Interpreting the Attitude and Behavior of Farmers: A Case of Organic Agriculture Adoption and Information Sharing in Laguna, Philippines

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DISSERTATION ACCEPTANCE CERTIFICATE

The undersigned, appointed by the **Department of Agribusiness Management** have examined a dissertation entitled

Interpreting the Attitude and Behavior of Farmers: A Case of Organic Agriculture Adoption and Information Sharing in Laguna, Philippines

presented by

Eliza Catelo Aquino
candidate for the degree of **Doctor of Philosophy** and hereby **certify that it is worthy of acceptance.**

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Abstract

Most of the social science research on the sustainability of organic farming includes research on agricultural management involving profitability, market research, and research on buyer awareness. However, there are quite a few farmers who risk adopting organic farming instead of conventional farming even if they have low profits. It is important to clarify and interpret the factors and their reasons for choosing organic agriculture (OA) in discussing its sustainability. Therefore, this study aimed to properly interpret farmers in terms of their attitude and behavior towards OA adoption and its effect in information sharing in the Philippines. To attain this, an in-depth interview mainly on small-scale organic farmers in Laguna, Philippines was conducted, and the study applied not only the conventional methods of agricultural management but also the methods of psychology and sociology to OA adoption and information sharing.

Detailed life histories (LH) of 30 farmers were collected utilizing the Life History Approach (LHA) and were plotted and represented using the Trajectory Equifinality Model (TEM), which is one of the qualitative and cultural psychology methods. The TEM was organized into three stages in chronological order, and the farmer-participants were classified into four categories. As one of the descriptive social research methods, Grounded Theory Approach (GTA) was also used to each of the classified categories. All the data related to information sharing including technical information and information sources were collected and qualitatively analyzed.

Various information and sources surrounding organic farmers were also explored. It was noted that technical information related to organic farming is being shared and handed down from information sources (mostly from family members, neighboring farmers, and regional agricultural institutions) that have strong impact, ties, and interaction to the farmers. This study also revealed that essential value on OA such as its well-being impact affects learning, adoption, and sharing of OA information especially for farmers in the category, which selected OA despite the expected low profits. This research clarified and concluded that well-being is one of the most important factors for continuous selection and adoption of organic farming.

要旨

有機農業の持続性に関する社会科学的研究には，収益性を含めた農業経営の研究や市場調査ならびに購買者意識に関する研究が多い。しかし，低収益であっても慣行農業ではなく，あえて有機農業を選択する農家が少なからず存在し，その選択理由を解明することは有機農業の持続性を議論する上で重要であると考えられる。そこで本研究では，フィリピン共和国ラグーナ州を対象に，小規模有機農家を中心に聞き取り調査を実施し，従来の農業経営学の手法だけではなく，心理学や社会学の手法を応用して有機農業の持続性に関わる要因を解明するための研究を実施した。ヒアリングを実施した 30 戸の農家に対し，Life History（LH）を克明に集積し（LHA: Life History Approach），心理学の分類手法の一つである TEM（Trajectory Equifinality Model）を応用して LH を時系列に 3 段階のステージに整理し，研究対象農家を 4 つのカテゴリに分類した。分類したそれぞれのカテゴリに対して記述的社会調査手法の一つである GTA（Grounded Theory Approach）を応用し，技術情報を含む情報共有と情報源に関わるデータを収集し定性的に分析した。その結果，本研究が提案する分析手法により，LH に基づく有機農家の分類と有機農業を取り巻く多様な情報と多数の情報源を定性的に整理し，低収益であっても有機農業を選択するカテゴリの農家では，特に個人との結びつきが強い情報源（家族，近隣農家や地域農業組織体）から，有機農業に関わる技術情報の共有・伝承が行われ，更に有機農業の本質的な価値としての well-being の共有が行われていることを明らかにし，これらが有機農業を継続的に選択する要因の一つであると結論づけられた。

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Chapter 1: Introduction

1.1. Background of the Study

The International Federation of Organic Agriculture Movement (IFOAM) defined Organic Agriculture (OA) as a sustainable production system that is created and guided with the principle of health, ecology, fairness, and care that are at the core of the organic philosophy. This core organic philosophy is being adopted as a standard and main goal of concerned organizations and institutions that are practicing OA. OA has numerous advantages. There is evidence on positive impacts related to wide range of important issues including consumer health, biodiversity, animal welfare, and the improved livelihoods and living conditions of producers which are not only focusing on farmers' income. OA has changed unsustainable habits around the globe by inspiring producers and consumers alike (Arbenz, et.al, 2016).

With these advantages, different countries including the Philippines are adopting the technology. The Philippine government has been promoting the adoption of organic agriculture to be one of the solutions in the current issues on conventional agriculture, environmental degradation, and climate change. On April 6, 2010, the Republic Act No. 10068 (RA 10068) or more commonly known as the Philippine Organic Agriculture Act was enacted. The signing of the RA 10068 is a result of long years of development efforts mostly by non-government organizations and private groups pushing for agriculture sector reforms to an economically viable, ecologically sustainable, environment-friendly, and safer production systems for the Filipino farmers. With these goals, the Department of Agriculture (DA) targets 5% of the country's agricultural lands to be used in organic farming. To meet this target and ensure the implementation of RA 10068, the National Organic Agriculture Program (NOAP) was established in 2012.

However, even with the efforts of the Philippine government to promote and adopt the technology, adoption rate of OA is still low. As cited by Pantoja, et al. (2016) the most

recent data from the Philippine Statistics Authority showed that in 2014, the country's agricultural area was nearly 10 million ha, of which 4 million ha was a cropland area; thus, the 5% OA target was about 200,000 ha. Nevertheless, Willer and Lernoud (2019) reports that in 2017 the area devoted to OA was only 0.17% of the total agricultural land (approximately 17,156 ha), conveying that the situation was still far below the target.

Lower adoption rate of OA technology can be attributed to different factors which includes all the variable components in technology provider and receiver. As per Pantoja, et al (2016) and del Rosario (2018), OA in the Philippines faces many challenges that leads to low adoption rate: policy gaps, lack of production support, promotion, and awareness activities, fragmented and inadequate research and development, extension and capability building activities, and poor market systems.

These challenges and gaps can be bridged through proper information sharing activities. Information is an essential component of a value chain network because it connects all its aspects such as components, activities, and operations. Information is critical in agricultural development as it is a means and a method for communication and coordination between stakeholders. Likewise, it serves as an avenue for assessing and evaluating trends and shaping decisions (Collence, 2012). In addition, Lotfi, et al (2013), stated that the agricultural sector strongly needs to create or generate, share, and disseminate up-to-date and appropriate knowledge and information. Hence, issues and factors affecting information sharing that leads to adoption of OA should be identified and understand.

Moreover, from the author's MS studies on the *Effectiveness of Farmer-Trainers in Laguna: A Case of Organic Agriculture* (Aquino, 2019) the flow of information sharing, and different challenges were also observed. Information sharing is crucial in technology adoption. As shown in Figure 1.1, the current flow of information is still top-down approach, attributing to low learning and adoption rate.

