[1]Amabella Grace N. Siaton,

[2]Judy Ann F. Gimena

[3]Jesszon Cano

Empowerment Development Model of Organic Farmers

Abstract: - Organic farming in the Philippines is taking a toll in establishing its sustainability in the market due to varying factors. This study determined the adoption of organic farming in the Visayas area, Philippines, A.Y. 2020 with the end view of formulating an empowerment development model for farmers. The study utilized the multi research method with the use of researcher-made questionnaire as the main instrument in data gathering. Both quantitative and qualitative data was used in ascertaining the factors that influenced the adoption of organic farming in Visayas. There were thirty-five (35) respondents who were the farmers from the selected organic farms in Visayas, both in Region VI-Western Visayas and Region VII-Central Visayas. These farms are accredited by a third-party accrediting body of the Department of Agriculture. Convenience sampling technique was used where the participants were selected based on their availability and their willingness to take part of the study. The main instrument used in gathering the data was research-designed and had undergone content validation and pilot testing to ascertain their functionality and reliability. For data analysis weighted mean, chi-square test of independence and One-Way ANOVA. Land size, soil quality, farmer's level of education and labor demand techniques influenced the farmers in adopting organic farming at a moderate extent. The organic farmers moderately practiced soil management, weed control techniques, crop diversification, fertilization, irrigation and harvesting. There is a significant relationship between the type of respondents and the extent of influence of land-size to the farmers toward adopting organic farming and there is also another significant relationship between cooperative membership of the respondents and the extent of influence of labor demand techniques towards the farmer's decision to engage in organic farming. However, there is no significant relationship between the profile of the respondents and the farming practices they employed in their organic farming activity. There is no significant difference between the responses of the respondents on the extent of influence of the factors like land-size, soil quality, farmer's level of education and labor demand techniques to the farmers in their inclination to adopt organic farming and the organic farming practice that used in their organic farming by activity Despite of a good market opportunity of organic farming, there was just a gradual conversion of the farmers from organic farming to conventional farming even though the country is doing some initiatives to push for the sustainability of organic farming industry. Likewise, the growing demand for organic produce in the market, the farmers in Region VI and VII have shown hesitation towards full adoption and had not applied the ideal farming practices at a maximum level to ensure that their activity addresses the vulnerability of the environment vis-a-vis fulfilling the commitment to provide healthy and nutritious crops to the consumers.

Keywords: Agriculture economics, crop diversification and fertilization, irrigation and harvesting, organic farming

I. INTRODUCTION

People today have a different take of being healthy. They seem to be more proactive in taking healthy measures. Lifestyle diseases could be prevented and controlled by disseminating health knowledge [178]. According to Reference [70], a registered dietician and health counselor, younger consumers are most willing to take initiative on behalf of their wellbeing. Also, baby boomers are more engaged in the quest for good health, active retirement, longevity and independence. The major shift of consumer buying interest gives rise to a greater window of opportunity to organic farming industry.

Organic farming in the Philippines is also taking a toll in establishing its sustainability in the market where there was 47% of the country's 30 million hectares of land area which are suitable for agriculture. The country also has a formal legislation that supports organic farming Reference [64]. This formal legislation is Republic Act No. 10068 or also known as Organic Agriculture Act of 2010 that helps support and promotes the practice of organic agriculture in the country and provides the establishment of a comprehensive organic agricultural [43]. Despite the market opportunity of organic farming and the passage of formal legislation to support the organic farming industry, farmers are still hesitant to shift fully in organic farming practices.

Moreover, Republic Act 10068 was enacted in 2010 and most of the farmers in Iloilo, Negros Occidental, Cebu and Bukidnon were considered as late adapters of this legislative enactment. In fact, 46.2% of the farmers in Cebu adopted organic farmers but there is a gradual conversion of the farmers to organic farming, where a portion of

[1] College of Business and Accountancy, University of Cebu, Cebu City, Cebu, Philippines ,

[2]College of Business and Accountancy, University of Cebu, Cebu City, Cebu, Philippines (corresponding author)

[3]College of Technology and Allied Sciences, Bohol Island State University – Candijay, Candijay, Bohol, Philippines(corresponding author),

[1] amabellagracesiaton@gmail.com ,[2] judygimena@gmail.com, [3] jesszon.cano@bisu.edu.ph

their farms is organic agriculture while continuing conventional farming in other portion of the farm. The reason of this gradual conversion is to minimize the risk in case organic farming may not be productive compared to conventional farming. Organic farmers experienced lower income due to decrease in yield during their first year in conversion to organic agriculture. This is also the reason why most of the farmers will retain or will rather go back to conventional farming [112].

The organic farming promotes opportunities in ensuring food safety but there are some problems in the implementation of the Organic Agriculture Act of 2010. The said law requires the certification of organic farms by a third-party certifier, to facilitate labeling and marketing their produce to supermarkets. The certification requires a huge financial capitalization in which most of the smallholder farmers cannot afford [95].

The provincial government in Cebu has passed an ordinance on organic agriculture, the Cebu Go Organic Ordinance that seeks to promote increase in farm production, mitigating the effects of climate change, prevention of ecological destruction like soil erosion and environmental pollution as well protecting the health of the consumers and farmers through organic farming [150] The organic farmers in Cebu had been seeking help and assistance from the provincial government to amend the implementing rules and regulations of the existing Cebu Go Organic Ordinance by instituting a clear and concrete mechanism that will fully enforce the provisions of Republic Act 10068. They further requested the provincial government to provide legal assistance to legitimate organic farming practitioners and to allocate funds for the trading posts to assist farmers in practicing and advocating organic farming [108].

Further, organic farming provides a huge market opportunity but organic farmers in the Philippines still experienced myriad of challenges that affect the organic farming industry as well as the organic farmers themselves. These struggles need to be focused and addressed in order to empower the farmers to shift to organic from conventional farming. Through this, the organic farming industry in the Philippines can be strengthened.

Most of the struggles of the farmers include land and water issues, old cultivation techniques, lack of information on marketing, degradation of natural resources and environmental issues, inadequate support services, framework and institutional constraints and lack of agricultural and rural development policies. These challenges are the main block for sustainability of organic farming considering that most of the farmers are small-scale in size, which makes them vulnerable to unstable business challenges in the market [148].

Another issue that organic farmers had faced was the weak demand of the organic products in the business sector. Most of the hotels and restaurants showed no intention of purchasing organic vegetables due to their preference for low price vegetables and fruits, good quality and stable supply of produce. Organic farmers were also struggling in sustaining the organic farming industry due to economic, educational and political challenges [115].

The practice of organic agriculture on a large scale requires support for research institutions dedicated to agro-ecological methods of fertility and pest management, a strong extension system, strong political support and committed public. There is also a problem in terms of the marketing arrangements with the traders in Cebu [99]. Big businesses and supermarket need a certification that the organic products are produced organically. Only commercial-level organic farms could access the big market since it also requires extensive labor, which needs more capital to meet the labor requirement. There is also a problem in terms of the supply of organic fertilizers. It takes time to produce organic inputs [95].

Also, there are some unique challenges in terms of the cost and logistics of moving locally or regionally produced organic food to the market. The production of the small and medium sized farm is of little interest to mainstream grocery chain stores since the yield is limited to a few hundred tons. Another problem is that, large-scale farming is sustained by important economies of scale while small scale farming leads to higher prices. This covers the extra costs of not using fertilizers and antibiotics. As a result, there are wide variety of product classifications depending on the production methods and the operations' size. This in turn gives raise to two (2) distinct distribution systems such as long channels, like the retail chains, that add value through price and high distribution intensity and short channels direct from producers that add value through their production methods and sustainable practices. The discrepancies between market realities, the value chain and the value delivery system also posed more challenge for the organic food sector [72].

The other problem of the organic farmers is the absence of a well-equipped agency to conduct inspection and certification of organically grown products. It needs series of workshops, trainings and organization to create a regulating body to inspect the standards of organic products.

The researcher who is in the field of business administration and management has been working with the small-scale organic farmers in Cebu by helping them at Cebu Farmer's Market as a volunteer marketing consultant had given her basic knowledge of organic farming. This exposure wide the researchers' knowledge on the intricacies of advocating for environmentally sustainable farming that also provides healthier food for the consumers.
The myriad of challenges faced by organic farmers like stable supply of produce, economic, educational and issues and other struggles on cost and logistics prodded the proponent to undertake this study in order to empower organic farmers in the Visayas in finding strategies for survival in the agricultural and business industry arena. This investigative work could help present ways to empower the organic farmers in order to increase productivity and efficiency. The output of the study, which is the empowerment development model, will be very helpful for the organic farmers to mitigate their problems and increase its efficiency in terms of production and marketing their products in the market.

II. FRAMEWORK

The main theory used in the study is the conservation model of agricultural development. The model presents three principles that involves direct planting, permanent soil cover, and crop rotation as well as intercropping [61]. The study is supported by diffusion model and empowerment theory. Diffusion model focuses on the variance of the land quality, farmers' labor productivity, and the geographical location in order to embrace the best farm practices to used [86]. Empowerment theory proposed that there is a need for synergy between the government and the farmers in order to increase the productivity and to mobilize the agricultural sector of the country [7].

This study is anchored on the conservation model of agricultural development, which proposed that as land scarcity increases, poorer land is used and this will cause the decline of marginal productivity of labor and land. Integrated crop production is suggested, according to this model, because it provides manures [90]. This model evolved from the advances in farming and agricultural production. The model emphasized the increase of a complex land and labor-intensive cropping system, including the production and use of organic manures and labor-intensive capital formation in the form of physical facilities to more effectively use of land and water resources [165].

Conservation model makes a better use of agricultural resources through the integrated management of available soil, water and biological resources, combined with limited external inputs. It contributes to environmental conservation and to sustainable agricultural production by maintaining a permanent or semi-permanent organic soil cover. Adoption of conservation model at the farm level is associated with lower labor and farm-power inputs, more stable yields and improved soil nutrient exchange capacity. Crop production profitability under conservation model tends to increase over time relative to conventional agriculture [157], [60].The model provides effective and natural solutions to conserve soil and water resources. It presents various strategies and practices in order to conserve the raw resources used in the production of the crops. The essential elements of this include minimum tillage, permanent soil cover and diverse crop rotation that has promising results. There were improvements in fertility and water retention in the soil and increase of yields [80].

Conservation model of agricultural development assures that the soil is properly utilized or the production of crops with the aim of reducing excessive mixing of soil and maintaining crop residues on the soil surface in order to minimize damage to the environment. It presents three principles. First, it involves minimum tillage, which involves direct planting and growing crops with minimum soil disturbance. Second, it provides permanent soil cover to enrich and insulate the soil. Third, is crop rotation and intercropping, which means that different crops are alternated in the same field [61].

The diffusion model is an approach to agricultural development on the observation of substantial differences in land and labor productivity among farmers and the geographical locations of the farms. The route to agricultural development is through a more effective dissemination of technical knowledge and narrowing of productivity differences among farmers and among regions. The diffusion of better farming production practices was a major source of productivity growth even in pre-modern societies. Before the development of modern agricultural research systems' substantial effort was devoted to crop exploration and introduction. Even in nations with well-developed agricultural research systems a significant effort is still devoted to the testing and refinement of farmers' innovations and to testing and adaptation of exotic crop varieties and animal species. The model was developed

emphasizing the relationship between diffusion rates and personality, characteristics as well as educational accomplishments of farm operators [165].

The diffusion model embraces the spread of new practices and ideas in both social and geographical sense. Social diffusion, which is also known as micro-aspect diffusion, is the spread of an innovation from its originating sources among a group of potential users (Jones, 2019). The core of the diffusion process is the operation and functioning of the social networks connecting people. The scope of the model is to reproduce the communication of the information dynamics and the adoption decision process among a population of farmers. In its most straightforward outline, the model depicts a network of agents connected by bidirectional links [18].

This model assumes that the market potential of the agricultural organic produce remains constant over time. It also assumes that the nature of its inStion does not change over time and that the diffusion process is not by marketing and promotional strategies for agricultural products. The diffusion model states that few farmers a direct result from the external influences [105].

It is further supported by empowerment theory, which is both a community value orientation and a theoretical model that process the understanding and consequences of efforts to exert control and influence over decisions that affects the individual and the community. This theory provides principles and framework for organizing knowledge and the value orientation of empowerment suggests goals, aims and strategies for implementing change [133].

The theory of empowerment can be established and sustained in a variety of community settings and for a variety of target groups that may operate at different levels, from individual to societal. There should be various components that must be established and sustained to empower activities at various levels. Various levels of activities must also have goals in order to establish and sustain the empowerment goals (Anme, 2019). Empowerment is also defined as the process of enhancing and developing communities to increase control over their way of living. It is the process of improving people's lives by increasing the assets and attributes to build capacities to gain access and control and establish a network [175].

Empowerment is the extension of the individual's ability to make strategic choices while empowerment in agriculture is very important in consideration in the expansion of the ability of making decision. Increased empowerment has positive effects on development outcomes like agricultural productivity [176]. The aforementioned theory also suggests as one prerequisite for the farming community to develop a synergy to the government and other stakeholders. Empowerment strategies vary based on the nature of the activities and on the situation that defines the concept of empowerment and how to operationalize empowerment policies. Empowerment for farmers proved to be important for the development of the demand-driven advisory services with farmers as the basis of improved knowledge and analysis of the situations. It can promote farmer groups and organizations to improve and promote better service provision for a more efficient use of public resources. It can also support farmers to be more potent actors in the area of farming industry that influence the development of the livelihoods such as education, health, and land rights [38].

The theory of empowerment has four ideological approaches. First is the ethnocentric approach that finds a solution for difficult social and ethnic problems. Conservative liberal approach seeks to revive the community as a social unit to uplift and care for its weak citizen. Socialist is the third approach that demands equity and social responsibility in the treatment of social problems. The fourth approach is a profound and professional implementation of democracy. It means that one will contain every legitimate social ideology in the democratic society. This is a progressive democratic world-view that promotes to live in harmony with the other approaches and attempts to create an integration of them [133].

There is an increase of public interest for organic products. This is evident by the increase of observed consumer demand for organically produced food and the number of publicly funded research and policy projects pertaining to organic food production [21]. In fact, in 2017, many of the world's major organic markets showed double-digit growth and the global organic market was estimated to be worth approximately 90 billion euros. Retail sales for organic food were the highest in the United States of America at 43 billion euros and Europe at 37.3 billion euros. China sits in third [135].

Under the Department of Agriculture, there were 91 certified organic operators in the Philippines [23]. Further, the global organic farming market is expected to expand at a growth rate of 8.4% by 2026 [32]. There is really a good opportunities for the organic products globally. These information shows that there is a good market for organic products.

Organic farming is a technique that uses biological materials, avoiding synthetic substances to maintain soil fertility and ecological balance, thereby minimizing pollution and wastage. It involves the cultivation of plants and rearing animals in natural ways. In other words, organic farming is a method that involves growing and nurturing crops without the use of synthetic-based fertilizers and pesticides [34]. It also aims to reduce greenhouse gas emissions, increases efficiency and profitability and promotes soil health [106]. Moreover, it is a production system that aims to avoid the use of synthetic and harmful pesticides, fertilizers, growth regulators and livestock feed additives. It also requires organic farmers to use agricultural methods that preserve the environment and avoid synthetic farming and agricultural materials [27].

Organic farming provides a number of benefits such as reduction of pollution, conservation of water, reduction of soil erosion, increase of soil fertility and lesser use of energy. Farming without pesticides is also better for nearby birds and animals as well as people who live close to the farms. Organic food which is a produce of organic farming does not contain preservatives that makes it last longer [139]. It also appeals to consumers as both healthy and ethical choice. It also encourages healthy biodiversity, which plays a critical role on how resilient, or not, a farm is to issues like bad weather, disease and pests. It also helps conserve water. Organic farmers in general, tend to spend time amending soil correctly and using much - both of which help conserve water. Organic farming is profitable and at the same time results to numerous environmental benefits [28].

