	-
Bio-N	1	1	-	2
BioGroe	-	-	-	-
BioSpark	-	-	-	-
Composting				
Vermicomposting	3	3	2	8
On-site	1	-	1	2
Windrow	-	-	-	-
In-vessel	-	-	-	-
Crop Rotation				
Year 1 (legume/leafy)	2	3	3	8
Year 2 (fruit)	-	-	-	-
Year 3 (root crops)	-	-	-	-
Year 4 (brassicas)	1	-	1	1
Cover Cropping				
Grasses	-	-	1	1
Legumes	3	3	2	8
Broadleaf non-legumes	2	3	3	8
Diversified Cropping				
Cucumber	1	1	1	3
Cauliflower	-	1	1	2
Broccoli	-	-	1	1
Lettuce	3	3	3	9

Cultural/Production Practices	Small Farm	Medium Farm	Large Farm	Total
Cabbage	1	1	2	4
Bell Pepper	-	1	-	1
Tomato	1	1	1	3
Herbs	1	1	1	3
Egg Plant	1	2	1	4
Bitter gourd	-	1	-	1
Others	Herbs Pechay		Carrot Radish Peanut	
Mulching				
Grass clipping	2	2	3	8
Straw	-	-	-	-
Newspaper	-	-	-	-
Dry leaves	3	1	3	7
Bark clipping	-	-	3	3
Saw dust	-	-	-	-
Compost	2	2	-	4
Plastic mulch	2	2	3	7
Seed Treatment				
Seed dressing	-	1	-	1
Seed coating	-	-	-	-
Seed pelleting	1	1	3	5
Seed scarification	-	1	-	1

Cultural/Production Practices

As to production/cultural practices, the organic vegetable growers generally relied on their long years of experience in vegetable farming, coupled with knowledge learned from the training and seminars in organic agriculture production.

Notwithstanding the farm type, soil cultivation practices such as ploughing, digging, and furrowing are common to all organic vegetable grower-respondents. Organic soil cultivation practices aim to get healthy soil using nonchemical, and pesticide-free methods. This result is supported by the study of Chait (2020), which revealed that effective organic soil cultivation helps control weeds and produce healthy plants.

Based on the above results, it is revealed that animal husbandry is not heavily practiced. Although medium and large farms engage in poultry production like raising chicken, duck, and turkey, it is only for home consumption. Large farm owners raised a maximum of at least 400 chickens. Unlike in India, animal husbandry is highly valued in their economy. It is a vital component of Indian agriculture supporting the livelihood of more than two-thirds of the rural population, and employment for 8.8% of the country’s population (Singh & Kumar, 2022). Moreover, medium and large farms also engage in fish (tilapia) and bee production.

As presented in table 1, all farm types (small, medium, and large) applied homemade organic

pesticides to control pests and diseases. The homemade organic inputs/pesticides produced by these three farm types are fermented plant juice (FPJ), fermented fruit juice (FFJ), Oriental Herbal Nutrient (OHN), calcium phosphate, ginger and garlic extract, and fish amino acid. All respondents claimed that the preparation of these inputs, to some extent, is laborious and time-consuming. However, they said that the results and benefits are remarkable; health-related, low cost of production because of the availability of the raw materials in the farm. Good results of organic pesticides conform to the study of Mhazo et al. (2010), which revealed the effectiveness of homemade organic pesticides (solanum and garlic) against aphids on rapeseed plants.

Additionally, most respondents practiced vermicomposting, while only two (2) considered on-site composting. The respondents used farm waste products for vermicomposting, especially rotten vegetables, animal manure, and farm residues. As reported by the respondents, vermicompost produced in their respective farms is insufficient for fertilizer requirements. They have to purchase additional organic fertilizer in the market. However, everyone agreed that establishing a vermicompost is cost-effective. In the study of Ramnarain et al. (2018), results revealed that vermicompost can be a significant value to farmers as a replacement for chemical fertilizers, which are produced at a much

lower cost. It has an excellent nutrient status, confirmed by chemical analysis, and contained all the essential macro and micronutrients.

Crop rotation, cover cropping, and diversified cropping system are among the cultural/production practices that organic vegetable growers highly observed. 8/9 respondents highly consider a year 1 (legume/leafy) crop rotation pattern. According to Stagnari et al. (2017), legumes for crop rotation reduce weeds and enrich the soil by partnering with nitrogen-fixing bacteria and performing well in conservation and intercropping systems. Legumes have a high potential for conservation agriculture, functional as a growing or cover crop. Legumes and broadleaf nonlegumes are types of the cover crop planted by the respondents. It is important to note that cover crops are grown to improve the farming system. Cover crops are typically planted between rotations of income-producing crops, but they can also be planted simultaneously. They fulfill various management objectives and are integral to farming systems (Treadwell et al., 2008). Meanwhile, lettuce, cabbage, cucumber, tomato, herbs, and eggplant are the types of diversified crops the respondents grew. Organic vegetable grower-respondent agreed that crop diversification provides them several agricultural and economic benefits. It increases crop portfolio so they would not depend on a single crop to generate income. NIA press release on crop diversification confirms that when farmers practice only monocropping they are more likely to experience high risks of unanticipated climate situations that seriously impact agricultural production. Thus, introducing a wide range of crop varieties will surely increase natural biodiversity, reduce the risk of crop failures, strengthen the agroecosystem, and provide farmers with another source of income (nia.gov.ph).

For organic mulching, the respondents widely use grass clipping and dry leaves. On the other hand, plastic mulches were used by seven out of nine respondents. Some respondents reported that these plastic mulches were given to them by the municipal agriculture office and ATI as part of their programs. According to Schonbeck (2020), organic mulches offer significant benefits to the soil such as soil protection, moderation of soil temperature, moisture conservation, and high content of organic matter and nutrients.

Moreover, only five respondents have reported that seed pelleting has been their practice for seed treatment. Jyoti and Bhandari (2016) reported that pelleted seeds give greater accuracy, resulting in a more efficient seedling process.

CONCLUSION

Regardless of the farm types (small, medium, large), organic vegetable grower-respondents have practiced soil cultivation techniques, such as ploughing, digging, and hoeing. The homemade organic pesticides used and preparation methods were common in all farm types, except for the raw materials used, which correspond to the available raw materials in their farm. The majority of the respondents practiced vermicomposting. They used farm waste products, especially rotten vegetables, and farm residues. Crop rotation, cover cropping, mulching, and diversified cropping are among the production/cultural practices that the respondents heavily observed. Legumes are the topmost crop used for crop rotation and cover cropping, while the respondents widely use grass clipping and dry leaves for organic mulching. In contrast, animal husbandry and seed treatment are not highly practiced by the organic vegetable grower-respondents.

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