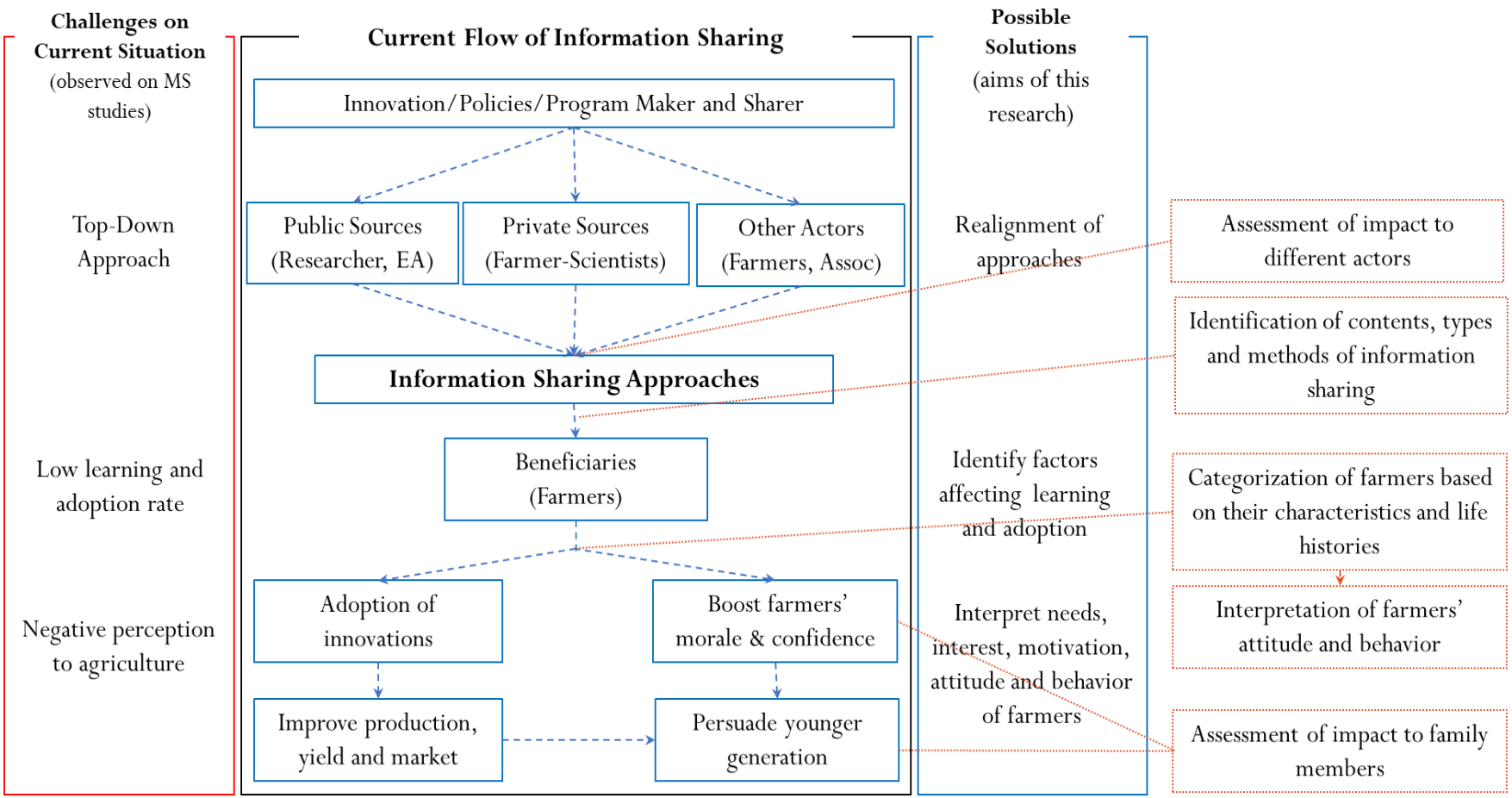

Figure 1. 1 Conceptual framework of information sharing flow between stakeholders, the challenges on the current situation and possible solution

Source: Aquino (2019)

On the other side, the big blue box shows the aims of this research and the orange boxes to the activities to be carried out in order to answer the challenges (in the big red box).

Several challenges that are still prominent on the current situation were observed and noted, conveying those farmers are continuously misunderstood in terms of policies and programs. Following the top-down approach, this resulted to institutions to recurrently provide innovations that hopes to attain agricultural sustainability (e.g. OA technology). However, those innovations have low adoption rate. In addition, the younger generation and some of the current farmers has negative perception about agriculture.

Furthermore, Aquino (2019) stated that aside from increased income and profit, small-scale organic farmers have different reasons and needs in adopting specific technology. It includes the adoption of OA technology for its safeness and health benefits to the farmer's children; technology adoption from a strong motivation of the farmer to retire early; and the farmer's interest to learn different techniques in adopting a technology.

Upon reviewing literature and based on the systematic review analysis of this study (Chapter 2) most of the studies conducted focused on the socio-demographic and socio-economic factors specifically, the productivity and profitability side and there is still no in-depth psychological factor study about farmers' attitude and behavior that are affecting information sharing and adoption of OA. Previous studies including Kettinger et al (2015) also recommend that there is a need for a research model especially in developing countries that will focus and will give adequate emphasis on the effect or impact to knowledge and information sharing of individual, organizational, and technological intentions.

To answer the challenges and bridge the gap in mismatched innovations, policies, and programs, farmers should be properly heard and understood. Starting with the farmers, researchers and other institutions can gain an in-depth understanding of different factors affecting information sharing, learning, and adoption of innovations. Moreover, proper understanding and interpretation of farmers' attitude and behavior towards OA adoption can

result in an effective information dissemination that will eventually lead to adoption of appropriate technologies or innovations they need and capable of using. Furthermore, their motivation and aspirations will also be shared to younger generations in persuading them to engage in agriculture. Thus, this study will be one of the possible solutions to achieve agricultural sustainability.

1.2. Objectives of the Study

The main objective of this study is to properly interpret farmers in terms of their attitude and behavior towards OA and its effect in information sharing in the Philippines through a Trajectory Equifinality Model of farmers' life histories. Specifically, this study aims to:

- Identify and classify farmers based on their characteristics through extrinsic and intrinsic variables;
- Explore and distinguish contents, methods, types, and sources of information sharing to and within farmers;
- Assess the impact of information sharing to farmers and other actors in the community; and
- Assess the effect of farmers' attitude and behavior towards OA adoption to the information they are sharing.

1.3. Significance of the Study

To bridge the gap between actors (e.g. policy makers, researchers, extension agents, farmers, farmer scientists, farmers' family members) that are key players in disseminating and adopting OA technology, and to address the problems in mismatched technologies, policies, and programs, this study attempted to properly interpret farmers as the core practitioner in

agriculture. In addition, other actors and factors that directly and indirectly affect farmers' attitude and behavior were also explored and interpreted.

While there have been several quantitative studies regarding the attitude and behavior of farmers towards adoption of technologies, only a few studies focused on OA adoption and no in-depth study about the interpretation of attitude and behavior of farmers. Hence, this study attmpted to gain the kind of in-depth knowledge and understanding of how to properly interpret farmers' attitude and behavior towards OA adoption and the effect of these in information sharing and adoption of OA technologies.

In addition, farmers' life trajectories model that shows how psychological factors (attitude and behavior) affects information sharing and adoption of technology were produced. Furthermore, it also sought to recognize how farmers (especially small-scale farmers) adopted and modified innovation, and how the information sharing affects them in changing their behavior, attitude, and motivation towards OA. This study focused on small-scale farmers since most OA farmers in Asia were small-scale.

A Trajectory Equifinality Model (TEM) of interpreting farmers' attitude and behavior towards adoption of innovation (based on farmers' life histories) is expected to guide the institutions for an effective technology information dissemination and adoption. This study can be considered the first TEM focusing on farmers that aims to bridge the gap to achieve rural development not only in the Philippines but in the global settings.