In addition, organic farming follows and implements sustainability management, which creates opportunities for the poor while keeping the planet intact. It also maintains the vibrant and dynamic lifestyles while ensuring the Earth stays productive and viable. It argues that it is possible for environmentally sustainable business practices and policy to foster economic growth and long-term growth [31]. Further, business sustainability has generated lifestyle changes for individuals across the globe, widespread initiatives within civil society and business, historic policies for municipal, regional and national governments, as well as crucial protocols and agreements by international organizations. Increasingly, sustainability provides a common language and goal for diverse people and nations. Sustainability requires innovation and adaptation as much as the conservation of resources [161].

Organic farming also provides ecological initiatives that are sustainable. Making use of renewable energy sources, using integrated pest management and natural pest eliminators, growing of the same crops, saving transportation and packaging costs, increasing economic profitability and using farm management practices that promote and protect public health are the different ecological initiatives in organic farming. Sustainable farming also helps reduce the need for chemicals fertilizers and pesticides. Ecological initiatives make the process more organic and cleaner [35].

Organic farming is an agriculture method that protects the environment, quality of food, animal health and natural resources on sustainable bases. Organic farming is one of the best practices to ensure the practices that are harmless to human health [166]. Some of the factors that affect the decisions of the farmers to use organic farmers are size of the land, educational attainment, the labor demand of the techniques, and the quality of the soil. Labor is a crucial input in organic farming since all the activities are manual. Organic farming may not be well developed as conventional farming due to exposure to formal education of the practicing farmers [114].

In order to fully-understand the production of organic farming, correct practice of soil management is needed. The types of land management practices of the farmers' use differ across the different ecological zones [10]. There are different sizes of farms in the Philippines like small, medium and large parcel of farmland. Most of the world's more than 570 million farms are small and family run [98]. The different land cultivation and management strategies that farmers used are slash and burn, bush fallow, adoption of soil fertility technology and soil conservation technology. These practices also affect food crop yields differently. The implication is that agricultural interventions should be developed on the basis of ecological zones and blanket crop improvement packages should be avoided [10].

There are different types of soil that is ideal to different types of crops. Each type of soil has its own blend and composition of minerals, organic and inorganic matters that can determine what crops can be grown successfully. Clay soil are sticky and lumpy when wet and rock hard when dry while sandy soil are gritty, dries easily and easy

to cultivate. Peaty soil is spongy and acidic that slows down decomposition. Loamy soil is the mixture of sand, silt and clay and has ideal characteristics for gardening, lawns and shrubs [49].
Aside from soil management, a water irrigation system is also very important in organic farming. The correct approach of water irrigation system can be implemented by the farmers themselves through using lesser irrigation approach. Soil cultivation also considers preserving the natural fertilizer of the soil. Excessive water use can waste soil and fertilizer in water runoff. Excessive irrigation results in deep percolation and leaching of nitrates, nitrites and other farm chemicals. There is a seasonal demand pattern for water, which varies by crop. The optimal time to irrigate a particular field also depends on when the crop last received water and the soil water holding capacity. The use of evapo-transpiration chart will help the farmers for it shows fairly accurate estimates of crop water use and can help decide when and how to irrigate. Irrigation scheduling can be done based on soil water content or soil water tension. Another approach is deficit irrigation where it applies less water than the crop needs for full development. It is also important to know the water-use requirements of the crops that are intended to grow, and ensure that there is enough water to get an economic yield. When there is shortage of water supply, the crops to be planted are those that require less water. It is also important to maintain and update sprinkler and drip irrigation systems [149]. Irrigation season according to Reference [69] must be detailed, oriented to integrate smart water management strategies and techniques in the operation and maintenance of farm irrigation systems.

Proper harvesting methods must be also applied in organic crops to ensure its sustainability. New quality-maintaining technologies and harvesting approaches for organic products need to be implemented. Optimum quality of organic produce will be achieved if the product is harvested during its optimum harvest period, which must be determined in each cultivar. The optimum harvest window will influence not only by each cultivar's firmness, size, color and taste. Harvesting strategies must be applied by the farmers in terms of sanitation, use of devices to produce maximum quality such as size measuring device, iodine test to determine the starch, skin color scale, instruments to measure ethylene or fruit acidity and identification of optimum harvest window of each [132].

Furthermore, organic agriculture is a holistic production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment as well as promote fair relationships and a good quality of life for all involved parties [51].

One of this innovation and management practice in organic farming is weed control management. Weed control is a botanical component of pest control that prevent weeds from reaching the mature stage of growth when they could be harmful to domesticated plants by using manual techniques including soil cultivation, mulching and herbicides [143].

Weed control techniques involved preventive weed control, cultural, mechanical and biological weed control. Preventative weed control refers to any control method that prevents weeds from being established in a cultivated crop, a pasture, or a greenhouse. Examples of preventative weed control is using certified weed free seed and making sure farm equipment is cleaned before moving from one location to another and screening irrigation water to prevent weed seeds from traveling along irrigation ditches. Cultural weed control refers to any technique that involves maintaining field conditions in order to control the growth of the weeds such that weeds are less likely to become established and/or increase in number. Examples of cultural weed control would be crop rotation, avoiding overgrazing of pastures or rangeland, using well-adapted competitive forage species and maintaining good soil fertility. While, mechanical weed control refers to any technique that involves the use of farm equipment to control weeds. The two mechanical control techniques most often used are tillage and mowing. Biological weed control refers to any technique that involves the use of natural enemies of weed plants to control the germination of weed seeds or the spread of established plants [124].

Crop protection against plague and other pests is very important and it finds that organic farming is mainly viewed as a homogeneous production system. Organic farming is also commonly thought to favor natural enemies of pests for crop protection. However, organic farming involves very different management practices and, in turn, various protection strategies. There are various crop protection strategies, which involve the ecologically intensive strategy, which promotes natural enemies by habitat management [102]. The substitution strategy of pest

management is mainly based on the use of pesticides and the technologically intensive strategy, which uses innovative technological methods such as exclusion nets and the integrated strategy, which mobilizes a wide range of different practices.

Crop diversification is one strategy that organic farmers may employ to reduce their vulnerability in the face of global environmental change. Diversification not only expands the number of potential crop types for market, but it also improves agro ecosystem functioning by building redundancy into the agricultural system and allowing for innovation in areas exhibiting impacts of climate variability [104].

There are different strategies in crop diversification like multicropping that involves two or more species growing on the same piece of land where at least part of the growth cycles of different species overlap. Another strategy involves a multicrop composed of two or more annual crops grown simultaneously on a piece of land within a single growing season, which is called intercropping. Mixed intercrop involves multicrops of randomly arranged plants of different species. Row intercrop is a strategy where intercrops grown in structured arrangements of different species arranged in alternating blocks of narrow rows. Intercrops where blocked rows of each species are grown separately is a strategy used in strip intercrop. Relay cropping is the inter planting of one species with a second species before the first crop reaches maturity. Agroforestry is the land use systems in which woody perennials are grown in association with herbaceous plants and livestock [14].

Organic fertilizers comprised a variety of plant-derived materials that range from fresh or dried plant material to animal manures and litters to agricultural by-products. The nutrient content of organic fertilizers varies greatly among source materials and readily biodegradable materials make better nutrient sources [67]. Organic fertilizers are maintained sources of nutrients due to slow release during decomposition. By increasing soil organic matter, organic farming can maintain and increase the natural fertility of the damaged soil, which will improve the crop productivity to feed the growing population. Organic fertilizers enhance the natural soil processes that will result to long-term effects on soil fertility [151].

There are several strategies in fertilization that is implemented in organic farming. One of these strategies is the use of meat and bone meal-by products or also known as tankage. Tankage is the solid by-product of animal waste rendering. The nutrient content of tankage varies with feedstock and storage time. Another strategy practiced is the use of livestock manure that is commonly applied in irrigated agriculture to improve soil fertility and crop yields. Animal manures need to be well composted before application to benefit both soil and plants. Algae species are also used as one of the fertilization strategies [5]. Plant-based organic fertilizers are also used in fertilization. Plant-based fertilizers break down quicker than other organics, but they generally offer more in the way of soil conditioning than actual nutrients. These materials, such as alfalfa meal or compost, help to add drainage and moisture retention to poor soils [16].

Local farmers fail to compete with the high quality and low-priced imported vegetables. The problems in disposing off the horticultural produce depress the farmers and this negatively affects local horticultural production and farm income. Commercialization of the small horticultural sector requires the development of market-oriented production, as opposed to the occasional sale of subsistence surplus. Insufficient production and inconsistent supply of local produce, high transportation costs, poor marketing infrastructure, high competition with imports and lack of marketing skills were the major problems in terms of marketing and meeting market demands [15].

The organic produce from organic farming is distributed using different marketing channels. The different mode of distribution is considered as one of the key roles in the development of organic farming. It is also considered as one of the obstacles to market development, which depends on how farmers know the proper evaluation of the marketing channels. These different modes of distribution include different types of marketing channels which includes supermarkets, specialized organic stores, processors of organic produce, organic restaurants and peasant markets [11].

The problem in transportation and shipment must be addressed. Organic fruits and vegetable are generally transported using vans, trucks, and on occasion, refrigerated vehicles. Mechanical injury during transportation often leads to considerable quality loss. Transportation is a major bottleneck in the marketing chain for organic fruits and vegetables that is caused by the lack of storage containers for transportation and handling, transportation

of unsuitable products together, poor quality of packaging, poor temperature management, poor loading and unloading system and shortage of inappropriate transport [81]. Properly managed transport is efficient in delivering farm resources and harvested crops as fast as possible. When considered as the final practice of delivering the crops to the market, transport is responsible for the preservation of crop yield and quality. Besides that, when it is economically managed, transport will give plenty of space for reducing total production cost [101].

Farming for profit requires products produced on farms to be sold which means that the farmers grow crops that they can sell in the market as well as understand market situation and profits. Organic farmers need to understand to identify their farm economics like the cost of production, value of production, gross profit margin and farm profit. Market-oriented farmers need to understand the kinds of product that will be produced, the quantity demanded and the price that consumers are willing to pay [88].

Reference [3] said that aside from weather monitoring, there are also production challenges that farmers are facing during cropping period. These challenges involved climate problems, decreasing level of groundwater, poor infrastructure, crop damage by pests, problem relating land tenure, ownership of farm in community, existence of gunner and thieves in the farmers, accessibility of new agricultural technologies, inability of farmer to access and use like seed and fertilizers, lack of capital to buy seed or fertilizers or other farm operations, inadequate investment in irrigation which makes farmers very vulnerable to drought, inadequate investment in processing of crop and other grains and high post-harvest crop losses caused by poor storage structures.

There are so many causes for losses in the post-harvest food chain and its major cause is the storage and improper crop handling. The major problems in proper crop handling involve biological, mechanical, microbiological and chemical problems. Biological problems are caused by the consumption of crops by large animals as well as the contamination of the crops excreta, hair and feathers of animals. Microbiological problems are caused by the microorganisms that are directly consumed by small amount of the crops that damage the crops to the point that it becomes unacceptable because of rotting and other defects. Chemical problems occur when stored crops loss and change their color, flavor, texture and even nutritional value. Mechanical problems are also caused by excessive cutting and trimming of the crops that causes it to have bruises. Other problems involves excessive or insufficient heat or cold, inadequate packaging, lack of adequate containers for the transport and handling perishables, lack of storage containers and equipment and inadequate refrigerated storage [12].

The demand of organic farming has increased globally. This is because organic foods are viewed as being healthier and safer than conventional alternatives. Organic products avoid synthetic pesticides and agro-chemicals and therefore considered to have less harmful chemicals than conventional foods. This is the reason why many consumers buy organic products as they are considered safe and more nutritious [8].

In the study of Reference [141], it disclosed that there is an emergence of organic food and to the sustainable food production in the Philippines. The country has a vibrant organic agriculture movement.

Also, the study of Reference [87] states that organic farming enhances food security by increasing the food purchasing power of local people. Organic farming is part of the solution and means of improving livelihood of the farmers.

According to the study of Reference [130], organic farming does not use artificial fertilizers and pesticides. To ensure that the organic crops can survive even without artificial fertilizer, it has a natural process called proteolysis.

The investigation of Reference [45] also added that proteolysis in plants is a complex and controlled process, essential for mobilization of nutrients from old or stressed tissues, mainly leaves, to growing or sinks organs. Protein breakdown in senescing leaves involves many plastidial and nuclear proteases, regulators, different subcellular locations and dynamic protein traffic to ensure the complete transformation of proteins of high molecular weight into transportable and useful hydrolysed products. Protease activities are strictly regulated by specific inhibitors and through the activation of zymogens to develop their proteolytic activity at the right place and at the proper time. All these events associated with senescence have deep effects on the relocation of nutrients and as a consequence, on grain quality and crop yield. Thus, it can be considered that nutrient recycling is the common destiny of two processes, plant senescence and, proteolysis.

The study of Reference [180] also revealed that the plague that affects the organic crops is also an ecological entity, which is a complex system of ecological interactions between the pathogen, the hosts, and the spatiotemporal variations of its ecosystems. Plague has notable environmental constraints, depending on altitude (500+ meters), warm and dry climates, and conditions for high productivity events for expansion of the transmission cycle. Human impacts are altering plague dynamics by altering landscape and the faunal composition of the foci and adjacent areas, usually increasing the presence and number of human cases and outbreaks. Climatic change is also affecting the range of its occurrence. In the current transitional state of zoonosis as a whole, plague is at risk of becoming a public health problem in poor countries where ecosystem erosion, anthropic invasion of new areas and climate change increase the contact of the population.

In the study of Reference [30] disclosed that organic farming also minimizes environmental problems by using and implementing natural ways of production.

Further, the study of Reference [79] showed that the intensification and expansion of modern agriculture is amongst the greatest current threats to worldwide biodiversity. Sustainable farming systems such as organic farming are now seen by many as a potential solution to this continued loss of biodiversity and receive substantial support.

Reference [46] disclosed that self-sufficiency in organic production has been a major goal in the Philippines. There are still movements and efforts to counteract the adversities brought by industrial and intensive agriculture such as the development and promotion of sustainable farming systems including organic farming. Most of the farmers who are small landholders and those with low-cost per hectare have higher likelihoods in adopting organic rice farming. Moreover, the importance of extension services, NGOs, and private institutions in the intensification of organic production was also seen.

The investigation of Ullah et al. (2015) opined that the factors that affect the adoption of organic farming such as land size and level of education of the farmers have a significant effect on farmers' productivity. Moreover, cost, productivity, profitability, compatibility and efficiency have a positive and significant effect to farmers' productivity. Further, adopting organic farming is not only to increase the farmers' income but also to protect environmental pollution by avoiding the toxic chemical and fertilizer. Hence, government agencies, extension and research institution should play a vital role to strengthen the awareness and advantages of organic farming.

Lastly, the work of Reference [44] disclosed that there are behavioral factors that influence farmers' decisions to adopt environmentally sustainable practices. These factors involve dispositional, social and cognitive. It demonstrates that considering behavioral factors enriches economic analyses of farmer decision-making and can lead to more realistic and effective agri-environmental policies.

The various theories and literatures that relate to the sustainability of organic farming provided wider insights and deeper understanding on its nature, structural requirements as well as the market and environmental challenges it faced under the current era. Moreover, it also affords an eye opening information to the readers of this paper on the importance of economic sustainability without harming the environment and the humanity such as the usage of artificial fertilizers and the pesticides in agricultural production.

III. OBJECTIVES OF THE STUDY

The study seeks to determine the adoption of organic farming in the Visayas area, Philippines A.Y. 2020 with the end view of formulating an empowerment model for farmers. Specifically, this study seeks to address to the extent land-size, soil quality, farmer's level of education, and labor demand techniques influence farmers in adopting organic farming; and the practices employed by the farmers in terms of soil management, weed control techniques, crop diversification, fertilization, irrigation, and harvesting. It also determines the significant relationship between the types of respondents and cooperative membership and the extent to which the factors like land-size, soil quality, farmer's level of education and labor demand techniques influence the farmers in adopting organic farming; and the significant relationship between the types of respondents and cooperative membership and the level of organic farming practices employed by the farmers. The study furthers identify the significant difference between the assessment of the respondents on the extent of influence of the factors such as land-size, soil quality, farmer's level of education and labor demand techniques to the farmers in adopting organic farming and the organic farming practices.

IV. METHODOLOGY

The study utilizes descriptive-survey research method with the use of researcher-made questionnaire as the principal tool in data gathering. The data gathered on the factors that influence the farmers in adopting organic farming and their farming practices were analyzed and presented with the end view of formulating an empowerment development model for organic farmers.

The research was conducted at the selected organic farms in the Visayas area, Philippines. These selected organic farms were certified organic farms by the Department of Agriculture- Bureau of Agriculture and Fisheries Standards. The organic farms were located in Region VI- Western Visayas and Region VII- Central Visayas. The farms in Region VI- Western Visayas were in San Carlos City, La Carlota City, Talisay City, and Bago City in Negros Occidental. The organic farms in Region VII- Central Visayas were in Barili and Dalaguete in Cebu Province. The research was conducted at the selected organic farms in the Visayas area, Philippines. These selected organic farms were certified organic farms by the Department of Agriculture- Bureau of Agriculture and Fisheries Standards. The organic farms were located in Region VI- Western Visayas and Region VII- Central Visayas. The farms in Region VI- Western Visayas were in San Carlos City, La Carlota City, Talisay City, and Bago City in Negros Occidental. The organic farms in Region VII- Central Visayas were in Barili and Dalaguete in Cebu Province.

Table 1 Distribution of Respondents

Type of Respondent	Cooperative Membership	Sample Size (n=)	Percentage
Owner	Member	20	57.14
	Non-Member	6	17.14
Worker	Member	6	17.14
	Non-Member	3	8.57
	Total	35	100.00

Table 1 presents the distribution of respondents. There was a total of (35) thirty-five farmers and were grouped into (2) two, the owner and worker. They were also categorized as member or non-member of farmer cooperatives. Also, there were twenty (20) respondents who were farm owners and members of the cooperative and another six (6) farm owners who were not members of the cooperative. Further, there were six (6) farm workers who were cooperative members and another three (3) farm workers with no cooperative membership.

The main instrument used in gathering the data was a researcher-designed research tool. Survey questionnaire was the research instrument used in the study. The survey questionnaire was divided into two parts. The first part of the research instrument contains questions on the extent to which land size, soil quality, farmer's level of education and labor demand of the techniques influenced the farmers in adopting of organic farming. The second part of the survey questionnaire contains items the different organic farming practices employed by the farmers in terms of soil management, weed control techniques, crop diversification, fertilization, irrigation and harvesting.

The data that gathered in the study was subjected to statistical treatment. The following statistical tools were used to facilitate the analysis and interpretation of the data.

Weighted mean was used to analyze the data on the extent to which land size, soil quality, farmer's level of education and labor demand of the techniques influenced the farmers in adopting of organic farming and the organic farming practiced employed by the farmers.

Chi-square Test of Independence was calculated to determine the significant relationship between types of respondents and cooperative membership and the extent to which the factors like land-size, soil quality, farmer's level of education and labor demand techniques influence the farmers in adopting organic farming as well as the level of organic farming practices employed by the farmers.

One-Way ANOVA was applied to determine the significant relationship between the types of respondents and cooperative membership and the extent of influence of the factors such as land-size, soil quality, farmer's level of education and labor demand techniques to adopt organic farming and their organic farming practices.

The research strictly followed the ethical principles of beneficence, non- maleficence, and justice. In the context of beneficence, the research provided benefit to the farmers and other stakeholders in the context of the model that would guide them in undertaking sustainable organic farming activity. Further, the proposed empowerment development model will be a basis for the policy initiatives formulation to improve the quality of lives of the farmers. In terms on the principle of non-maleficence, the conduct of the research was done without harming the reputation and human rights of the participants. The primary concern of the study is to protect them from possible harm through treating them and keeping all the information gathered with confidentiality and destroying all the files from the survey and interview after the data were analyzed and recorded. Lastly, in the principle of justice in ethics, all the research participants were treated fairly and equally. The researcher ensured that the method of choosing the participants was equitable and with no bias. The study also ensured that there was a fair distribution of benefits. The researcher did not take advantage the vulnerability of the research respondents and participants.

In the administration of the survey questionnaires, the researcher followed the ethical protocols in the conduct of the data gathering procedure. There will be two (2) general rules that will be observed: (1) it should not harm the respondents, and (2) it should maximize possible benefits and minimize possible harm to the respondents. Before the respondents answered the questionnaire, he was given an informed consent, which allowed him to choose whether or not he will give his/her consent to participate in the research. The respondents were fully informed of the benefits of the study and the rights to withdraw from the research. To those research respondents who signified their permission to participate in the survey, they will affix their signature in the informed consent. All the information gathered in the study were withheld confidential and used only for the research. The survey questionnaires that contained the answers from the respondents were destroyed right after all the data were analyzed.

V. RESULTS AND DISCUSSION

A. Extent of Influence to the Farmers in Adopting Organic Farming

This section presents the data on the extent of influence of land size to the farmers in adopting organic farming.

The influence to the respondents of having a small-size of farmland like one hectare or less in adopting organic farming is *highly extensive* with a highest overall mean of 3.63. This data is based on the highest mean at 3.65 (*highly extensive*) representing the responses of the farm owners and 3.56 (*highly extensive*) for the response of the farm workers, who had the same assessment. This data means that even if each farmer had only small area of land for farming it was not a hindrance for him or her to shift from traditional farming method that uses commercial fertilizers and pesticides to organic farming since they can choose the most appropriate kind of crop in which they can maximize the yield. Aside from that having a small area entails small cost of farming and if ever there failures then the loss would be lesser as well.

Table 2 Extent of Influence of Land Size in Adopting Organic Farming

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
1.	A small size of farmland (1 hectare or less) can influence me to adopt organic farming.	3.65	Highly Extensive	3.56	Highly Extensive	3.63	Highly Extensive
2.	A medium size of farmland (1.01 to 7 hectares) can influence me to adopt organic farming.	3.54	Highly Extensive	3.11	Moderately Extensive	3.43	Highly Extensive
3.	A large size of farmland (7.01 to 24.99 hectares) can influence me to adopt organic farming.	3.23	Moderately Extensive	2.33	Less Extensive	3.00	Moderately Extensive
4.	A very large size of farm (over 24.99 hectares) can influence me to adopt organic farming.	2.89	Moderately Extensive	2.00	Less Extensive	2.66	Moderately Extensive
	Aggregate Mean	**3.33**	**Highly Extensive**	**2.75**	**Moderately Extensive**	**3.18**	**Moderately Extensive**

According to the study of Reference [162] organic farming has large positive effects on biodiversity compared with conventional farming, but that the effect of land size varies with the organism group and crop studied, and is greater in landscapes with higher land-use intensity. It is easier for the farmers to practice organic farming with a smaller farm size compared with very huge farm size because it is easier to maintain the nutrient dense of the land. Organic farming had a greater effect on biodiversity as the percentage of the landscape consisting of arable fields increased, that is, it is higher in intensively farmed regions.

On the other hand, the lowest overall mean of 2.66 *(moderately extensive)* shows that the respondents assessed that owning a very large size of farm that is over 24.99 hectares can influence them in adopting organic farming at a moderate extent only. This result emanates from the lowest weighted mean of 2.89 (*moderately extensive*) for the farm workers' assessment and 2.00 (*less extensive*) for the farm workers' evaluation. The data shows that the farm owners and workers have dissenting opinion on this matter. This result further indicates that when a farmer owns a very vast tract of land it will only make him decide to transfer to organic farming method from conventional farming in many instances only since it entails a big amount of cost for maintenance including the annual real property tax, wage for the workers, watering the plants and other farming operating costs. So, to be able to recover the farming costs, there were cases wherein they will stick to the commercial farming method, which produce more amounts of harvest compared to organic farming with low yield.

The size of the land influenced the farmers to adopt organic farming is only *moderately extensive*, having an overall aggregate mean of 3.18. This result is based on the aggregate mean of 3.33 (*greatly extensive*) for the farm owners' responses and aggregate mean of 2.75 (*moderately extensive*) for the farmworkers' answers. So the decision to change from customary farming methodology to non-usage of chemical fertilizers and pesticides really depends on the farmer since it did not really lie on how much area of land is available for farming despite that in this study they had dissenting responses from the farm workers. Aside from that, the decision is also dependent on the financial resources of the farmers in capitalizing the expenses for each farming cycle.

Of the country's 9.2 million hectares, only 0.6% was cultivated land area. The Philippine commitment to organic agriculture is nonetheless significant, given the country's history of promoting chemically intensive technologies to raise yields of rice, a staple crop. Achieving self-sufficiency in rice production is another important goal of the Philippine government. This necessitates the country in increasing rice yields to the levels of some of its more productive Asian neighbors. Achieving both higher rice yields and greater amounts of land under organic production will require investments in programs that target smallholder farmers, who constitute the majority of rice producers in the Philippines [121].

About 98 percent of the total farms or holdings in the country in 2012 had size of 7 hectares and below. Of these, three in every five farms or holdings were below 1 hectare with an average area of 0.28 hectare per farm/holding. About 32 percent or 1.78 million farms/holdings belonged to farm/holding size group 1 hectare to 2.999 hectares. The area of these farms/holdings totaled to 2.59 million hectares with an average of 1.46 hectare per farm/holding. One out of ten farms/holdings belonging to 3 hectares – 7 hectares had an average area of 4 hectares per farm. Two (2) percent of the remaining number of farms/holdings had size of more than 7 hectares, which were categorized as large farms/holdings. These measured to 1.6 million hectares [129].

This section presents the data on the extent of influence of soil quality in adopting organic farming.

Table 3 Extent of Influence of Soil Quality in Adopting Organic Farming

Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
	Mean	Description	Mean	Description	Mean	Description
1. The clay soil-type in my farm has influenced me to adopt organic farming.	3.31	Highly Extensive	2.44	Less Extensive	3.09	Moderately Extensive
2. Loamy soil-type in my farm has influenced me to adopt organic farming.	3.54	Highly Extensive	3.67	Highly Extensive	3.57	Highly Extensive
3. Peaty soil-type in my farm has influenced me to adopt organic farming.	2.73	Moderately Extensive	1.89	Less Extensive	2.51	Moderately Extensive
4. Sandy soil-type in my farm has influenced me to adopt organic farming.	2.77	Moderately Extensive	2.44	Less Extensive	2.69	Moderately Extensive
Aggregate Mean	**3.09**	**Moderately Extensive**	**2.61**	**Moderately Extensive**	**2.97**	**Moderately Extensive**

The influence to the farmers of having a loamy soil-type in adopting organic farmers is *highly extensive* with the highest overall mean of 3.57. Further, this result is based from the highest weighted mean of 3.54 for the farm owners' responses (*highly extensive)* and 3.56 for the farm workers' answers (*highly extensive*). This result indicates that if the type of soil that is present in the farm is loamy then the farm owner has the highest propensity to indulge to organic farming because the vegetables that will be planted will have more yield and will be healthy. Loam soil is a combination of sand, silt and clay such that the beneficial properties from each are included. It is more suitable for farming. This soil is also referred to as an agricultural soil as it includes an equilibrium of all three types of soil materials being sandy, clay, and silt and it also happens to have humus. Apart from these, it also has higher calcium and pH levels because of its inorganic origins [25]. Reference [144] added that it is a combination of sand, silt, and clay together provides desirable characteristics. This type of soil is easier for the farmers to tilt and the roots can easily feed on the minerals in the suspended water.

Reference [144] discoursed that loam soils are best for plant growth because sand, silt, and clay together provide desirable characteristics. First, the different-sized particles leave spaces in the soil for air and water to flow and roots to penetrate. The roots feed on the minerals in the suspended water. Deep sands do not hold moisture well and are often infertile. Clays hold moisture better than sands and may be more fertile, but they tend to swell when they get wet, which may limit the movement of water and roots. Clays crack when they dry and the clods become very hard and difficult to manage. A desirable soil is a loam with enough sand to drain well yet with enough clay and silt to hold-to-hold moisture. Silt-sized grains also contain nutrients and help make a soil workable.

On the other hand, the lowest overall mean of 2.51 *(moderately extensive)* signifies that having peaty soil-type in the farm has influenced the respondents to adopt organic farming at a moderate extent only. This result comes from the lowest weighted mean of 2.73 for the farm owners' responses (*moderately extensive*) and 1.89 for the farm workers' answers (*moderately extensive*). It means that if the predominant type of soil of in the farm is peaty, then the farmer would consider of engaging in organic farming in many cases only since there are crops that will not grow healthy due to high content of acid from the waterlogged partially decomposed plant material.

Peaty soils vary greatly in acidity and fertility, affecting their suitability for crop production. Challenges of agricultural production on peat soils include water logging, low fertility and typically high acidity; however, this can be variable. Peat soils that are less acidic will have larger amounts of plant available nutrients. Organic soils are also susceptible to a phenomenon called subsidence. Subsidence describes a lowering of the soil surface elevation, which leaves this soil type highly prone to rapid soil erosion and degradation. It is assumed that even under optimal soil management, organic soils subside 2-5cm each year [55].

The soil quality influenced the respondents in adopting organic farming is only *moderately extensive* having an overall aggregate mean of 2.97. This result is based on the aggregate mean of 3.09 (*moderately extensive*) for the farm owners' responses and aggregate mean of 2.61 (*moderately extensive*) for the farmworkers' answers. So the type of soil that are present in the farmland of the farm owner can only be a deciding factor in changing from commercial farming method to organic farming in many cases only since there are other aspects that need to be considered for such decision like weather conditions in the area, practices of neighboring farms, and etc.

Soil health is the foundation of productive farming practices. Fertile soil provides essential nutrients to plants. Important physical characteristics of soil-like structures and aggregation allow water and air to infiltrate, roots to explore, and biota to thrive. Diverse and active biological communities help soil resist physical degradation and cycle nutrients at rates to meet plant needs. Soil health and soil quality are terms used interchangeably to describe soils that are not only fertile but also possess adequate physical and biological properties [92].

The farmers have developed certain indigenous knowledge in assessing their fields using soil quality indicators such as crop performance and yield, and soil color and used to establish soil categories (fertile soil, moderate soil and poor soil). Farmers developed over the years of their farming experiences their own soil management practices, which are not far from scientific practices. There are indigenous practices representing successful ways by which farmers have dealt with poor soil quality. These practices vary from farmers to farmers, farming system to farming system, from field to field and even within fields depending on their accessibility and availability of resources. Farmers' portfolio of soil management practices ranged from indigenous to adaptive strategies [42].
Soil quality is a critical part of successful agriculture and is the original source of the nutrients used to grow crops. The nutrients move from the soil into plants. Nutrients are also a part of the food animals eat. In the end, farmers benefit from healthy soil. The healthiest soils produce the healthiest and most abundant food supplies. Since the healthiest soils produce the most food, they have also been at the center of the best communities in history. Farmers use many practices to make sure they are taking good care of the soil and the surrounding environment. Healthy soil results in a more stable food supply, which results in a strong community. Farmers use many practices and technologies, including precise applications of fertilizer and irrigation, to ensure that soil is conserved for sustainable food production [154].
Table 4 presents the data on the extent of influence of the farmers' level of education in adopting farming.