1.4. Methods of the Study

1.4.a Study Area

Laguna Province (Figure 2) was chosen as a research study for two reasons. First, Los Baños is one of its cities that is designated and declared through the Proclamation Order No. 349, s. 2000 as a special science and nature city of the Philippines because it caters to different agricultural institutions. It has remained the country's hub of science and nature with the presence of national and international research institutions such as University of the Philippines

Los Baños (UPLB), Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD), Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), International Rice Research Institute (IRRI), and Bureau of Plant Industry (BPI). In addition, regional agricultural offices can also be found in Laguna. OA information can be accessed through most of these institutions.

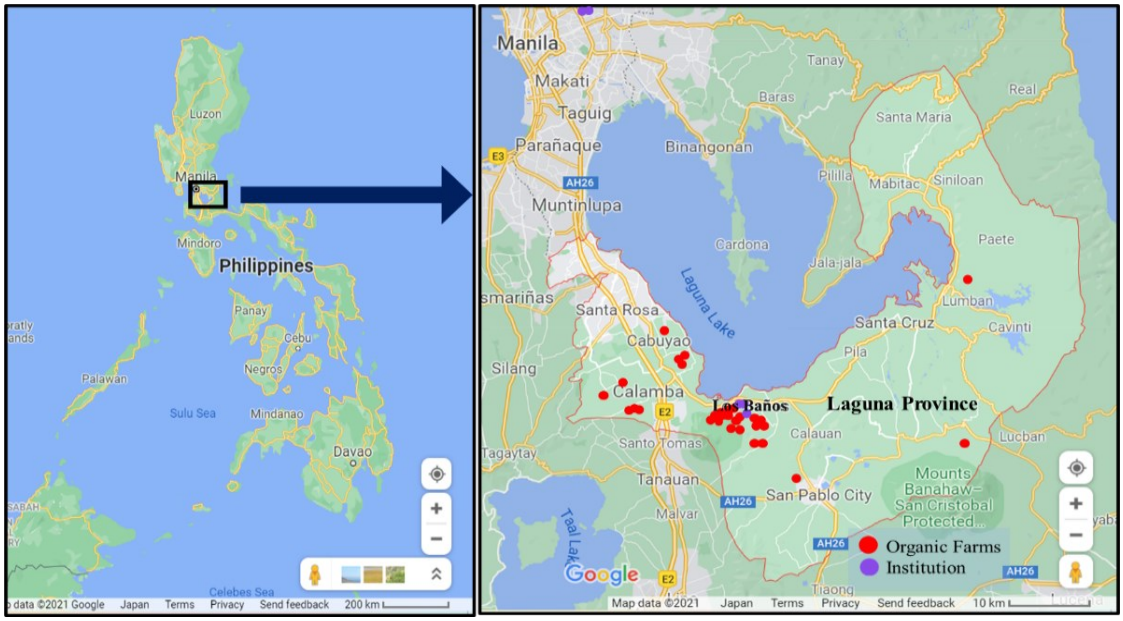

Figure 1.2 The Philippine map and the Province of Laguna where organic farmers and institutions are located

(Google maps, 2021)

Second, even with these agricultural institutions, Laguna as part of region 4-A CaLaBaRZon (collectively referring to Cavite, Laguna, Batangas, Rizal, Quezon provinces) only ranked 2nd to the last in Luzon in terms of OA adoption or conversion based on the OA share to each region's agricultural land from the National Organic Agriculture Program of the Department of Agriculture's data in 2018.

1.4.b Interviews and Sampling

In 2019, there were about 50 recorded organic agriculture practitioners in Los Baños, Laguna, more than half of them qualified for the study's established criteria as a requirement for a purposive sampling. During the preliminary interview and in the middle of the data collection, purposive sampling was modified to historically structured inviting (HSI) following

the procedure of Valsiner and Sato (2006) and Sato et al. (2007) Trajectory Equifinality Approach (TEA) to gain more in-depth and on the ground data from the participants. Nine of the farmers (three from MS studies) accepted the invitation to be included as a farmer-participants and some of them referred farmers within and farmers outside but mostly near Los Baños, Laguna. This made the 30 total participants (16 from Los Baños and 14 farmers outside Los Baños). Details on when and how these farmers were interviewed and included in the research were discussed below.

As the primary data source, semi-structured interviews were utilized to gain a good access of people's perceptions, interpretation of situations to understand and record what is happening on the ground. The purposes of the interviews were to confirm the existence of information systems, and to record the details and compare what information and technology are being delivered and received by the farmers depending on different sources. In addition, constant and in-depth interviews gave grounded data on farmers' life histories that were substantially significant for the interpretation of farmers' attitude and behavior.

For this reason, this study utilized the Historically Structured Inviting (HSI) of Valsiner and Sato (2006) and Sato et al. (2007) to invite and arrange participants that satisfied the requirements for the appropriate sample and cases. Preliminary interviews were done to refine the questionnaire and expand the research participants. The primary requirements include farmers who are: 1) practicing organic agriculture, 2) residing in Laguna, 3) received OA training, 4) sharing OA information to others, and 5) willing to be included as a research participant. Following the series of interviews and observations that were conducted in July to August 2017, March 2018, and July to August 2018 from initial five (5) organic farmers, different factors were gathered.

From the data collected, questionnaire focusing on information sharing and adoption of OA technology was created. In addition, the primary requirements were reformed, specifically changing the number 3 requirement (received OA training) to those farmers who received OA information. In order not to limit the research participants to those farmers who received formal

training correspondingly, this study found that there were still farmers who has not attended any formal training. With the revised requirement for the study, HSI was organized and on July 17, 2019, to September 2, 2019, continuous interviews, visits, and observations with 17 farmers were conducted. Refinement of questionnaires were performed based on the encoded data and memos from the observations. Life histories were made and showed to farmers for verification. Life path of each farmer were graphed using Trajectory Equifinality Models (TEM) and were assembled to make a one TEM with a compilation of farmers' life histories.

Continuous encoding and comparing of data were executed and in March to August 2020, additional four (4) farmers were able to be interviewed in person and through a phone call. Even with the comparison of 21 farmers was accomplished, data saturation was reached from 14 complete and validated life histories. In order to conduct statistical analysis, at least 35 questionnaires were sent to other areas in Laguna. Unfortunately, due to COVID-19 pandemic, farms were not visited in respect of farmers concern of being infected by outsiders. Thus, only nine (9) questionnaires returned that made the total of 30 farmer participants.

To ensure validity and reliability of the research, data triangulation was also conducted. In 2018, 2019, and 2020, 11 staffs from five (5) different institutions and organizations providing information about organic agriculture were interviewed. Some of the farmers' family members were also interviewed and observed. Information from books, journals, training modules, websites, and other printed materials were also crossed referenced.

To categorize farmers, questions concerning farmers and their farms' profiles (parts I and III) were included in the questionnaires (Appendix 2). These include age, gender, educational attainment, main and secondary job, income, farming experiences, location of the farm, land area, and other external characteristics of the farm that were all under the extrinsic variables. In addition, to group the farmers based on their intrinsic variables, their attitude, knowledge, perception, and motivation were included in the parts I, II, and V of the questionnaire especially in part V that focuses mainly on questions or topics to attain an in-depth understanding of farmers' situation and life histories.

To know the impact of information sharing to farmers and other actors in the community, respondents were asked to specify each source of information they are getting, from where those information comes from, their frequency of use, rank its effectiveness and the respective reasons. In the part IV of the questionnaire, information was categorized as printed materials, electronic sources, and face-to-face information sharing. Furthermore, open-ended questions were included to gain more evidence and understanding about the information sharing to and within the farmers.

1.4.c Study Approach and Data Collection

Life History Approach (LHA), Trajectory Equifinality Approach (TEA), and Grounded Theory Approach (GTA) were utilized in this study. Equifinality Points (EFP) and Obligatory Passage Points (OPP) were set as guide in Historically Structured Inviting (HSI) as a way of sampling selection. Each farmer's life history was plotted with the aid of trajectory equifinality model (TEM). Continuous interviews and observations, and memoing with different actors in the information flow were done.

Institutions were selected based on the results of preliminary interviews with farmers. On the other hand, farmers were identified and invited for interviews after setting up three EFPs: (1) adopted OA and sharing OA technology to others, (2) went back to conventional farming, and (3) stopped farming for the mean time and an OPP of learned and accepted the importance of organic agriculture. With the continuous (series of) interviews, observations, and analysis, saturation of data was achieved after interviewing 14 farmers, additional farmers were invited for an interview for future statistical analysis. A total of 30 farmers were interviewed. Farmer families were gathered and interviewed following purposive sampling method. Interviews were recorded using a digital voice IC recorder (Olympus Voice-Trek V-863) to capture the voice from the ground.

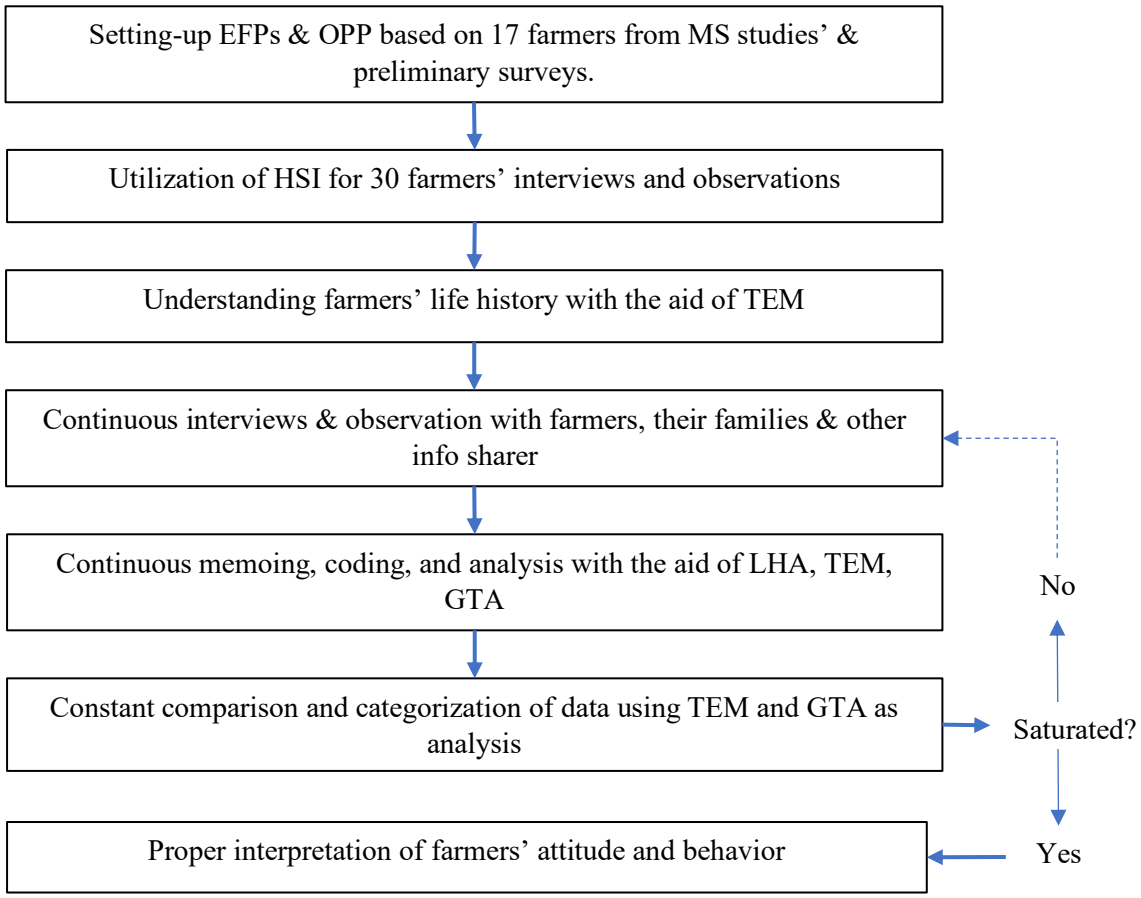

Figure 1. 3Flow of data collection and analysis using LHA, TEM and GTA as qualitative method and analysis

<u>1.4.d Data Analysis</u>

Qualitative research is interpretative, very dynamic, and free-flowing process. It is used to understand and discover how meanings are formed and transformed, uncover relevant variables that later can be tested through quantitative forms of research and take a holistic and comprehensive approach to study phenomena. (Babbie, 2014 and Corbin and Strauss, 2015).

LHA helped in the explanation of what happened to farmers and what caused a certain decision. LHA aided in exploring and identifying the dominant narratives of people's lives within events and situations. These narratives were contextualized and described how a specific event came to be significant, and how opinions and decisions changed over time (Ssali et al., 2015); TEM as one of the three major components of TEA (Sato, et al., 2016) was generated

following TEA aid in the discussion of LHA; and GTA was used in categorizing and linking data. Following the methodology of analysis for grounded theory of Locke (2002) and Glaser (2001), there were constant comparison and categorization of data using GTA with the aid of the Archive of Technology, Lifeworld and Everyday Language. text interpretation (ATLAS.ti) application until saturation of data.

Simple descriptive statistical analysis was also used for some of the parts of the dissertation.

1.5 Limitations

This study is limited to organic farmers in Laguna mostly from the City of Los Baños. Due to COVID-19 pandemic, the sample size was limited to 30 participants. Scheduled interviews and observations with other farmers were not able to accomplish due to Luzon-wide Enhanced Community Quarantine (ECQ)-lockdown from March 17, 2020, three days before the 14-days self-quarantine for returnees. Under ECQ, no one was allowed to go outside the house except for those who will buy food and medicine from 6:00 am to 5:00 pm. After a year, the situation in the Philippines was not improving, hence field surveys for March 2021 and July 2021 were not possible.

In addition, other data regarding economic variables for some farmers were not able to verify because most of the farmer participants do not have internet connection and poor mobile phone signal hence, follow-up interviews through phone calls were not completed.

1.6 Research Questions

- How does categorization of farmers help in understanding their attitude and behavior towards OA?

- Are the contents, types, and methods of information sharing satisfy the interest and need of farmers?
- What are the impacts or influences of OA information sharing to different actors in the community?
- How to interpret farmers' behavior and attitude properly, and how it affects OA information sharing and adoption?

These research questions guided the study to stay on its objective and find answers to what the study hopefully is trying to figure out and understand. Since this is a grounded study which utilizes qualitative approaches as the main research methods, the indicators should be sustainable and workable, thus the extrinsic variables specifically, income and profit were not included as major indicators because most of the extrinsic variables are not maintainable. Thus, intrinsic variables such as motivation, change in behavior, and attitude and adoption of technology or innovations were selected as major indicators for the study.

1.7 Conceptual Framework of the Study

OA as an answer to problems on sustainable agriculture is being promoted in the Philippines. But there are hindrances and challenges that limits sustainable agriculture and one of it is the low adoption of OA. OA adoption faces plenty of challenges and one of these is the information system. The top-down approach in the information systems is still the predominant factor of the problems in low adoption rate of technologies. As stated in the background, the information and technology provider keep providing information and innovation that has low adoption rate mainly because farmers are not interested, and they are always misunderstood in terms of policies and programs. Similarly, the predicaments of the negative perceptions of younger generations on agriculture as most of them see agriculture as a back-breaking, very hard, unbeneficial, non-lucrative, and a very degrading career.