Table 4 Extent of Influence of Farmer's Level of Education in Adopting Organic Farming

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
1.	I am an elementary graduate and has an exposure to farming that has influenced me to adopt organic farming.	3.89	Highly Extensive	3.89	Highly Extensive	3.89	Highly Extensive
2.	I am a high school undergraduate and has an exposure to farming that has influenced me to adopt organic farming.	3.42	Highly Extensive	3.44	Highly Extensive	3.43	Highly Extensive
3.	I am a high school graduate and has an exposure to farming that has influenced me to adopt organic farming.	2.69	Moderately Extensive	2.11	Less Extensive	2.54	Moderately Extensive
4.	I am a college graduate and has an exposure to farming that has influenced me to adopt organic farming.	2.35	Less Extensive	2.00	Less Extensive	2.26	Less Extensive
	Aggregate Mean	**3.09**	**Moderately Extensive**	**2.86**	**Moderately Extensive**	**3.03**	**Moderately Extensive**

The influence to the respondents of being an elementary graduate to adopt organic farming is *highly extensive* with a highest overall mean of 3.89. This data is based from the highest weighted mean of 3.89 for the farm owners' responses (*highly extensive*) and 3.89 for the farm workers' answers (*highly extensive*). It indicates that engaging in organic farming or chemical-free farming does not really lie on the educational attainment of the farmer since in the Philippines the farmers were not highly educated, but it depends on their experience and long years of exposure in the field. Although at present times, the change in the dynamics of the market like consumer behavior is one of the factors to consider since farmers would ensure that the crops that they grow will be bought by the consumers in the market.

Most of the farmers are only elementary graduates. Also, due to economic industrialization, agriculture is dying. The agriculture sector employs only 25.96% of the Filipino workers. This is very low compared to many countries [40].

Further to the study of Reference [39] showed that the relationship between level of farmers' education and level of productivity is positive, continuous and significant. A similar result is also seen between level of education and other agricultural inputs. The study also reveals that that variation in productivity increases with increase in level of education. It also shows that the level of education does not indicate the academic qualification, but education is the level of trainings that the farmer was able to undergo. Academic qualification is not significant in farming but the farm educational trainings are very significant in increasing the level of productivity in farming.

However, the influence to the respondents of being a college degree holder in adopting organic farming is *less extensive* only with the lowest overall mean of 2.26. This data is based from the lowest weighted mean of 2.35 for the farm owners' responses (*lese extensive*) and 2.00 for the farm workers' answers (*less extensive*). It is striking to note that having higher educational background is not the deciding factor in applying the organic way of farming since most often than not these farmers would prefer for commercial farming method since the amount of yield is

massive compared to the low-yielding organic farming. Moreover, those people in the rural area who are bachelor's degree holder would prefer to work in other industries rather than farming.

According to Reference [22], the output share of agriculture fell by 14% from 1986 to 2015 while its employment share fell by 21%. This is only means that most of the college graduate choose to work in the industries and big companies and are not interested in pursuing agriculture. Inclusive growth requires boosting incomes of workers currently in agriculture either shifting them to better – paying jobs outside agriculture, or raising wages within agriculture.

Refereence [4] states that technical skills are more important than academic skills in farming. Emotional intelligence also plays a very important role in farming. Emotional Intelligence describes abilities distinct from, but complementary to, academic intelligence. Those farmers with high EQ scores had the exact competencies one would expect to find in high performing managers in any industry. They used emotion and intuition to communicate, were relaxed and were genuinely interested in their employees' wellbeing.

The overall aggregate mean of 3.03 indicates that the level of education influenced the respondents to adopt organic farming is *moderately extensive*. This result is based on the aggregate mean of 3.09 (*moderately extensive*) for the farm owners' responses and aggregate mean of 2.86 (*moderately extensive*) for the farmworkers' answers. The educational qualification in farming is not a primordial factor in the mechanisms applied in farming since the farmer's training, practical knowledge and skills are the ones, which are important in indulging to organic farming. Although, shifting to this kind of farming needs training but those who had been practicing these for many years have more capability to do so.

As educational level increases, output increases with secondary school education having the highest returns on agricultural productivity. Extension service has a greater impact on agricultural productivity than formal education even though coverage is low. It is also concluded that education is important to the improvement of agricultural productivity such that formal education opens the mind of the farmer to knowledge, non-formal education gives the farmer hands-on training and better methods of farming and informal education keeps the farmer abreast with changing innovations [119].

Training helps farmers to incorporate the latest scientific advances and technology tools into their daily operations. The results of enhancing their operations with these tools increases efficiency and can also lead to less harm to the environment, reduced food contamination, reduction of the need for water and chemicals for crops, and increased profits. Farmers require ongoing education to stay aware of fast-moving developments in technology, science, business management, and an array of other skills and fields that affect agricultural operations [167].

This section presents the data on the extent of influence of labor demand techniques in adopting organic farming.

The highest weighted mean of 3.35 shows that the farm owners answered that the need to employ a number of laborers in their farm has influenced them to adopt organic farming is *highly extensive*. It indicates that the need to hire workers in the farm is one of the major aspects that they considered in embracing the use of animal and plant manure as fertilizers, plant-based insecticides at all times. Also, in organic farming there more processes that needs to be performed and requires more workers.

Farm labor employment is highly seasonal. A multistage production process means that agricultural labor demand tends to be highly seasonal. Combine this with risk and we can begin to understand why agriculture and farm labor markets are so different. Agricultural production *at each stage of the production process* is stochastic. Nature's surprises early in the growing season can create large swings in labor demand come harvest time [160]

On the other hand, the lowest overall mean of 2.94 reveals that the need to employ a large number of laborers has influenced the respondents to adopt organic farming is *moderately extensive*. Likewise, the lowest weighted mean of 3.12 (*moderately extensive*) denotes that the farmworkers had the same response to this aspect in organic farming. Since having a big area of land requires more farm workers, there are certain cases wherein farmers were hesitant to utilize the organic farming method. This finding relates to the earlier findings that having a large a large farm size would only influence them in the adoption of organic farming in many cases. However, on the part of the farmworker the aforementioned indicator influenced them to adopt organic farming is *less extensive* as

indicated by the lowest weighted mean of 2.44. The difference on the answers between the groups of respondents depends on who will make the decision between the two, wherein in this case it would be the farm owner. This result clearly points out that having many people who would be hired to work in the farm at different stages of farming process would discourage the respondents in changing their farming method to organic means since there will have to spend more money for the wages of the laborers.

Agriculture plays a significant role in the Philippine economy. The main agricultural enterprise is crop cultivation and out of the 40 percent Filipino workers, 20 percent of these are farm workers. This output comes mainly from agribusiness, which in turn accounts for about 70 percent of the total agricultural output. The neglect of the agriculture sector and the uneven distribution of resources worsened the poverty situation in rural areas. The Philippines is an agricultural country and it has a high labor demand in the agricultural sector [64].

Reference [128] explained that farms need a large number of laborers in order to increase its production. In fact, the workers in agriculture accounted for 25.2 percent of the total employed. The underemployed persons who worked for 40 hours or more in a week in July 2018 made up 52.9 percent and 32.4 percent were in the agriculture sector. Some of the farm laborers who were classified as underemployed are those who work from one farm to another.

The highest overall mean of 3.37 shows that the respondents were influenced to adopt organic farming if there is only minimal labor requirement is *highly extensive*. Also, the influence to the farm workers to adopt organic farming only if there are few workers to be hired is only *moderately extent*, with the highest weighted mean of 3.89. At the average, when the farming method requires only limited manpower, then it will be more favorable since the amount of labor pay would be lower also.

Table 5 Extent of Influence of Labor Demand Techniques in Adopting Organic Farming

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
1.	The labor requirement in my farm is minimal which has influenced me to adopt to organic farming.	3.19	Moderately Extensive	3.89	Highly Extensive	3.37	Highly Extensive
2.	There is a need to employ small number of laborers in my farm which has influenced me to adopt to organic farming.	3.15	Moderately Extensive	2.89	Moderately Extensive	3.09	Moderately Extensive
3.	There is a need to employ a number of laborers in my farm which has influenced me to adopt to organic farming.	3.35	Highly Extensive	2.44	Less Extensive	3.11	Moderately Extensive
4.	There is a need to employ a large number of laborers in my farm which has influenced me to adopt to organic farming.	3.12	Moderately Extensive	2.44	Less Extensive	2.94	Moderately Extensive
	Aggregate Mean	**3.20**	**Moderately Extensive**	**2.92**	**Moderately Extensive**	**3.13**	**Moderately Extensive**

The family members, who engaged in long, arduous and sometimes hazardous work to cut costs and compensate for the farm's low productivity mostly perform the work in the farm. While this keeps the family farm viable in the short run, such working conditions ultimately undermine the wellbeing and productive potential of the family. Most of the farms have their own family members to do the farm works. This is because family members work long hours. Many family members pursue off-farm employment out of distress [63].

Reference [174] disclosed that half of the world's labor force works in agriculture. While 40 percent of the agricultural work forces are in waged employment; the other 60 percent are self-employed as farmers, mainly as small farmers. This means that the small farm owners do not have the capacity to pay a large number of farm workers and instead apply as farm workers to other large farms, which have the financial capacity to pay for a large number of laborers.

The overall aggregate mean of 3.13 indicates that the influence labor demand requirements to the respondents in adopting organic farming is *moderately extensive*. This result is based on the aggregate mean of 3.20 (*moderately extensive*) for the farm owners' responses and aggregate mean of 2.92 (*moderately extensive*) for the farmworkers' answers. It can be inferred that the number of workers required to perform various tasks in organic farming is an

influential factor in deciding whether to employ organic method of farming which does not apply commercial fertilizers and pesticides. The number of workers required also affects the level of production and at the same time can affect the level of prices to the organic produce.

Farm labor market matches farm workers with farm jobs. Farm labor market involves recruitment or getting workers into jobs, remuneration or paying wages to induce workers to perform their jobs and retention. Agriculture handles these labor functions differently by relying on intermediaries such as contractors to assemble crews of workers and move them from farm to farm, using piece-rate wage systems to motivate workers, and having employers cooperate to flood the labor market with immigrant newcomers, rather than developing mechanisms to identify and retain the best workers on any farm [103].

Additionally, the farm workers, the families of farm workers, and the communities where farm workers live will benefit from rising agricultural wages. Rural communities will experience economic growth, as more skilled and better-paid agricultural employees increase their spending and standards of living rise. In theory, the transition of labor away from agriculture can be positive for rural communities in high-income countries. The challenge for the agricultural industry will be to anticipate and adjust to a changing farm labor market [163].

However, Reference [63] discussed that family farms account for almost 90 percent of the world's farms. Most are small-scale operations with low yields and productivity levels, especially in developing countries. As a result, many of the farming families go to organic farming because of the minimal labor requirement.

Reference [160] further said that agricultural labor markets differ from other labor markets in fundamental ways related to seasonality and uncertainty, and they evolve differently than other labor markets as economies develop. A labor requirement is a very important factor to consider. The labor demand is based on the market demand of the produce. It affects the level of the production of the organic produce and also affects the efficiency to follow the farming calendar of the organic crops. As the market demand of the produce increases, the production level must also increase and therefore requires a larger demand of farm workers to meet the production level.

This part presents the information on the organic farming practices employed by the farmers in terms of soil management, weed control techniques, crop diversification, fertilization, irrigation and harvesting.

B. Organic Farming Practices Employed by the Farmers as to Soil Management

This section presents the data on the organic farming practices employed by the farmers in terms of soil management.

Table 6 Level of Organic Farming Practices Employed by the Farmers as to Soil Management

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
	In my farm I practice:						
1.	slashing and burning of the remaining crops to clear the land.	2.00	Less Practiced	2.44	Less Practiced	2.11	Less Practiced
2.	bush fallow wherein the land is cultivated for years and later leave it for some years to restore its fertility of the soil.	3.00	Moderately Practiced	2.67	Moderately Practiced	2.91	Moderately Practiced
3.	soil fertility technology by using green manure to fix nitrogen from the air through plant uptake.	3.23	Moderately Practiced	3.44	Highly Practiced	3.29	Highly Practiced
4.	soil conservation technology by reducing soil erosion such as terraces, tillage practices, and crop sequences.	3.27	Highly Practiced	3.56	Highly Practiced	3.34	Highly Practiced
	Aggregate Mean	**2.88**	**Moderately Practiced**	**3.03**	**Moderately Practiced**	**2.91**	**Moderately Practiced**

The highest overall mean of 3.43 shows that the respondents *highly practiced* soil conservation technology by reducing soil erosion such as terraces, tillage practices and crop sequences. This result is based from the highest weighted mean of 3.27 (*highly practiced*) for the farm owners' responses and another highest weighted mean of 3.56 (*highly practiced*) for the farm workers answers. This means that at all times the farmers applied efficient farming mechanism that minimizes wearing down of soil from highland to the lowest point of the slope since it will also erode the nutrient contents of the soil. If that happens the growth of the plants will also be affected.

Effective control of soil erosion by water consists of minimizing the impact of raindrops and the velocity of running water on the soil surface. This task includes enhancing infiltrability and surface storage, improving soil structure, protecting the topsoil by a cover crop or a mulch of organic residues to prevent raindrops from striking the bare surface, minimizing cultivation and performing it on the contour rather than up and down the slope. It also entails avoiding both compaction and excessive soil pulverization. An ancient and still common practice of soil conservation is the shaping of sloping land by means of terraces or contour strips to reduce the inclination of the surface and the length of slope segment, thereby checking the downhill acceleration of running water [76].

This result relates to the study of Reference [48] in which soil conversion technology is commonly used. However, approaches to soil conservation are in constant evolution and improvement. There are modern approaches, ranging from no-till to conservation agriculture to sustainable land management. These approaches are not separate, but components of a continuum of conservation approaches applicable at different levels and different scales. Recognition of the different levels of soil conservation does not imply promotion of a specific technology but rather a process of application and adoption. Local farmer knowledge, innovative farmers, research backstopping and farmer associations are all necessary elements in adoption of the principles.

The lowest overall mean of 2.11 indicates that the respondents *less practiced* the slashing and burning of the remaining crops in the land. This result is based from the lowest weighted mean of 2.00 (*less practiced*) for the farm owners' responses and another lowest weighted mean of 2.44 (*less practiced*) for the farmworkers' answers. This denotes that they avoid the ripping and burning strategy of the plants after harvesting to prepare the land for another cropping cycle since it has environmental impact especially putting the farm on fire even though it is the fastest way to clear the farm and less costly as well.

Slash and burn agriculture is a traditional method of tending domesticated crops that involves the rotation of several plots of land in a planting cycle. Slash and burn agriculture works best in low-intensity farming situations when the farmer has plenty of land that he or she can afford to let lay fallow. It works best when crops are rotated to assist in restoring the nutrients. Since the 1970s or so, slash and burn agriculture has been described as both a bad and good practice, resulting in the progressive destruction of natural forests, and an excellent practice, as a refined method of forest preservation and guardianship [77].

The slash-and-burn method in farming will make the land fertile for a couple of years before the nutrients are used up. After using this method, the farmers must abandon the land, now degraded, and move to a new plot. There are many problems that result from this method of growing crops, including deforestation, which is a direct consequence of cutting down forests for crop land, loss of habitat and species, an increase in air pollution and the release of carbon into the atmosphere that contributes to global climate change as well as an increase in accidental fires. Slash and burn agriculture also result in significant soil erosion and accompanying landslides, water contamination, and/or dust clouds, as without trees and vegetation and their root systems, soil washes away during heavy rains and blows away during droughts. Today, with more people than ever trying to survive in the midst of dwindling natural resources, its impact is particularly destructive and unsustainable.

Further, Reference [120] added that that slash and burn is not a good practice and farmers must do well to avoid it. Burning vegetation residues after slashing exposes the soil surface to direct contact with rain. Exposed soil surface erode easily with rainfall impact leaving gullies on the field. Erosion takes away the fertile topsoil of the field. After burning the land severally, it takes between 10 to 25 years and sometimes even 40 years to regain its fertility. The practice of leaving the land fallow for that long is more difficult with the growing population and increasing demand for food. Burning becomes an additional activity in farming and therefore comes with a cost. When farmers do not burn, they reduce total cost of production and they save time too. Uncontrolled burning on farms can also cause of bushfires spreading to destroy vast areas of forests, plantations and other properties.

The overall aggregate mean of 2.91 specifies that the respondents *moderately practiced* soil management in their organic farming. This data comes from the aggregate mean of 2.88 (*moderately practiced*) for the answers of the farm owners and another aggregate mean of 3.03 (*moderately practiced*) for the answers of the farm workers. This means that in many instances they practiced the application of operations and treatments to protect the soil in many instances only. This was mostly undertaken by the farmers to enhance its performance and retain the fertility of the soil or known as soil conservation techniques.