With these challenges, interpretation of the attitude and behavior of farmers towards OA adoption can be a possible solution. This interpretation will also give us knowledge and insight of the needs, interests, capabilities, and capacities of farmers in different situation in their life when they are receiving information about the technology. Figure 1.4 shows the methodology to attain the aims of this research.

The interpreted attitude and behavior will be the basis to recommend a realignment of information approaches, policies, programs that will help to achieve an effective information dissemination strategy. In addition, farmers' aspirations and motivations will be shared to younger generations that will hopefully engage and adopt OA.

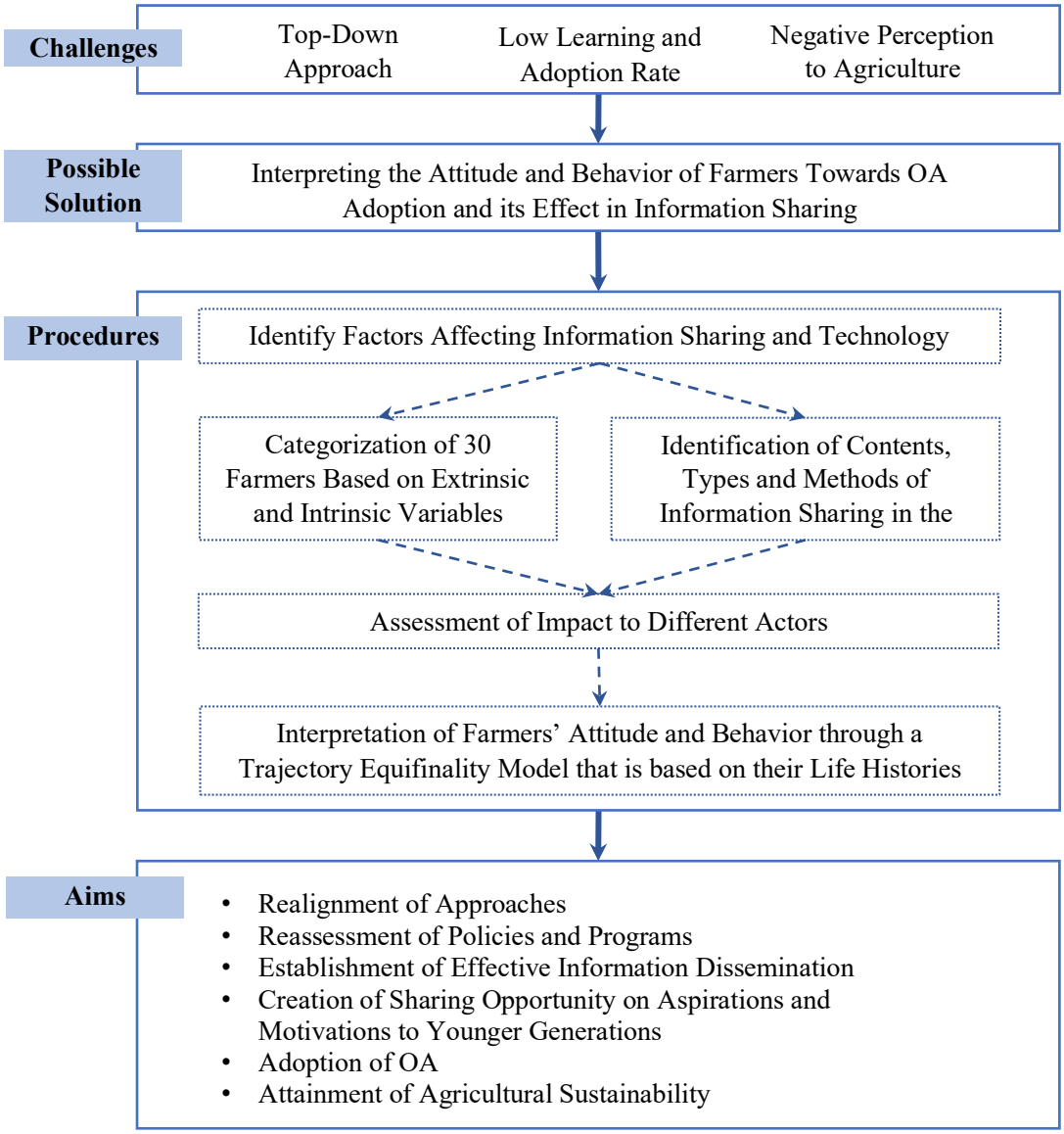

Figure 1. 4 The Conceptual Framework of the Research

1.8 Structure of the Dissertation

This dissertation is composed of seven (7) chapters with respective with a concise description or details (Figure 1.5). This includes introduction, review of literature, four chapters answering each study's objectives, and the chapter for summary, conclusion, and recommendation.

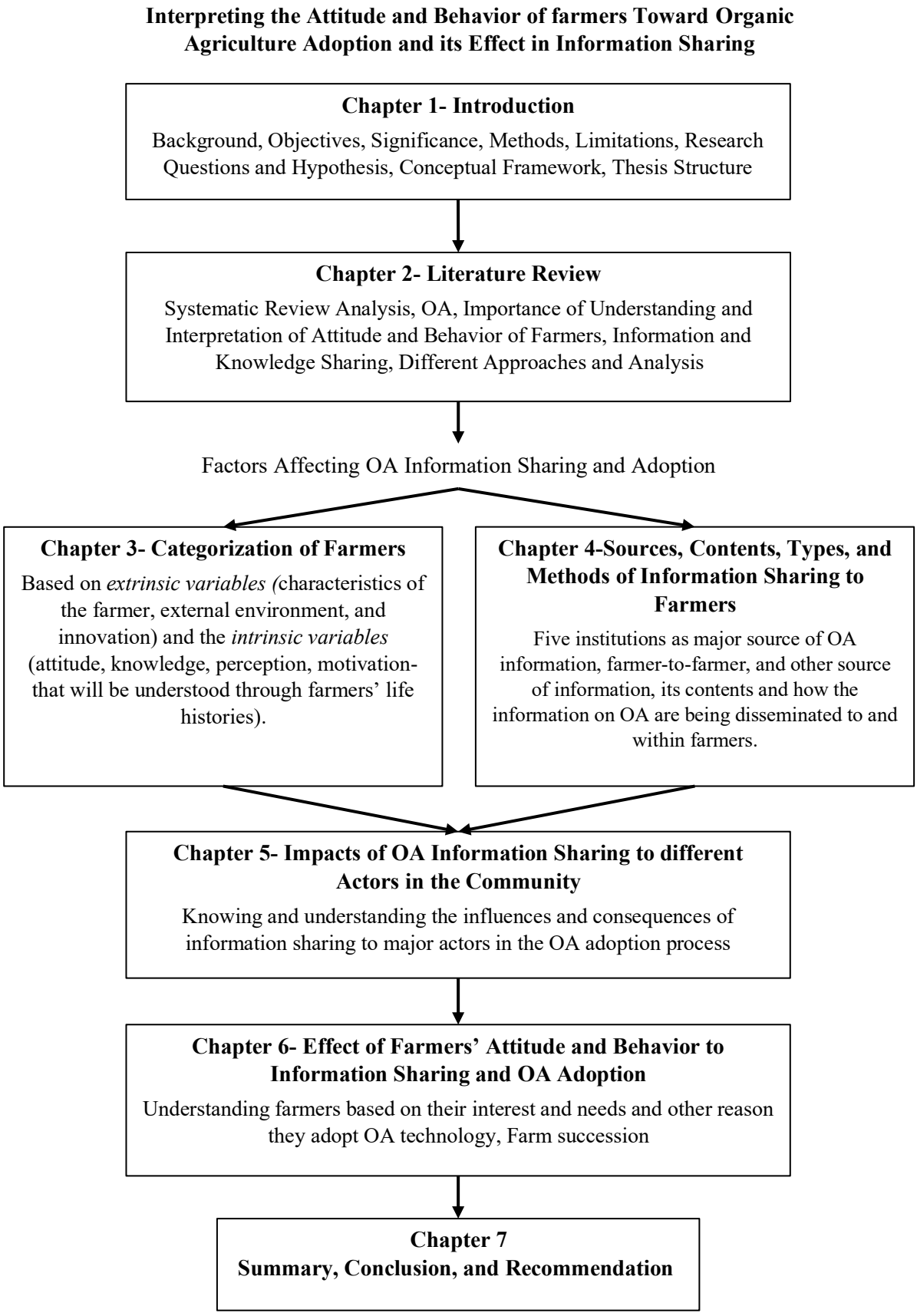

Figure 1. 5 The structure of the thesis (with details)