Reference [85] said that soil management in farming starts with a farmer's ability to vary the depth of tillage according to soil conditions and is important in proper seedbed preparation, control of weeds, and fuel consumption, with the potential to lower production costs within an individual field. With conservation and reduced tillage, the amount of soil disturbance is minimal, but adjustments according to soil conditions such as texture, moisture content, and pH are important to seed depth and fertilizer placement. The adjustments may contribute to higher yields and safer production at lower cost.
The study of Reference [173] reveals that soil management is important, both directly and indirectly, to crop productivity, environmental sustainability, and human health. Because of the projected increase in world population and the consequent necessity for the intensification of food production, the management of soils will become increasingly important in the coming years. The soil sustains most living organisms, being the ultimate source of their mineral nutrients. Good management of soils ensures that mineral elements do not become deficient or toxic to plants, and that appropriate mineral elements enter the food chain.

Soil conservation practices are tools the farmer can use to prevent soil degradation and build organic matter. These practices include crop rotation, reduced tillage, mulching, and cover cropping and cross-slope farming. It enables farmers to increase soil organic matter content, soil structure and rooting depth. This is accomplished by growing secondary crops, which enhance soil health. It also includes cross slope farming. Cross slope farming is the most effective method to control large volumes of runoff that flow over a long field. Other soil conservation practices can be effectively integrated with cross slope farming [50].

Good management of soils ensures that mineral elements to become deficient or toxic to plants. This is appropriate for mineral elements enter the food chain. Soil management is important in order to reduce the loss of topsoil, either through mineral imbalance or erosion and is the single largest threat to agricultural productivity. Soil erosions by wind and water are the main processes by which topsoil is lost. Soils with high soil surface roughness, such as those produced with conservation tillage, are less susceptible to erosion. It is suggested that these soil properties might be used to predict the susceptibility of a soil to erosion by wind or water [173].

Further, soil management practices increase the amount of water available to crops, while others will degrade soil and decrease available soil water. Good soil structure improves water infiltration and decreases runoff and erosion. Well-structured soils are porous and allow water to enter easily, rather than running off to be lost to streams and rivers. Soil organic matter plays a vital role in soil quality and soil water availability. Organic material applied to soil and maintained on the surface protects the soil from the impact of raindrops, a major erosive force. Surface residue and mulches also reduce evaporation and smother weeds, leaving more water for plant use. Studies show that as organic matter increases, soils develop more macropores. That happens because, as plant residue and other organic amendments decompose, sticky substances bind soil particles and create pore spaces between them. Moreover, organic matter itself can hold water [158].

This section presents the data on the organic farming practices employed by the farmers in terms of weed control techniques.

Table 7 Level of Organic Farming Practices Employed by the Farmers as to Weed Control Techniques

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
	In my farm I practice:						
1.	cultural weed control that involves maintaining the field conditions so that weeds are less likely to increase in number.	3.50	Highly Practiced	3.44	Highly Practiced	3.49	Highly Practiced
2.	mechanical weed control which involves the use of farm equipment /machine to control weeds.	3.08	Moderately Practiced	2.89	Moderately Practiced	3.03	Moderately Practiced
3.	biological weed control which involves the use of natural enemies of weed plants to control the germination of weed seeds or the spread of established plants.	2.31	Less Practiced	1.89	Less Practiced	2.20	Less Practiced
4.	preventive weed control which uses any control method that aims to prevent weeds from being established in a cultivated crop.	2.92	Moderately Practiced	3.33	Highly Practiced	3.03	Moderately Practiced
	Aggregate Mean	**2.95**	**Moderately Practiced**	**2.89**	**Moderately Practiced**	**2.94**	**Moderately Practiced**

The highest overall mean of 3.49 points that the respondents *highly practiced* cultural weed control that involves maintaining the field conditions so that weeds are less likely to increase in number. This result is based on the highest weighted mean of 3.50 (*highly practiced*) for the farm owners' responses and another highest weighted mean of 3.44 (*highly practiced*) for the farm workers' answers. This means that in all cases they ensured that the growth of the weeds in the field is controllable so that they will not affect the growth of the crops. If they failed to do so the weeds will compete against the crops in the usage of the soil nutrients so instead of growing of bearing more fruits or growing healthy the result will be otherwise [177] .

Cultural weed control includes non-chemical crop management practices ranging from variety selection to land preparation to harvest and post-harvest processing. Cultural weed control is a part of integrated weed management, which involves the integrated use of cultural, manual, and/or mechanical control methods. Weeds need to be controlled from planting until the crop canopy closes. Water is the best control for weeds. Many weeds cannot germinate or grow under flooded conditions [136].

Cultural control practices are simple modifications of the pests' environment or habitat. It frequently involves variations of standard horticultural, silvicultural, or animal husbandry practices. Simplicity and low cost are the primary advantages of cultural control tactics. Crop rotation is a common and widely used cultural weed control technique. Growing a single crop year after year in the same field gives pest populations sufficient time to become established and build up to damaging levels. Rotating the field to a different type of crop can break this cycle by starving pests that cannot adapt to a different host plant. It is effective because they increase the diversity of a pest's environment and create discontinuity in its food supply. As a rule, rotations are most likely to be practical and effective when they are used against pests [107].

Ccultural weed control is a long-term effective weed management strategy that is based on the practical application of the ecological concept of maximum diversification of disturbance. This results in a continuous disruption of weed ecological niches and hence in a minimized risk of weed flora evolution towards the presence of a limited number of highly competitive species. Beside this, a highly diversified cropping system also reduces risk of the development of herbicide-resistant weed populations. Cultural methods include crop sowing time and spatial arrangement, crop genotype choice, cover crops, intercropping and crop fertilization [17].

On the other hand, the lowest overall mean of 2.20 reveals that the respondents *less practiced* biological weed control which involves the use of natural enemies of weed plants to control the germination of weed seeds or the spread of established plants. This result is based on the lowest weighted mean of 2.31 (*less practiced*) for the farm owners' responses and another lowest weighted mean of 1.89 (*less practiced*) for the farm workers' answers. This means of eradicating and controlling the growth of unwanted plants in the farm is technical and complicated and it required more knowledge on the part of the farmers. So, there were only few who have the capability to apply this method of weed control. Aside from the technical complexity this is also an expensive method since there is a need to develop predators to eat the weeds.

Biological weed control is an alternative of using the broad-spectrum pesticides that kill off the beneficial insects as well as the pest organisms. It is an environmentally friendly method & it does not introduce the pollutants into the environment. On the other side, it takes a lot of time & patience for the biological agents to work their magic on the pest population, whereas the other methods like the pesticides work offer immediate results. The biological control is unpredictable. Its unpredictability lies mostly in the fact that the natural enemies are dependent on the environmental conditions [153]

Biological weed control can be fickled. Ultimately, it cannot control whatever natural enemy is set loose in an ecosystem. While it is supposed to manage one pest, there is always the possibility that the predator will switch to a different target. It might eating the crops instead of the insects infesting them. It takes a lot of time and patience for the biological agents to work their magic on a pest population, whereas other methods like pesticides provide immediate results [164].

The process of setting up the biological control system is a costly endeavor. A lot of planning money goes into developing the successful system. The predator being introduced may not eat the pest and instead eat useful species. The predators' population may increase and get out of control. The predator may not stay in the area

where it is needed. It lacks the immediacy of chemical control. It is difficult and sometimes expensive to develop biological control in field because it requires high qualified scientific staff [153].

The overall aggregate mean of 2.94 shows that the respondents *moderately practiced* weed control techniques in their organic farm. This data is based on the aggregate mean of 2.95 (*moderately practiced*) for the farm owners' responses and another aggregate mean of 3.44 (*moderately practiced*) for the farm workers' answers. This result indicates that the farm owners and workers the farm applied varying method of controlling the weeds at the farm in many instances so that the nutrients of the soil will not be consumed by these unwanted plants even if this entails additional farming costs. Although, the farm owner would natural choose the least costly method of weed control mechanisms.

Weed control includes many techniques used to limit weed infestations and minimize competition. These techniques attempt to achieve a balance between cost of control and crop yield loss, but weed control is used only after the problem exists and it is not prevention. Weed control techniques have been adopted widely because control is the easiest thing to do and is usually effective. Control techniques can be selected to meet short-term economic and agricultural planning goals. It also includes non-chemical weed control techniques as well as the role of minimum and no-tillage in weed management [181].

Weed control is important in successful farm production. Early weed control is especially critical. Cultivation is an effective control method for weeds in the farm, especially young plants. Weed control is usually performed by cultivating in between the rows [109].

Weeds and crops compete for the same resources, light, water, and nutrients, but this is only part of the story. Plants have the ability to detect if another plant is growing nearby. They do this by detecting the light that gets reflected off nearby plants, which is of a different wavelength than light reflected off bare soil. Once weeds are detected, a crop may devote more resources into becoming more competitive, such as by growing taller and less energy into producing seed. This change can happen early in the season, even before weeds and crop are competing for resources such as water or nutrients. Weeds are unsightly, they can interfere with harvest, they can carry crop pathogens or host damaging insects, and most importantly they rob a crop of its yield potential [96].
Reference [126] said that weed control in crop production involves higher costs than disease and insect pest control because weeds are relatively constant problem and insect and disease break out sporadically. Despite billion dollars spent on weed management, weeds cause significant losses (13.2%) in terms of reduced crop yield potential. Weed control technology plays an important role in managing weeds under different agrosystems, particularly in organic agriculture.

Further, weed control during time periods between crop growing seasons and weed control within the growing season are critical to retaining water for the cropping system. Tillage and herbicidal weed control are two extremes of a spectrum. Both can be effective in controlling weeds and preventing water use by weeds. They differ greatly, however, in terms of their effect on water evaporation from the soil surface. Herbicidal weed control minimizes water evaporation, while tillage maximizes evaporative losses since all tillage events expose moist soil to the atmosphere, while herbicides kill weeds with no soil disturbance. Thus, water retention is maximized if the soil is not stirred in most environments. Residue cover also reduces water evaporation rates because it reflects and absorbs heat energy, preventing it from warming the soil beneath [127].

This section presents the data pertaining to organic farming practices employed by the farmers in terms of crop diversification.

Table 8 Level of Organic Farming Practices Employed by the Farmers as to Crop Diversification

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
	In my farm I practice:						
1.	multi-cropping where two or more species are grown on the same piece/parcel of land and at least part of the growth cycles of different species overlap.	3.31	Highly Practiced	3.22	Moderately Practiced	3.29	Highly Practiced
2.	intercropping where two or more annual crops are grown simultaneously on a piece of land within a single growing season.	2.92	Moderately Practiced	2.67	Moderately Practiced	2.86	Moderately Practiced
3.	Mixed intercrop which involves planting of more than two crops which are randomly arranged.	2.19	Less Practiced	2.22	Less Practiced	2.20	Less Practiced
4.	row intercrop that involves growing intercrops in structured arrangements of different species arranged in alternating blocks in narrow rows.	3.42	Highly Practiced	3.33	Highly Practiced	3.40	Highly Practiced
	Aggregate Mean	**2.96**	**Moderately Practiced**	**2.86**	**Moderately Practiced**	**2.94**	**Moderately Practiced**

The highest overall mean of 3.40 indicates that the respondents *highly practiced* row intercrop that involves growing different types of plants or different species in structured arrangements in alternating blocks in narrow rows. This data is based on the highest weighted mean of 3.42 (*highly practiced*) for the farm owners' responses and another highest weighted mean of 3.33 (*highly practiced*) for the farm workers' answers. This result reveals that in all instances the respondents grow two or more types of crops in the same field simultaneously with one or more of the crops grown in a distinct row arrangement so that there will be variety of produce that will be offered to the market. So the viability of the farming business is high also.

Row intercrop is a strategy where intercrops grown in structured arrangements of different species arranged in alternating blocks of narrow rows. Intercrops blocked rows of each species that are grown separately and used as a strategy in strip intercrop. Farmers highly practiced this strategy utilize the level of the production [14].

In farms, growing perennial crops, annual crops like corn, rice and pineapple are commonly grown as intercrop between the rows of the main crop. It is the growing of two or more crops at the same time with at least one crop planted in rows. This strategy is an efficient way of maximizing the use of farmland by utilizing vacant spaces while at the same time suppressing the growth of weeds during the juvenile stage of the main crop [169.

On the other hand, the lowest overall mean of 2.20 reveals that the respondents *less practiced* mixed intercrop which involves planting of more than two crops, which are randomly arranged. This data is based on the lowest weighted mean of 2.19 (*less practiced*) for the farm owners' responses and another lowest weighted mean of 2.22 (*less practiced*) for the farm workers' answers. This means that they rarely grow two or more crops in proximity and simultaneously on the same field. Although, the most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources or ecological processes that would otherwise not be utilized by a single but this is a complicated technological process that entail more knowledge on the side of the farmers.

Mixed cropping technique is practiced to decrease the risk of total crop failure due to adverse climatic conditions or less rainfall. One crop may be the main crop and rest may be the subsidiaries. In general, it is believed that planting multiple crops simultaneously helps save space as different crops in the same field usually ripen at different seasons. Furthermore, this technique also helps restore soil fertility as the remains of one plant aid the growth of another plant which helps increase the overall yield [82].

The overall aggregate mean of 2.94 shows that the respondents *moderately practiced* crop diversification techniques in their organic farm. This data is based on the aggregate mean of 2.96 (*moderately practiced*) for the farm owners' responses and another aggregate mean of 2.86 (*moderately practiced*) for the farm workers' answers. This indicates that in many cases they vary the types of plants or crops that they plant in their farm so that they will be able to cater to the variation of the demands of the market or consumers. This is their common way of differentiating the crops in a given area so as to expand production related activities on various crops. Also this is a way to bring down the possible risks in the market volatility.

Crop diversification provides the farmers with a wider choice in the production of a variety of crops in a given area so as to expand production related activities on various crops and also to bring down the possible risk. Crop diversification and growing of large number of crops are practiced in dry-land areas to reduce the risk factor of crop failures due to recurring droughts. Crop substitution and crop shift are also taking place in the areas suffering with some specific soil related problems. Crop diversification can be used as a strategy for addressing food and

nutritional security. The diversification of horticultural crops especially fruits and vegetables have been very important in ensuring nutrition security and played a pivotal role in poverty reduction [6].
Mixed cropping is a type of agriculture that involves planting two or more plants simultaneously in the same field, interdigitating the crop like interlocking the finger so that they grow together. Mixed cropping is best suited for small-scale farming where harvesting is done by hand. The process has been successfully employed to improve income and food production for small farmers and lessen the likelihood of total crop failure because even if one crop fails, others in the field might still produce. The close monitoring of the different crops is the challenge. Weed control techniques must be employed since there is more than type of crops grown.

As a strategy, crop diversification maximizes the use of land and optimizes farm productivity and incomes. With growing population, urbanization and industrialization, the area devoted to crop production has been declining. As a result, new strategies were formulated and crop diversification is one of these. The adoption of crop diversification schemes is dictated by both physical and economic factors. Physical factors include land capability, rainfall patterns, water quality, crop suitability and technology. Economic factors, on the other hand, include costs, prices, markets and economic viability of alternative cropping schemes [54].

Different planting patterns affect the light interception of intercrops under intercropping conditions. Planting pattern in intercropping systems changed the microclimate, especially the light conditions of intercrops. The adjacent growing of crops always causes mutual shading among individual intercropped plants. Therefore, by selecting the appropriate genotypes and planting pattern it can increase crop yield and quality under prevailing conditions. In intercropping system, the planting system, row arrangement and spacing and crop architecture can reduce the negative effects of taller crop shade on the middle strata leaves within the rows and between the rows. It is important to investigate the effects of different planting patterns on light interception and distribution in the plants under row intercropping system [55].