Chapter 1 focuses on the introduction that discusses the background, objectives, significance, methods, limitation, research questions, hypothesis, conceptual framework of the study, and the thesis structure.

The background of the study gives a short information on the connection of the dissertation to the MS research and describes how interpretation of attitude and behavior towards OA adoption and its effects in information sharing may optimistically solve the gap and problems related to the lower adoption rate of OA in the Philippines.

The objectives of the study present the aims on what to achieve after the research, which includes the general and specific objectives that focused on the proper interpretation of farmers' attitude and behavior and how these affects information sharing and adoption of OA.

Significance of the study provides the importance of the research as the first in-depth study on OA focusing on non-monetary factors affecting farmers decisions in information sharing and OA adoption. The study hopes to guide and give idea on how to properly interpret attitude, behavior, and other factors affecting farmers decision making to learn, share, and adopt information and technology that will help in bridging the gap between stakeholders to efficiently share and disseminate information and innovation. This study gives recommendation to academic and research institutions, policy makers, and farmers to be more effective in sharing information and persuading other farmers to adopt OA technologies.

Methods of the study includes the study area, interviews and sampling, study approach and data collection, and data analysis. In this part, justification of the study area and research participants were deliberated, and the reason Historically Structured Inviting (HSI) was done. Life History Approach (LHA), Grounded Theory Approach (GTA) and Trajectory Equifinality Approach (TEA) were utilized in collection, organization, categorization, and analysis of data. ATLAS.ti version 7 software was also presented as aid in utilizing GTA and Trajectory Equifinality Model (TEM) to understand farmers' life histories.

Conceptual framework of the study summarizes and figure the idea, significance, goals, and methodologies to assess and properly interpret attitude and behavior of farmers and its effect in information sharing and adoption of OA using a diagram to visualize the whole study. On the other hand, the structure of the thesis summarized the whole dissertation per chapter and sub-chapters and categories.

Chapter 2 is allotted for the review of literature which consisted of past studies that are related to information sharing, organic agriculture, the Philippines' agricultural systems, interpretation or understanding of farmers for effective information sharing, gender analysis in interpretation of farmers, and behavior, attitude, and intention in information sharing. This chapter also supports the whole study as it shows the lack of in-depth study on non-monetary factors affecting farmers' activities in dissemination and adoption of innovations. In addition, description and short explanation of qualitative methods, tools, and analyses used were also included in this chapter.

Chapter 3 and 4 mainly concentrate on different factors affecting information sharing and OA adoption. Factors were divided into two (2) parts or categories: the *extrinsic variables* (e.g. characteristics of the farmer, external environment, and innovation) and the *intrinsic variables* (e.g. attitude, knowledge, perception, motivation- that will be understood through farmers' life histories).

Chapter 3 generally focuses on the categorization of farmers based on their extrinsic and intrinsic variables (for extrinsic) and farmers' intrinsic characteristics' categorization. Chapter 3 basically focuses on farmers. Chapter 4 thoroughly discusses the innovation and information and knowledge they received and its respective sources.

Chapter 4 lists and examines the different contents, types and methods of information or innovation that farmers are receiving and sharing to other farmers or their families. Different institutions provide information and knowledge regarding various OA technologies or innovation. For this study, government and some private institutions are discussed as OA

information source. Through the series of interviews, observations, and e-mails exchange, contents, types, and methods of information sharing were gathered from key public and private institutions.

Upon knowing the different factors affecting information sharing and adoption, Chapter 5 assesses the impacts of information sharing to different actors in the community. Specifically, this chapter presents and explains the value of factors and difference by actors, the degree and interaction of information impact to different actors. Major actors on this study include institutions (as the main information sources), farmers (as the main receiver or beneficiaries of information and innovation), and the farmers' families (who are the main factor or reason affecting farmer's decision in adopting certain innovation).

Chapter 6 accounts for the effect of farmers' attitude and behavior to OA information sharing and adoption. This chapter gives an in-depth understanding on the interpretation of farmers' attitude and behavior and other related and important factors affecting farmers' decision in learning, accepting, sharing, and adopting OA through a trajectory equifinality model based on the 30 farmers' life histories. This highlights the interests, needs and reasons why farmers adopt and share OA practices. Moreover, this chapter provides the information on what and how farmers' attitude and behavior affect farm succession.

Chapter 7 summarizes and concludes the study by chapter in line with the objectives and research questions. Furthermore, this chapter also states the formulated recommendations which will hopefully encourage further studies and be helpful and useful to institutions, policy makers, upcoming farmer-trainers, potential farmers, and other actors in the community.

Chapter 2: Literature Review

Chapter 2 presents and discusses the past studies that are related to pertinent topics: interpretation or understanding of farmers for effective information sharing and technology adoption; information sharing; organic agriculture; the Philippines' agricultural systems; gender analysis in interpretation of farmers; and behavior, attitude, and intention in information sharing and technology adoption. This chapter also highlights the lack and importance of in-depth study on non-monetary factors affecting farmers' activities in dissemination and adoption of innovations. In addition, this chapter briefly explains the qualitative methods, tools, and analyses utilized.

2.1 Organic Agriculture

2.1a Definition

The International Federation of Organic Agriculture Movements or IFOAM define organic agriculture (OA) as a production system that sustains the health of soils, ecosystems, and people. This relies on ecological processes or procedures, biodiversity and cycles or rotations adapted to local conditions, instead of the use and application of synthetic inputs such as chemical fertilizers and pesticides with adverse effects to people and environment. OA is a combination of tradition, innovation, and science that benefits the shared environment and promote fair relationships and a good quality of life for all involved (IFOAM, 2005). To simplify, OA is a farming system that eliminates and excludes the use of synthetic chemicals, such as fertilizers, pesticides, herbicides, and antibiotics, in both crops and livestock production. OA relies on ecosystem management to improve its productive and functional capacities contrasting with the conventional agriculture which heavily depends on external inputs (Setboonsarng, 2015).

Tradition, as one of the components of OA, allows farmers to practice OA or natural faming without certification. However, certification is extremely important in international

trade to make sure that standard regulations were followed, hence organic agriculture can be certified or non-certified. As per Setboonsarng (2015) and PCAARRD (2012), certified organic agriculture usually implies to production processes that undergo assessment and evaluation by an unbiased third-party certifier to guarantee that national and international organic standards are being followed. This standardized system on OA is necessary to create a more cost-efficient information about procedure or processes across borders. In the international trade, organic certification seemed to be the most important because the information attached to the organic certified product or produce generates a certain value reflected as a price premium. On the contrary, non-certified organic agriculture, under national or international standards is not subject to third-party evaluation and commonly practiced by small traditional farmers who comprehend and support agroecological principles. These traditional farmers' produce is mainly for family consumption (subsistence) and or for local markets with no or limited price premium.

2.1b Importance

Being a production system that supplies food while it also protects and nourishes the environment, organic agriculture is extremely an important technology. Since 1975, IFOAM proactively promotes OA as a provider of a wide range of benefits including it conceivable multiple roles to answer various problems on hunger, malnutrition, poverty, water use, climate change, and unsustainable production and consumption. These significant aspects were also observed, perceived, recorded, tested, and reported by numerous studies.

It can also be added that OA can answer nine (9) of the United Nation's Sustainable Development Goals (SDG), specifically, SDG 1 no poverty, SDG 2 zero hunger, SDG 3 good health and well-being, SDG 6 clean water and sanitation, SDG 8 decent work and economic growth, SDG12 responsible consumption and production, SDG13 climate action, SDG14 life below water, and SDG 15 life on land.

According to Nugent (2015), OA produces food without using agrochemicals, sustains the health of soils, improves biodiversity, recycles nutrients, and climate-friendly through

minimizing fossil fuel-based chemical inputs and sequestering or isolating carbon from the atmosphere into the soil.

In addition, PCAARRD (2012) listed major benefits or significance of OA such as a "global industry" (since OA is now widely comprehended as an ecologically, economically, and socially sustainable agricultural production system), "green growth" (a movement that creates sustainable development through the attainment of basic needs of all without the addition of environmental burden), "fair trade" (considering exceptional attention on small-scale farmers or producers), "guardian of indigenous and traditional culture" (continuous utilization and development of indigenous and traditional practices), and "guardian of animal welfare" (where livestock are being provided an environment that match their natural role and behavior).

Furthermore, Jitsuchon and Methakunavut (2015) reported that aside from the economic benefits, Thai farmers adopted OA because of its most important benefit on health. Likewise, López and Requena (2005), Defrancesco et al (2008), and Burton et al (2003) stated that OA generates greater returns and mostly adopted by its economic impact.

Moreover, Genius, et al (2006) indicates that organic farming adoption would encourage farm output diversification and environmental awareness. Hattam (2006) and Laepple and Donnellan (2008) reported that apart from increased price, positive attitude of farmers towards health, and better environment were distinguished as benefits in adopting OA.

Anecdotal evidence of the positive and multi-branch benefits of OA in terms of poverty alleviation multiply as more farmers adopt OA around the world. According to Setboonsarng (2015), farmers reported that they experienced improvements in income, food security, health, and the environment after adopting OA practices. Unfortunately, empirical evidence of the impacts on poor organic farmers in developing countries are lacking and this situation obstructed an in-depth understanding and policy formulation crucial to promoting organic agriculture sector.

2.1c Organic Agriculture Status

IFOAM (2019) published a report on the world of organic agriculture 2017 which specified that in 2017, there were 69.8 million ha farmland worldwide, of which Asia accounted for 6.1 million ha was. Top Asian countries were China (3million ha) and India (1.8 million ha).

Moreover, IFOAM (2019) report showed the distribution of farmland in the world with the top three (3) countries with the largest share of organic agricultural land. Comparing to the producers/ farmers in the same year, there were about 2.9 million organic producers worldwide and 1.16 million (40%) organic farmers were in Asia. Philippines was even included on the top five (5) countries with the most number of organic farmers/ producers. This report also clearly shows that most of the Asian, African, and Latin American countries were dominated mainly by small-scale organic farmers. Furthermore, in 2019 IFOAM data, there were 23% (50,218) decreased on the organic land in the Philippines turning more farmers into small-scale.

2.1d Organic Agriculture in the Philippines

With its varied advantages and benefits, OA has been adopted and implemented in most of the countries all over the world including the Philippines. Long years of development efforts mostly by non-government organizations and private groups pushing for agriculture sector reforms to an ecologically sustainable, environment friendly, and safer production systems for the Filipino farmers were the driving forces for the enactment of the Republic Act No. 10068 (RA 10068) or more commonly known as the Philippine Organic Agriculture Act on April 6, 2010. Since then, the Philippine government has been doing numerous efforts and projects in promoting the adoption of organic agriculture to be one of the solutions in the current issues on sustainable agriculture, environmental degradation, and climate change. With the enactment of the RA 10068, the National Organic Agriculture Program (NOAP) was created and signed in 2012 to attain the goal of the Department of Agriculture (DA) that targets 5% of the country's agricultural lands under organic management.

NOAP, envisions that the OA sector will be contributing to the country's over-all agricultural development in terms of sustainability, competitiveness, and food security. In addition, the program also aims to provide support in making Philippine organic food products available for both domestic and international consumers. Fundamentally, the program intends to oversee the promotion, propagation, further development, and implementation towards a competitive and sustainable OA industry that contributes to better farm income and sustainable livelihood; improved health; environmental protection; disaster risk reduction and resilience to climate change; and social justice.

Filipino farmers have different reasons in adopting OA. The study of Landicho, et al (2014) stated that the shift was attributed to farmers' concern on health and food safety, cheaper inputs, and the preservation of their local agricultural practices. But the number of farmers and land devoted to OA are still low despite the efforts of the Philippine government to promote and adopt the technology, the OA adoption rate is still low and far from the target 5% land. Willer and Lernoud (2019) reports that in 2017 the area devoted to OA in the Philippines was only 0.17% of the total agricultural land or about 17,156 ha.

Various challenges such as policy gaps, lack of production support, promotion, and awareness activities, fragmented and inadequate research and development, extension and capability building activities, and poor market systems (which includes product labelling, quality of the organically produced agricultural products) attributed to low adoption rate of OA (del Rosario 2018; Pantoja et al. 2016; Landicho, et al 2014).

2.2 Understanding and Interpretation of Attitude and Behavior of Farmers

Effective information dissemination can be achieved through proper understanding and interpretation of farmers attitude and behavior that will leads to adoption of innovations they need.

2.2a Attitude and Behavior

According to the explanation of Voas (2014), attitude is a complex mental state or mind's predisposition or bias to certain ideas, philosophies, values, people, institutions, while behavior is the actual reaction or expression of feelings or action under specified circumstances. In addition, Kendra (2021) in psychology defines attitude as a feeling, belief, or opinion of approval or disapproval towards something while behavior is an action or reaction that occurs in response to an event or internal stimuli (i.e., thought). The connections between attitude and behavior are also affected by social factors. Ideally, positive attitude demonstrates sensible behavior. Conversely, in some instances positive or good attitude may result in negative or harmful behavior. Behavior frequently, but not always, reflects established beliefs and attitudes as it be influenced by a different factor beyond attitude, including presumptions or preconceptions about self and others, monetary factors, social influences, and convenience (Chaiklin, 2011; and Kendra, 2021).

2.2b Interpretation of Attitude and Behavior

Meijer, et al. (2015), argued that the understudied and less focused intrinsic factors such as attitude, knowledge, and perceptions of farmers towards innovation play a key role in knowledge sharing and adoption of innovation. In addition, a study conducted in Ireland by Laepple and Donnellan (2008) indicated that farmers attitude towards converting to organic farming are affected and motivated through the advice of others or act on information received from sources such as information events (training, seminar, symposium) or other people including family members and farm leaders.

Furthermore, Crawford, et al (2015) suggested that extension should include peer-to-peer learning as part of the facilitated activities in training so that farmers can share information and experiences. This grower-to-grower networking is a highly effective information-seeking behavior for organic growers in North Carolina.