According to Reference [152] mixed intercrop is a farming that involves planting two or more crops. Mixed intercrop requires more resources, such as tools and equipment, to care for livestock and crops simultaneously, than would a farmer engaged in just one such line of business. A proper training is required to provide the background necessary to enable a farmer to maintain a mixed farm.

Reference [110] said that crop diversification has been increasingly recognized as a priority for agricultural development programming policies. For farm households with few resources, crop diversification is likely to be an important strategy for managing production and price risk. It also serves as an important climate risk management strategy. The economic returns to crop diversification tend to be highest for the poorest farmers. It has a significant effect on long-term child nutritional status, in particular for very young children and children living in households with limited market access.

Recognition that climate change could have negative consequences for agricultural production has generated a desire to build resilience into agricultural systems. Crop diversification can improve resilience in a variety of ways through engendering a greater ability to suppress pest outbreaks and dampen pathogen transmission, which may worsen under future climate scenarios, as well as by buffering crop production from the effects of greater climate variability and extreme events. Such benefits point toward the obvious value of adopting crop diversification to improve resilience, yet adoption has been slow [78]. Economic incentives encouraging production of a select few crops, the push for biotechnology strategies and the belief that monocultures are more productive than diversified systems have been hindrances in promoting this strategy. However, crop diversification can be implemented in a variety of forms and at a variety of scales, allowing farmers to choose a strategy that both increases resilience and provides economic benefits [97].

This section presents the data pertaining to the organic farming practices employed by the farmers in terms of fertilization.

Table 9 Level of Organic Farming Practices Employed by the Farmers as to Fertilization

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
	In my farm I practice:						
1.	fertilization strategy with the use of meat and bone meal-by products (tankage) which is the solid by-product of animal waste rendering.	2.54	Moderately Practiced	2.78	Moderately Practiced	2.60	Moderately Practiced
2.	fertilization strategy is the use of livestock manure.	3.39	Highly Practiced	3.56	Highly Practiced	3.43	Highly Practiced
3.	fertilization strategy is the use of plant-based fertilizers.	3.12	Moderately Practiced	2.89	Moderately Practiced	3.06	Moderately Practiced
4.	fertilization strategy is the use of ready-made organic fertilizers that can be bought in the market.	2.92	Moderately Practiced	3.33	Highly Practiced	3.03	Moderately Practiced
	Aggregate Mean	**2.99**	**Moderately Practiced**	**3.14**	**Moderately Practiced**	**3.03**	**Moderately Practiced**

The highest overall mean of 3.43 indicates that the respondents *highly practiced* fertilization strategy in terms of applying livestock manure. This data is based on the highest weighted mean of 3.39 (*highly practiced*) for the farm owners' responses and another highest weighted mean of 3.56 (*highly practiced*) for the farm workers' answers. This means that at all times the livestock manure is used in fertilizing the crops that are planted in the farm since in organic farming, commercial and chemical-based fertilizers is not applied due to the toxic effects to human health. This type of fertilizer is also non-expensive since in livestock production, the manure is just a by-product and considered as waste. In the sense, using the animal wastes is an efficient alternative way of disposal.

Animal manure is widely used as fertilizer to improve the fertility of cropland. Land application of animal manure is a common practice in the world and tends to increase water-soluble level in top soils. It is necessary to study the potential migration pathways of the agricultural soil amended by animal manure to groundwater and surface water. There is still limited knowledge and requires further exploration in the effects of application timing and methods of animal manure on the release and transport of nutrients in the soil [66].

Animal manure is considered an agricultural commodity that can be utilized as a fertilizer source for pastureland, cropland and hay production. Manure is recognized as an excellent source of the plant nutrients nitrogen, phosphorus and potassium. In addition, manure returns organic matter and other nutrients such as calcium, magnesium and sulfur to the soil, building soil fertility and quality. Any financial valuation of manure would be dependent on the market value of nitrogen, phosphorus, potassium, and other plant nutrients that the manure is replacing, organic matter as a soil amendment, and the nutrient needs of the crops and fields receiving the litter.

Animal manures are important source of agricultural nutrients, including N, and contribute to soil N_2O emissions. On a global basis, about 38% of N is applied as animal manures. Animal manures are often thought to increase soil N_2O emissions compared to N fertilizers since they provide a substantial amount of C, which stimulates soil heterotrophic activity, thereby depleting soil oxygen levels and augmenting denitrification denitrification. The expected impact of manure on N_2O production, however, may be mitigated because the amount of N_2O released as a proportion of denitrification end products decreases with increasing C:NO_3 ratio [26] .
Further, animal manure is an excellent source of nutrients to support the growth of agricultural crops, but it may also carry a variety of human pathogens of great public health concern. With the increasing production of food-producing animals, how to recycle those nutrients in enormous amount of animal wastes safely while preventing adverse impacts on the environment is very challenging. The direct application of raw manure to agricultural fields has been recognized as one of potential contamination sources of food supply, particularly fresh produce, at the pre-harvest stage. To address the microbial safety concerns of animal wastes, well-composted animal manures are recommended over the use of raw manure for agricultural applications. Although the composting process has been approved as an effective way for pathogen inactivation, there are many conditions that may be conducible for a few pathogenic cells to survive the process. In consideration of the heterogeneous nature of the composting process, the various physiological stages of the microorganisms, and many variables occurring during the process, parameters critical to the composting process need to be optimized to enhance pathogen inactivation throughout the composting piles, and the composting process should be validated under the worst scenario [84].

The lowest overall mean of 2.60 reveals that the respondents *moderately practiced* fertilization strategy with the use of meat and bone meal-by products (tankage), which is the solid by-product of animal waste rendering. This data is based on the lowest weighted mean of 2.54 (*moderately practiced*) for the farm owners' responses

and another lowest weighted mean of 2.78 (*moderately practiced*) for the farm workers' answers. This means that in many cases only they applied animal protein as fertilizer since it is environmentally sustainable yet is more technical and expensive compared to the usage of animal wastes.

Meat and bone meal is the rendered product from mammalian tissues, including bone but exclusive of blood, hair, hoofhorn, hide trimmings, manure and stomach and rumen contents. It must contain a minimum of 4% phosphorus with a calcium level not exceeding 2.2 times the actual phosphorus level. Small-scale farmers seldom use these products as fertilizers because of the preparation and the extent of knowledge needed in the preparation of this kind of fertilizers [18].

Meat and bone meal fertilizers are both produced by rendering the inedible or unsold by-products from slaughterhouse operations. Most the raw materials present are from cattle, swine and poultry. These types of fertilizer have been thoroughly characterized including the proximate composition, gross energy, and amino acid profiles, which are more useful for designing non-feed applications [168].

In the study of Reference [83] it explained that meat and bone meal contains appreciable amounts of nitrogen, phosphorus and calcium, making it interesting as fertilizer to various crops. This has been widely used as valuable protein and mineral source in farm production. Mixing meat and bone meal in soil has been found to increase the quality of the produce due to the decreased population of parasites.

The overall aggregate mean of 3.03 reveals that the respondents *moderately practiced* fertilization in their organic farming activity. This data is based on the aggregate mean of 2.99 (*moderately practiced*) for the farm owners' responses and another aggregate mean of 3.14 (*moderately practiced*) for the farm workers' answers. This means that in many cases the respondents applied fertilizers to increase the nutrients in the soil of their farmland. Subsequently, fertilizers are required to increase the amount of yield as well enhance the quality of the produce. There were various types of natural fertilizers that were applied such as meat and bone, plant manure, other ready-made fertilizer but the most viable was the application of animal manure due to abundance and it is less complicated to apply especially in the rural farming environment.

Plants need to be fertilized because most soil does not provide the essential nutrients required for optimum growth. Well-fed plants are healthier, more productive and more beautiful. By fertilizing the farm, the nutrients lost will be replenish and ensure that this year's plants have the food they need to flourish. Plants need calcium, magnesium, and sulfur. Calcium is used by plants in cell membranes, at their growing points and to neutralize toxic materials. In addition, calcium improves soil structure and helps bind organic and inorganic particles together. Magnesium is the only metallic component of chlorophyll. Without it, plants cannot process sunlight [94].

Understanding the nutrient variability and release pattern of organic fertilizers is crucial to supply plants with sufficient nutrients to achieve optimum productivity, while also rebuilding soil fertility and ensuring protection of environmental and natural resources. Soils rarely have sufficient nutrient for crops to reach their potential yield. Applying organic fertilizers without prior knowledge of their properties may cause yield decline under low application or pollute the environment with excessive application [5].

Organic fertilizers are made from naturally occurring mineral deposits and organic material, such as bone or plant meal or composted manure. Organic fertilizers are best applied in the fall so the nutrients will be available in the spring. These organic fertilizers stimulate beneficial soil microorganisms and improve the structure of the soil. Soil microbes play an important role in converting organic fertilizers into soluble nutrients that can be absorbed by the plants. In most cases, organic fertilizers and compost will provide all the secondary and micronutrients the plants need [94].

The proper use and application of fertilization techniques in farming is very important. Soil that is rich in nutrients is fertile. The expectation of growing plants as food for livestock must include the reality that plants will take nutrients out of the soil. Replacing nutrients is the basic goal of fertilization and supplement the existing soil with additional and needed nutrients. Fertilizing wisely increases yield, quality and profits [75]. Fertilization is an important issue because it is needed in order to produce enough food for the increasing population from the decreasing cultivated land, but too much or inappropriate use can be detrimental to the environment [123].

This section presents the data relating to the organic farming practices employed by the farmers in terms of irrigation.

The highest overall mean of 3.06 denotes that the respondents *moderately practiced* scheduling of irrigation based on evapo-transpiration by evaporating water from leaves and from the soil. This data is based on the highest weighted mean of 2.92 (*moderately practiced*) representing the farm owners' responses and another highest

weighted mean of 3.44 (*highly practiced*) for the farm workers' answers. Based on this data there was a difference between the responses of the two groups of respondents in which the farm owners applied this method at all times but the workers applied in many times. This means that at all times the livestock manure is used in fertilizing the crops that are planted in the farm since in organic farming commercial and chemical-based fertilizers should not be used due to the toxic effects to human health. This of fertilizer is also non-expensive since in livestock production manure is just a by-product. Generally, this method of irrigation that is the combination of evaporation and transpiration from the Earth's land and ocean surface to the atmosphere is natural but there are only few who can knowledge on this. Aside from that, this source of water for the crops depends on the weather conditions of the area.

Table 10Level of Organic Farming Practices Employed by the Farmers as to Irrigation

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
	In my farm I practice:						
1.	scheduling of irrigation based on evapo-transpiration by evaporating water from leaves and from the soil.	2.92	Moderately Practiced	3.44	Highly Practiced	3.06	Moderately Practiced
2.	scheduling of irrigations based on soil-water content and soil water tension by using soil moisture equipment to measure how much moisture is in the soil is practiced.	2.89	Moderately Practiced	2.89	Moderately Practiced	2.89	Moderately Practiced
3.	deficit irrigation by applying less water than the crop needs for full development of the plant.	2.50	Moderately Practiced	2.00	Less Practiced	2.37	Less Practiced
4.	maintaining an updating sprinkler and drip irrigation system.	2.65	Moderately Practiced	3.22	Moderately Practiced	2.80	Moderately Practiced
	Aggregate Mean	**2.74**	**Moderately Practiced**	**2.89**	**Moderately Practiced**	**2.78**	**Moderately Practiced**

Evapo-transpiration-based irrigation scheduling combine the effects of soil evaporation and plant transpiration rates and water lost from the root zone due to ET is replenished to meet plant water requirements. Plant water requirements are determined by balancing water inputs and outputs from the root zone. The main water inputs to the root zone are effective rainfall, net irrigation, and a capillary contribution – the water contributed from the shallow groundwater table. A change in soil water storage in the root zone at a given time is due to water use by the crop and water loss due to deep percolation. All inputs and outputs are in units of depth per time. It can lead to an optimum irrigation water use based on a simple water balance concept. Different types of evapo-transpiration controllers are available and selection depends on site characteristics and desired irrigation needs [93].

Evapo-transpiration is a term used to describe the water consumed by plants over a period of time. Evapo-transpiration is the water loss occurring from the processes of evaporation and transpiration. Evaporation occurs when water changes to vapor on either soil or plant surfaces. Transpiration refers to the water lost through the leaves of plants. The most important factors needed to estimate evapo-transpiration are the local weather conditions and the cropping system for which estimates are needed. For irrigated crops and landscapes that provide complete ground cover for most of the growing season, the majority of the seasonal evapo-transpiration is from transpiration. Transpiration losses are usually high and are directly linked to plant growth and productivity. This is because the pathway for transpiration in plants is the same one that allows for plant intake of carbon dioxide [33].

The evapo-transpiration method is an excellent way to determine how much water to apply based on estimates of the amount of water lost from the vineyard. Evapo-transpiration is the sum of water loss from evaporation from the soil surface and a plant's loss of water through transpiration – a water vapor moving out of leaf stomata [74].

Reference [116] exposed that evapo-transpiration is an important process in the water cycle because it is responsible for 15% of the atmosphere's water vapor. Without that input of water vapor, clouds could not form and precipitation would never fall. Evapo-transpiration is the combined name for the processes of evaporation and transpiration. When water vapor is released into the atmosphere both processes are involved, so they have been combined into one word to cover all bases. Transpiration happens when plants release water vapor from tiny holes, called stomata, in their leaves. This is caused in part by the chemical and biological changes that occur

as the plant undergoes photosynthesis and converts carbon dioxide into oxygen. Transpiration performs the same function as a human sweating because plants do it to cool down their leaves.

The lowest overall mean of 2.37 reveals that the respondents *moderately practiced* deficit irrigation through the application of less water than the crop needs for full development of the plant. This data is based on the lowest weighted mean of 2.50 (*moderately practiced*) for the farm owners' responses and another lowest weighted mean of 2.00 (*less practiced*) for the farm workers' answers. In this context, both groups of respondents had dissenting answer on the application of deficit irrigation in which the farm owner applied in many instances while the farm workers only applied in few cases. The difference in their answers was attributed to the occurrence of intense El Niño in which this optimization strategy in of irrigating the farm is applied during drought-sensitive growth stages of a crop and outside these periods, irrigation would be unnecessary if rainfall provides minimum water supply to the field.

Insufficient water supply for irrigation will be the norm rather than the exception. Irrigation management will shift from emphasizing production per unit area towards maximizing the production per unit of water consumed. To cope with this, deficit irrigation is an option. While deficit irrigation is widely practiced over millions of hectares for a number of reasons from inadequate network design to excessive irrigation expansion relative to catchments supplies, it needs to be studied because it affects the growth of the plant. The use of deficit irrigation with a little or knowledge about this strategy will result to the decrease of the production of the organic produce.

More than 70% of fresh water is used in agriculture in many parts of the world, but competition for domestic and industrial water use is intense. For future global food security, water use in agriculture must become sustainable. Agricultural water-use efficiency and water productivity can be improved at different points to the regional scale. This arises to the use of deficit irrigation. The use of this strategy is the last option used by most of the farmers. This is used when there is drought but when water supply is enough, this strategy is not used [47].

Decreasing water use through deficit irrigation also decreases the economic water productivity. Limited water deficits for maize are likely to be viable when the irrigation performance is improved if water prices do not increase much, and the commodity price does not return to former low levels. Other crops do not appear to be a viable solution to replace maize when water restrictions are high; however it becomes an attractive crop if recently high commodity prices are maintained. With improved irrigation performance, wheat deficit irrigation is viable including when full water costs are applied, if former low prices are not returned to. However, under drought conditions full water costs are excessive [140].

Deficit irrigation strategies become popular in the areas where water supply is limited under erratic climatic situations. These strategies offer great opportunities for saving water without compromising production. Several researchers have reported water savings from 43% to 65% under deficit irrigation strategy with a small reduction in yield, but with higher quality of produce. Deficit irrigation is commonly used by some of the farmers because of water supply scarcity [9].

The overall aggregate mean of 2.78 reveals that the respondents *moderately practiced* irrigation in their organic farming activity. This data is based on the aggregate mean of 2.74 (*moderately practiced*) for the farm owners' responses and another aggregate mean of 2.89 (*moderately practiced*) for the farm workers' answers. This denotes that the respondents in many instances applied water irrigation strategies in their organic farming activity since it depends on the availability of water in the area and the amount of rainfall during the specific period of the farming cycle.

Irrigation practices contributes to the increase of agricultural productivity. Increased supplies of irrigation water have been instrumental in feeding the populations of developing countries in the last 50 years, increased food security and improved living standards in many parts of the world [146]. With a rapidly growing world population and a limited food supply, fifty years ago it was common to hear concerns of food shortages and mass starvation [53].

Effective irrigation will influence the entire growth process from seedbed preparation, germination, root growth, nutrient utilization, plant growth and re-growth, yield and quality. Deciding which irrigation systems is best for your operation requires knowledge of equipment, system design, plant species, growth stage, root structure, soil

composition and land formation. Irrigation systems should encourage plant growth while minimizing salt imbalances, leaf burns, soil erosion and water loss. Losses of water will occur due to evaporation, wind drift, run-off and water and nutrients sinking deep below the root zone. Proper irrigation management takes careful consideration and vigilant observation [170].

Supplying water to forage production must carefully consider several factors to be worthwhile. Each forage species has specific qualities and each will respond differently to irrigation and other modifications. The costs of irrigation must be weighed against the potential gain in yield or improved quality. Around 618 million acres (250 million hectares) are irrigated around the world. This land is only a portion of all cultivated land but very significant. Most of the irrigation occurs in a handful of countries because it is expensive but is increasing as a whole[122].

Further, increased in agricultural production and productivity depends, to a large extent, on the availability of water. Irrigation provides water supply especially in period when rain is insufficient. Insufficient, uncertain and irregular rain causes uncertainty in agriculture. The period of rain is restricted to only four months in a year, June to September, when monsoon arrives. The remaining eight months are dry. There is some rainfall during the months of December and January in some parts of the country. Irrigation confers indirect benefits through increased agricultural production. Employment potential of irrigated lands, increased production, helps in developing allied activities; means of water transport etc. are improved income of government from agriculture. Availability of regular water supply will increase the income of farmers imparting a sense of security and stability in agriculture [147].

This section presents the data on the organic farming practices employed by the farmers in terms of harvesting.

Table 11 Level of Organic Farming Practices Employed by the Farmers as to Harvesting

	Indicators	Farm Owners (n = 26)		Farm Workers (n = 9)		Overall (N = 35)	
		Mean	Description	Mean	Description	Mean	Description
F.	**Harvesting**						
	In my farm I practice:						
1.	devices to produce maximum quality such as size measuring device, iodine test to determine the starch, skin color scale, instruments to measure ethylene or fruit acidity is practiced.	1.96	Less Practiced	1.67	Not Practiced	1.89	Less Practiced
2.	sanitation practice is observed during harvesting period by ensuring that manual-harvesting procedure is not the cause of biological contamination of the produce.	3.81	Highly Practiced	3.44	Highly Practiced	3.71	Highly Practiced
3.	identification of the optimum harvest window of each cultivar, by knowing the market value of each cultivar at harvest and after short-term and long-term storage is the harvesting practice used.	3.35	Highly Practiced	3.78	Highly Practiced	3.46	Highly Practiced
4.	use of harvesting calendar to know the best time in harvesting the crops.	3.65	Highly Practiced	3.78	Highly Practiced	3.69	Highly Practiced
	Aggregate Mean	**3.19**	**Moderately Practiced**	**3.17**	**Moderately Practiced**	**3.19**	**Moderately Practiced**

The highest overall mean of 3.71 reveals that the respondents highly practiced and observed sanitation during harvesting period by ensuring that manual-harvesting procedure is not the cause of biological contamination of the produce. Likewise, the highest weighted mean of 3.81 shows that the farm owners had the same responses to the abovementioned method of harvesting. This finding shows that they followed appropriate procedure in protecting the vegetables and fruits from impurity and other bacteria since these are for human intake although in varying level of observance. Hence, improper handling may harm the consumers due to sickness and other health problems. This practice of harvesting can lessen the possibility of more problems associated with customer complaints, which would tarnish the name and reputation of the farmers, the farm as a whole and even the locality of the farm.

Comprehensive sanitation regimen lessens the possibility of making people ill and can also increase the farmer's revenue. A good sanitation regimen involve not just the proper harvesting, washing and cleaning of each item offered, but the detailed record keeping of its growth, harvest, cleaning, packaging and storage. A dedicate sanitation practices increases the quality of the farm products. In the case of produce, one of the most sanitary

things to be done is simply keep them cold and keep it that way. Another is to get it entirely dry before storing it so the product does not sit in water until it is sold. Accomplishing these tasks simultaneously is the best way to promote a product's shelf life, especially in the case of leafy greens [65].
Fresh produce can become contaminated with pathogens before, during and after harvest. It is important to consider all potential microbial hazards when harvesting to ensure the safety and quality of the harvested product. Taking the appropriate steps to implement good field sanitation practices will benefit the producers and consumers. To prevent potential for cross-contamination, avoidance of harvesting on a rainy day or when produce is covered with heavy dew is observed. Pathogens can be dispersed easily from plant to plant or fruit to fruit by water. Produce that is bruised, produce that has been damaged by insect feeding, rodents or birds and produce that is diseased should be separated from healthy or undamaged products during harvest. Damaged products must be heat-treated before it can be sold for human consumption. Fruit and vegetable crops that have dropped from the plants prematurely should not be harvested for fresh consumption. If practical, removal as much soil or plant debris from the produce before it leaves the field [59].
Pests, diseases, food safety all are important factors in hydroponics crop production. Reactionary approaches to problems cost money, take time and, in some cases, are not always going to remedy the problem while sometimes the damage is already done. Alternatively, one of the most effective ways to reduce the risks of the greenhouse is through prevention. Taking leaves that have been removed from plants can promote good sanitation. In addition to surfaces, sanitize equipment. For plants that are highly susceptible to viruses, sanitize pruners between every plant [37].
In addition, mechanical harvesting is becoming available for processing crops but nearly all other crops are hand harvested. The fresh produce sector is technically challenging like the range of crops is large and different production systems are employed for many of them. The lack of the harvesting devices is a problem to most of the small-scale farmers. Variable maturity of plant produce means that fields may be harvested a number of times with usually three or more passes. During summer the field may be harvested every three days and in autumn or winter every seven days. This requires devices to harvest more efficiently. Plant produce can deteriorate in warm conditions and should be cooled rapidly after harvest. Long-term storage requires humidification equipment [57].

Farmers opt to use manual method of harvesting their produce instead of using devices and equipment. Manual harvesting is the most labor-intensive activity of the planting season. When the period comes rice farmers relied on labor-contract arrangements. This had been a practice for most of the farmers in the Philippines. In manual harvesting, it requires 40-80 hours per hectare and it takes 8-10-person to manually reap, collect and haul the harvested crop [43].

Manual harvesting is a traditional and common method to harvest fruits. Although it is labor intensive, manual harvesting is particularly popular for fruits that have large time windows for optimal maturity or for fruits that are marketed for direct consumption. It is sometimes carried out as a cleanup operation either after the mechanical harvesting or at the end of the harvesting season to pick up the fruits that are left behind [29]. Further, manual harvesting is a selective method and the crops can be harvested several times. In this method, pickers or harvesters must determine the maturity level of the crop as precisely as possible. This is particularly important for the crops that have a long maturation period and need to be harvested several times during the harvest season. This method reduces the mechanical damage of the harvested produce. In some cases, hand harvesting requires the use of different equipment such as secateurs, knives, clippers,and digging tools for tuberous vegetables [53].

On the other hand, the lowest overall mean of 1.89 indicates that the respondents less practiced the usage of devices to produce maximum quality such as size measuring device, iodine test to determine the starch, skin color scale, instruments to measure ethylene or fruit acidity. This result emanates from the lowest mean weighted mean of 1.96 (less practiced) for the farm owners' responses and another lowest weighted mean of 1.67 (less practiced) for the farm workers' answers. This result signifies that the farmers did not prefer to use these tools to enhance their harvest since purchasing these need high amount of money and there is no assurance that the cost will be recovered. In relation to the fragmented ownership of farmland in the country including in the study area, the farmers' income would not be enough to cover the investment needed.

Agricultural devices and equipment including harvesting equipment is still a problem. Mechanization of agriculture is fundamental to reducing poverty and improving lifestyle and food security in the developing world.

Large populations are escaping subsistence agriculture, and there is a broad consensus that conservation agriculture is the only sustainable approach to cropping. Equipment for pre-harvesting, harvesting and post-harvesting could be a major focus by the global farm machinery industry, but this is not happening [163].

Furthermore, the highest weighted mean of 3.78 denotes that the farm workers highly practiced the use of harvesting calendar to know the best time in harvesting the crops. This shows that in many instances they properly count the number of days from plating to harvesting to ensure that the crops are old enough when they are harvested. Also, they considered the proper timing in harvesting the crops in relation to the weather situation like hot season to avoid more spoilage and fast decay of the high perishable crops.

It is important to know when to harvest since the correct time of harvest is crucial in preventing crop losses. Field animals, plant diseases, insect pests or certain weather conditions caused the losses of crops. Timely harvesting ensures good crop quality and market value. Harvesting too early or too late will result in larger percentage of immature or premature fruits, which will result in lower yield. There are different methods that the farmers can use to determine the right time for harvesting like moisture content of grains, sugar and nutrient content of fruits, visual properties of mature fruits (color, scent, size), counting of the vegetation season days characteristic for each variety, and etc. [58].

Fruits and vegetables have a high market value, and the maintenance of quality after harvest is important issue to growers. Several factors such as environmental conditions, cultivars, cultural practices, susceptibility to pests, time of harvest, and post-harvest conditions determine the quality of these commodities. As quality greatly affects the consumer's preferences, it is a key factor to marketing. To gain the best value for growers, storage operators and consumers, it is very important to maintain quality throughout pre-harvest development, post-harvest development, pot harvest storage, and subsequent distribution and marketing [125].

The overall aggregate mean of 3.19 shows that the respondents moderately practiced harvesting strategies in their organic farm. This data is based on the aggregate mean of 3.19 (moderately practiced) for the farm owners' responses and another aggregate mean of 3.17 (moderately practiced) for the farm workers' answers. This result can be inferred that in many cases that they employed myriad methods of harvesting the crops to ensure that they will be able to cater the market demand both locally and even from other provinces in the country.

As the yield of the farm increases, the harvest age also increases. This will also result to a longer crop cycles that reduce the total annual area harvested and potentially reducing the farm's total production. A set of crop cycles, also known as harvesting strategy, should be planned to optimally exploit the farm's soil and climatic resources and to maximize the profit. Harvesting strategies also need to be practical, allowing consistent delivery rate throughout milling season for sustainability [20].

It is important to choose a suitable method to maximize the yield and minimize losses. Many farmers have difficulties at harvesting and handling their crops. They have to know the exact time for harvest, because harvesting period and the duration affect the quality, durability, transportation and storage of harvested crops. A farmer's ability to successfully harvest and handle his fruits could be the difference between financial success and failure. The goal of good harvesting is to maximize crop yield and minimize any crop losses and quality deterioration. Harvesting can be done manually, using hands or knifes and it can be done mechanically with the use of rippers, combine harvesters or other machines. Regardless of the method that the farmers' use, several guidelines should be followed to ensure that harvest losses are minimum and crop quality is per served during harvest operations, such as harvest time, method, duration and post-harvest processes [58].

It is important to apply good harvesting methods to be able to maximize grain yield, and minimize grain damage and quality deterioration. Correct timing of harvest is crucial to crop loss prevention. Grain losses may occur caused by rats, birds, lodging, insects and shattering. Timely harvesting ensures good grain quality and high market value. Harvesting too early will result in a higher percentage of unfilled or immature grains, which will lower the yield and cause higher grain breakage during milling. Harvesting too late will lead to excessive losses and increased breakage in rice. Harvest time also affects the germination potential of the seed. Harvesting also needs to be timed so that threshing can be done as soon as possible after cutting to avoid rewetting and to reduce grain breakage. If the crop has a lot of surface moisture, it is advisable to wait until the surface moisture dries off [137].

This section presents the results on the test of significant relationship between the types of respondents and cooperative membership and the extent of influence of the factors such as land-size, soil quality, farmer's level of education and labor demand techniques to adopt organic farming.

Table 12 Result on the Test of Significant Relationship between Respondents' Profile and the of Influence of the Various Factors to Farmers to Adopt Organic Farming ($\propto = 0.05$)

Variables	Computed Chi-Square	df	Critical Value	Significance	Result
A. Respondent Type and					
Land-Size	9.037	2	5.991	Significant	Ho Rejected
Soil Quality	1.757	3	7.815	Not Significant	Ho Accepted
Farmer's Level of Education	4.313	3	7.815	Not Significant	Ho Accepted
Labor Demand Techniques	3.136	2	5.991	Not Significant	Ho Accepted
B. Coop Membership and					
Land-Size	1.446	2	5.991	Not Significant	Ho Accepted
Soil Quality	2.240	3	7.815	Not Significant	Ho Accepted
Farmer's Level of Education	2.580	3	7.815	Not Significant	Ho Accepted
Labor Demand Techniques	7.261	2	5.991	Significant	Ho Rejected

The data contained in table 14 shows that there is a significant relationship between the type of respondents and the extent of influence of land-size to the farmers toward adopting organic farming based on the computed chi-square value of 9.037 which is higher than the critical value of 5.991. Hence, the null hypothesis was rejected. This means that size of the farmland has different degree connection to the point of view of between the farm owners and the farm workers. Well, in reality the burden of the decision would really lies in the hands of eh farm owners as to whether they will shift the usual farming method that they were used towards organic farming which more complicated by high value in the market.

There are five major factors that affect the adoption of organic farming. These are economic, social, marketing, cultivation and government policy. Land ownership including the size of the land affects the decision of the farmers in deciding whether to shift to organic farming or to continue in traditional and non-organic farming. The farmers with more farming experience were more concerned about social factors. Similarly, the farmers using lease farms were found to be concerned about the economic viability of organic farming [13].

Also, there is a significant relationship between cooperative membership of the respondents and the extent of influence of labor demand techniques towards the farmer's decision to engage in organic farming. This result is based on the computed chi-square is 7.261 which is greater that critical value of 5.991. Hence, the null hypothesis is rejected. This means that the number of people to hired in the farm relates to the respondents affiliation in any cooperative organization since they will be able to obtain support it they are members of the cooperative.

Cooperation is an inevitable trend in the sustainable development of agricultural economy in the world. The cooperative is a more formal way of organizing collective action by farmers. They link farmers to stakeholders, such as governments, extension agencies, research institutions, and retailers to form a more efficient division of labor networks. Cooperatives play an important and diverse role in the rural economic reform and the development of agricultural modernization. There is a huge gap between service supply of the cooperatives and labor demand of farmers and it has a positive effect on reducing the degree of service demand. This effect is only significant when concerning sale, pest control and mechanization. On the whole, there is a weak correlative relationship between the current service supply of cooperatives and the service demand of farmers [177].

This section presents the results on the test of significant relationship between the types of respondents and cooperative membership and the organic farming practices employed by the farmers.

Table 13 Results on the Test Significant Relationship Between the Respondents' Profile and their Organic Farming Employed ($\propto = 0.05$)

Variables	Computed Chi-Square	df	Critical Value	Significance	Result
A. Respondent Type and					
Soil Management	0.565	2	5.991	Not Significant	Ho Accepted
Weed Control Techniques	1.299	3	7.815	Not Significant	Ho Accepted
Crop Diversification	3.502	2	5.991	Not Significant	Ho Accepted
Fertilization	1.841	2	5.991	Not Significant	Ho Accepted
Irrigation	1.571	3	7.815	Not Significant	Ho Accepted
Harvesting	1.845	2	5.991	Not Significant	Ho Accepted
B. Coop Membership and					
Soil Management	2.136	2	5.991	Not Significant	Ho Accepted
Weed Control Techniques	3.426	3	7.815	Not Significant	Ho Accepted
Crop Diversification	2.935	2	5.991	Not Significant	Ho Accepted
Fertilization	1.381	2	5.991	Not Significant	Ho Accepted
Irrigation	1.571	3	7.815	Not Significant	Ho Accepted
Harvesting	0.785	2	5.991	Not Significant	Ho Accepted

There is no significant relationship between the profile of the respondents and the organic farming practices they employed in their organic farm. This indicates that whether the respondent is a farm owner or worker it does not correlate to their utilization of soil management, weed control techniques, crop diversification, fertilization, irrigation and harvesting in their farm. Further, the membership in any cooperative organization also does not have any bearing to their execution of the abovementioned farming practices.

According to Reference [73] that organic farming in the Philippines requires certification. This certification is necessary to ensure that the organic farmers are strictly employing organic farming practices. The Department of Agriculture nationally accredited, (2) two known certification bodies such as: OCCP (Organic Certification Center of the Philippines) and NICERT (NISARD Certification Services) and thus permit them to have nationwide power to certify growers based on strict standards in Internal Control Systems. Farmers are monitored on a regular basis from seeding-to-harvest-to-processing, so that any form of compromise in quality or integrity of harvest is avoided. If farmers do not follow the policies and standards, they would risk the permanent removal of their certification.

This part presents the results on the test of significant difference between the assessment of the respondents on the extent of influence to the various factors to adopt organic farming and the organic farming practices that they employed.

Table 14 Results on the Test of Significant Difference between the Extent of Influence of Various Factors to Adopt Organic Farming and the Organic Farming Practices Employed by the Farmers(N = 35; $\propto$ = 0.05)

Comparing the Difference	Mean	StDev	t-Value	P-Value	Significance	Result
Extent of Factors that Influence Farmers to Adopt Organic Farming	3.075	0.647	0.89	0.378	Not Significant	Ho Accepted
Level of Organic Farming Practice Employed by the Farmers	2.963	0.432				
Difference	0.112	0.741				

There is no significant difference between the responses of the respondents on the extent of influence of the factors like land-size, soil quality, farmer's level of education and labor demand techniques to the farmers in their inclination to adopt organic farming and the organic farming practice that used in their organic farming by activity. This result is based on the p-value of 0.378, which is greater than 0.05 level of significance. Hence, the null hypothesis is accepted. This result means that there is no variation on the number of hectares of the land area owned by the farmers, the characteristics of the soil, the farmers' level of knowledge and the number of people to be hired to perform various works and the implementation of the proper farming procedures to ensure that the

organic farming is done according to standards set by certifying bodies since organic farmers must follow the standards in organic farming as set by the third- party certifying body accredited by the Department of Agriculture.

Republic Act 10068 also known as Organic Agriculture Act of 2010 stipulates that the Bureau of Agriculture and Fisheries Standards is hereby designated and authorized to grant official accreditation to organic certifying body or entity. The Bureau of Agriculture and Fisheries Standards is tasked to formulate the necessary rules and procedures in the accreditation of organic certifying body, provided, that there shall be at least one (1) accredited organic certifying body each in Luzon, Visayas and Mindanao or in case of only (1) organic certifying body is accredited, it shall have at least one (1) satellite office or processing unit each in Luzon, Visayas and Mindanao [41].

VI. CONCLUSION

Organic farming is a farming method that involves growing crops without the use of synthetic materials. Despite of a good market opportunity of organic farming, there was just a gradual conversion of the farmers from organic farming to conventional farming even though the country is doing some initiatives to push for the sustainability of organic farming industry. Likewise, the growing demand for organic produce in the market the farmers in Region VI and VII have shown hesitation towards full adoption and had not applied the ideal farming practices at a maximum level to ensure that their activity addresses the vulnerability of the environment vis-a-vis fulfilling it commitment to provide health crops to the consumers. Also, the farmers encountered various issues in dealing with the havoc of the changing climatic conditions and the lack of government support of infrastructures that would can expand its production and be able to fill in the growing demand for the healthy conscious consumers in the Visayas.

VII. PROPOSED EMPOWERMENT MODEL FOR ORGANIC FARMERS

Figure 1 shows the proposed empowerment model for farmers. The model's stipulations relate to the results and findings of the study and aim to increase the motivation and empower the farmers to adopt organic farming practices. The model consists of four (4) areas to empower farmers. These areas include an increased level of supporting infrastructure, continuous learning development, updated marketing programs, and community support.

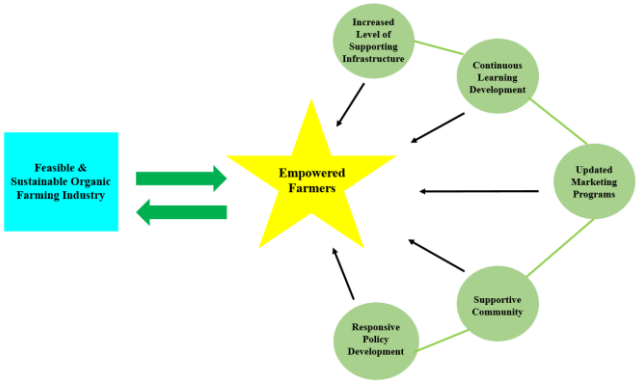

Figure 1. Empowerment Development Model for Organic Farmers

1. Increased level of supporting infrastructure. One of the challenges faced by organic farming is the lack of supporting infrastructure. This issue is why most of the farmers have second thoughts in adopting organic farming and even consider shifting from organic farming to conventional farming. The increase in the level of supporting infrastructure means increasing the farmers' accessibility to these supports. The government and other stakeholders must intensify programs like good transport and shipment of the product, a place for small market or *tabo* where farmers can quickly drop and sell their produce, access new and latest farming equipment and devices, and access easy access for financial assistance. Support for the farmers in getting their farms accredited (and also for accreditation renewals) must be provided since it is costly to obtain certification and accreditation. Assistance to get certified as an organic farmer will lessen the burden of the farmers and will empower them to adapt and continue their organic farming practices.

2. Continuous learning development. Supporting infrastructure is not enough. Farmers must be updated to the new and latest trends in farm management. This will help them increase the level of productivity of their farm. As they say, that experience is the best teacher, but the experience must be backed up with new learning. Consecutive and timely learning sessions for the farmers will give them more knowledge on the latest trends in farming and expand their opportunity to meet the market demand of their produce by increasing their optimum harvest. This continuous learning development must be accessible and affordable for farmers.

3. Updated marketing programs. Increased level of productivity is not only a concern for the farmers. Marketing is also a significant concern. To meet the market demand for these products, increase its competitiveness, setting the appropriate prices of the harvest based on the current market situation, valid promotion for the organic products, and effective distribution strategy for these products is the significant scope of the biological product marketing program. Farmers should be taught how to make simple marketing plans to understand the current market situation for organic products.

4. Supportive community. Increasing the empowerment of the farmers needs to have a supportive community. Supportive community means farmers must have cooperative, groups, or associations for easy access to all the updates in organic farming. A supportive community also would create camaraderie for the farmers with the same objectives and goals. It will be easier for them to survive to have supporting communities that will lend a hand to each other.

5. Responsive policy development. The last area to consider is a responsive policy development. An up-to-date policy development is very essential to increase the level of the empowerment of the farmers. A responsive policy development prioritizes a proper evaluation of the existing policies in organic farming. The realistic situation and evaluation of the current status and the gap of the policy versus the actual implementation of the policy must be considered. Responsive policy development will correct the lapses of the existing policy for it considers the current needs and challenges that the organic farming industry is currently facing. A timely and updated policy development will help the organic farming industry to be sustainable.

The five (5) factors namely: increased level of supporting infrastructure, continuous learning development, updated marketing programs, supportive community, and responsive policy development, must be fully-integrated in order to increase the empowerment of the farmers to adopt organic farming. Empowered farmers will make the organic farming industry sustainable and feasible. This means that level of feasibility and sustainability will increase, which will increase profitability, a good return on investment, and, in return, increase its survival. Empowered farmers can able to establish an excellent competitive advantage. A sustainable and feasible organic farming industry will empower more farmers to adopt organic farming.

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AUTHORS PROFILE

Dr. Amabella Grace N. Siaton. Dr. Amabella Grace N. Siaton is the a faculty member, the current Program Research Coordinator of the College of Business and Accountancy in University of Cebu-Banilad . She is a product of University of Cebu- Main Campus from undergraduate to post-graduate studies. She finished her degree in Doctor of Business Administration in 2021. At the age of 21, she finished her Master in Business Administration. She is a Bachelor of Science in Business Administration major in Management Accounting degree holder with an Academic Excellence Award in 2015. During her undergraduate years, she is a consistent top student and very active in different organizations like the Junior Philippine Institute of Accountants (JPIA) and University of Cebu Community Awareness, Relations, and Extension Services (UC-CARES). She also graduated in college as a Cebu City Scholar and a scholar of the 2 + 10 scholarship extended by the University of Cebu to Cebu City Scholars.

She is active in various research activities in University of Cebu-Banilad in close coordination with the University Research Center. She also participated number of research colloquium and a member to various research organizations (Philippine Association of Institutions for Research, Asian Society of Teachers for Research, and Asian Qualitative Research Association). She has also advised numerous feasibility studies and researches. Currently, she is the faculty adviser of the Junior People Management Association of UC-Banilad Chapter. She also handles the researches of the BSA, BSMA and BSAIS programs of the College of Business and Accountancy.

Aside from her affiliation in the academic institution, she is also a business and management consultant. Currently she is the management consultant in different firms specifically in a Montessori school and in a construction firm. She is also offering services to different companies specially in business planning and feasibility studies. Dr. Siaton is also one of the Board Directors of a shooting range in Cebu, Philippines. She is also a certified SAP Business One Trainer. In 2021, she gained her professional certificate in Adaptive Design for Learning Course from the Ateneo de Manila University- SALT Institute Online Program. In February 2022, she also got her FinTech Educational Professional Certificate given by Erasmus + TRUST.

Dr. Siaton is also very active to parochial activities. She was the youth president for seven years in their Chapel Organization. She is also the current Parish Pastoral Council Secretary of the Parish of the Alliance of Two Hearts in Banawa, Cebu City, Ceby, Philippines. She is the secretary for eight years in the Sitio Chapel Leaders Association of the said parish. She also the member of the PPC-Finance Team and currently one of the spearheads of the fundraising campaign of the parish.

Dr. Judy Ann O. Ferrater-Gimena the current Director of the Research Center, faculty member, College of Business and Accountancy of the University of Cebu (UC) – Banilad & University of Cebu Graduate School. She obtained the degree of Bachelor of Science in Commerce (BSC) Major in Economics at the University of San Jose- Recoletos (USJ-R), in Cebu City, where she graduated *cum laude* and

was awarded as the Most Outstanding Graduate of the College of Commerce and Excellence in Economics by the Council of Economic Educators. It is in the same university where she obtained her Master in

Business Administration (MBA) [Thesis Program] as well as her degree in Doctor in Business Administration (DBA). She also graduated valedictorian both in high school at the Holy Trinity College in Ginatilan, Cebu; and in elementary at the Ginatilan Central School.

She is also active in research activities and had done a research works in the university and some externally funded researches, entitled:" "Marine spatial planning of aquaculture facilities in the Philippines: protecting biodiversity whilst maximizing economic returns for local communities" in partnership with Centre for Fisheries and Aquatic Science (Cefas) in Lowestoft, England, under the CHED-Newton Fund Institutional Links Programme. She was also involved in a study under the CHED-Zonal Research Center entitled "Environmentally-directed Organizational Citizenship Behavior of the Career Municipal Government Official in Cebu", a research undertaking in collaboration with other universities in Cebu City such as the University of San Carlos (USC), University of San Jose-Recoletos (USJ-R), Cebu Institute of Technology – University (CIT-U) and Cebu Normal University (CNU). Another research grant was awarded from the Department of Interior and Local Government (DILG) for the following projects: Citizen Satisfaction Index System for the City of Carcar in 2015; Citizen Satisfaction Index System (CSIS) for Cebu City in 2017; Citizen Satisfaction Index System (CSIS) for the Municipality of Sogod, Cebu in 2018; Citizen Satisfaction Index System (CSIS) for the Municipality of Alicia, Bohol in 2018; Citizen Satisfaction Index System (CSIS) for the Municipality of Larena, Siquijor in 2019; Citizen Satisfaction Index System (CSIS) for the Municipality of Balamban, Cebu also in 2019; DARE TO Grant-in-Aid by the Commission on Higher Education (CHED) for a project entitled: The Region 7 and Negros Island K to 12 Implementation Experience: A Proposed Learning Management System; and the Hull Design Standard for Philippine Seawater Typology (SPST), under the NICER (Niche Centers in the Regions for R&D) program Center of Modernized Maritime Transport System (CMMTS) of Department of Science and Technology.

Dr. Gimena had presented her research papers in various research conferences here and abroad. Moreover, she was one of the presenters at the World Research Festival 2013, an international research conference, which was held at the Marco Polo Hotel, Davao City, Philippines last May 1-4, 2013, where she was awarded as the Best Oral Presenter. She also presented during the 3rd International Conference on Multidisciplinary Research held at Dorsett KwunTong Hotel, Hongkong in 2015 at the 3r Internationla Conference on Business, Education, Engineering & Sciences (ICBEES) 2019 at Rose Garden Hotel, Yangon, Myanmar. She was also a recipient of Outstanding Researcher Award given by the University of Cebu and Outstanding Filipino Researcher awarded by the Phillippine Association of Institutions for Research in Hongkong.

Aside from her faithful performance of her functions as a faculty member of UC – Banilad's College of Business and Accountancy, she had also coached various business plan competitions, both local and national in scope. One of such competitions was the Pasigarbo sa Dakbayan sa Sugbo Interschool Business Plan Contest where the UC-Banilad's entry the "UC-Namay" won the irst (1st) prize. She was also one of the coaches of the UC-Banilad's Team in the Obra Negosyo Eskwela Countryside Business Upliftment (ONE CEBU) Business Plan Contest where UC-Banilad was the Champion in both Season 1 and Season 2. Aside from winning the first prize, the UC- Banilad team, successfully implemented the projects such as CMD Black Beans and Taosio Manufacturing in Liki, Sogod, Cebu; Dawis Norte Fishermen's Association Mudcab Fattening in BFAR-RFTC, in Dawis, Carmen, Cebu; and Catmon Native Chicken Carenderia in Poblacion, Catmon, Cebu. Furthermore she also coached UC-Banilad's entry "Mango Seed Oil" at the British Council Business Plan Contest which won the first place and got a Php 100,000.00 financial grant.

Before she joined the academe, she had various experiences in the shipping and forwarding industry and had worked with the banking industry for several years.

Dr. Jesszon B. Cano is a graduate of Holy Name University (HNU) in 2015 with an undergraduate degree Bachelor of Science in Hotel and Restaurant Management (BSHRM). He obtains his Master's degree in Business Administration majoring in Hotel and Restaurant Management (MBA-HRM) in 2018 at the University of Cebu, Graduate School, Main Campus (UC-Main), and finish his degree in Doctor of Business Administration (DBA) last 2020 in the same university. He completed the certificate of Professional Education (CPE) at the University of Cebu - Lapu-Lapu and Mandaue Campus (UC-LM) in the year 2021. He is also successfully met the prescribed requirements for certification as established by the Institute of Tourism and Hospitality Professionals (ITHP) in a co-certifying partnership with Global Professional Advancement (GPA) and was awarded the professional designation of Certified Hospitality Professional (CHP®) in the same year. Moreover, he is a designated Program Research Coordinator of the Hospitality Management department in his college.

Furthermore, Dr. Cano actively participated in research presentations both in local and international fora. He also published several articles in multidisciplinary, scientific, peer-reviewed, indexed, and cross-referenced journals. His research interests include environmental management in tourism and hospitality, service quality, destination marketing, community participation in tourism development, career development in hospitality, and events management.