2.2c Behavior, Attitude, and Intention in Information Sharing

According to Kettinger, et al (2015) individuals' intention has potential impact on knowledge and information sharing activities. Most of the previous knowledge and information sharing research have overlooked the technological dimensions of ICT for knowledge sharing. Moreover, individual, organizational, and technological determinants for knowledge or information sharing research as a whole have not been given adequate emphasis in developing countries. Whereas prior studies suggest that there is a need for a research model.

Most studies including Defrancesco et al., 2008; Burton et al, 2003; focused on the adoption of organic farming as assumed and predicted to be driven or directed by a variety of different reasons including economic and socio-economic, structural, and institutional factors. Nevertheless, the study of Genius et al (2006) focused on information gathering and the research of Willock et al (1999), Hattam (2006), Rehman et al (2007) on attitudes of the farmer are also important factors in the adoption decision and information sharing activities.

2.2d Interpreted Needs from the Previous Study

A study conducted by Aquino (2019) stated that aside from increased income and profit, small-scale organic farmers have different reasons and needs in adopting specific technology. It includes the adoption of botanical concoctions for the reason that the technology is safe for the farmer's children; fruit tree integration was also noted as technology adopted from a strong motivation of the farmer to retire early. In addition, another farmer stated that safeness is the main cause for her to adopt composting and botanical concoction and her interest to learn different techniques in fruit trees pushed her to adopt grafting and budding of fruit technology.

2.2e Proper Interpretation of Farmers for Effective Technology Adoption

According to Mottaleb (2018), the adoption of new technology in agriculture can lead to agricultural growth that can have a vital impact on rural poverty alleviation. Unfortunately, the adoption of new agricultural technology is seldom rapid since various factors can affect the

adoption process (Pierpaoli, et al., 2013). In addition, new agricultural technologies are often correlated with risks and uncertainties about proper application, scale appropriateness and suitability with the prevailing environment, and importantly with farmers' perceptions and expectations (World Bank, 2007). Therefore, examining farmers' perceptions of a new agricultural technology is extremely important to ensure the adoption and scaling up of the technologies, thereby, ensuring sustainable growth and development of the agriculture sector (Mottaleb, 2018).

Compiled works of several social scientists including Chambers et al. (1989) and Franzel et al. (2015), show that farmer's participation in agricultural research and the concepts of identifying farmers' problems giving feedback with alternatives. Moreover, these prove that more systematic and active involvement of farmers in the research process has positive results to farmer skills to experiment and adopt technology.

2.2f Proper Interpretation of Farmers Factor in Persuasion of Younger Generations

Kimhi and Bollman (1999) examined a 10-year period to determine why the owners of Israeli and Canadian farms decided to stop farming as well as the aspects of the owners' behavior connected with this decision. According to Kimhi and Nachlieli (2001), in their study of Israeli farms, it was determined how the characteristics of the farm family and the farm affect farm succession. Kimhi (1994) also paid attention to how the age and experience of the owner, the successor's level of education, socioeconomic characteristics, and characteristics of the farm affect when the owner transfers the farm to his/her successor. For each farm, they studied factors connected with its location, the personal characteristics of the owner, off-farm employment of the owner, the type of farm production, the size of the farm, and other characteristics of the farm. Kimhi and Lopez (1999) conducted a study of farms in Maryland in which they examined how the characteristics of the owner, farm family, and farm affect decisions on farm takeover. Prior to this, Gale (1993) examined the effect of the demographic and economic factors and farm location on the actual and potential farm takeover by younger successors. Goetz and Debertin

(2001) studied factors believed to affect the American farm exit, focusing on the effect of various characteristics of the farm and farm family as well as the effect of regional characteristics.

In the Philippines, young people avoid their fathers' farm plots in favor of work cubicles in the cities where they see pay to be not only better but also more certain. The reluctance of young Filipinos to take up farming is easy enough to understand. Aside from the difficulty of the work, there is also the uncertainty in returns, especially due to weather (Habito, 2016).

2.2g Understanding and Interpreting Farmers for Effective Information Sharing

Effective information dissemination can be achieved through proper understanding and interpretation of farmers attitude and behavior that will lead to adoption of innovations they need. As supported by the explanation and definition of Voas (2014), that attitude is a complex mental state or mind's predisposition or bias to certain ideas, philosophies, values, people, institutions, while behavior is the actual reaction or expression of feelings or action under specified circumstances. Attitude and behavior of farmers towards organic agriculture must be understood.

Meijer, et al. (2015), argued that the understudied and less focused intrinsic factors such as attitude, knowledge, and perceptions of farmers towards innovation play a key role in knowledge sharing and adoption of innovation. In addition, a study conducted in Ireland by Laepple and Donnellan (2008) indicated that farmers attitude towards converting to organic farming are affected and motivated through the advice of others or act on information received from sources such as information events (training, seminar, symposium) or other people including family members and farm leaders. Furthermore, Crawford, et al (2015) suggested that extension should include peer-to-peer learning as part of the facilitated activities in training so that farmers can share information and experiences. This grower-to-grower networking is a highly effective information-seeking behavior for organic growers in North Carolina.

Extrinsic variables such as age, gender, and agricultural education or experiences has indirect effect on attitude of farmers in adopting sustainable agricultural practices. Changing farmers' knowledge and belief about sustainable agriculture will also change their attitude. Proper dissemination information, which means information must be made available to farmers in a usable form that will satisfy or serve their needs and interest is a necessity for technology adoption (Petrzelka & Korsching, 1996).

2.2h Gender Analysis in Interpretation of Farmers in Information Sharing

Study published by FAO (2005) about gender and farming systems stated that the development of policies and programs need to take into account the status of the women as forgotten in the Women in Development (WID) approach. This FAO study highlighted the need to focus on the roles and responsibilities of both women and men, to differentiate their participation in the decision-making process, and to foster changes in social structures, values, and behavior.

World Bank (2007) also published supporting studies that highlighted the importance of gender analysis. Research showed that women farmers are as efficient as men farmers in controlling for other characteristics and input levels; agriculture is becoming feminized in many countries; attention to gender facilitates the achievement of economic and social objectives; and Ignoring gender can lead to project failure.

Gender analysis conducted within a specific social group is an instrument for studying relations between women and men by examining the activities, responsibilities, opportunities and constraints regarding resources, decisions, and the execution of personal activities in the group under review (FAO, 2005).

2.3 Information and Knowledge Sharing

2.3a Definition and Importance

Effective information service delivery or dissemination specifically to the people at the grassroots can be achieved when adequate attention is focused on how information is received, processed, communicated, and used positively for all stakeholders' benefits. Quality information delivery is a right step towards the growth of agriculture, infrastructure, and small-scale industries. Good communication with the rural population will enable access to relevant information that can nurture their business desires supported with adequate skills acquisitions (Ogar, et al., 2018).

Accascina (2000) pointed out that information communication technology has a positive impact in reducing poverty alleviation in relation to rural development and food security. In addition, Ogar, et al. (2018) stated that an effective service delivery, can provide the rural dwellers their needed information to support their occupation which is mainly agriculture and allied services. The implication is that life will become more meaningful and attractive at the rural areas through education, health care, transportation, agriculture, and small and medium enterprise support by using information and communication technology.

2.3b Information System in the Philippines

According to FAO (1995), the transfer of technology (TOT) model has been adopted and commonly used in varied countries including the Philippines as a standard for the National Agricultural Research Systems (NARS) since the late 1960s. TOT considers and credits research as the starting point for disseminating agricultural knowledge, then extension workers are demanded to transfer the technology they received from research institutions to farmers. This shows the top-down approach information system. In1987, the Philippines' Department of Agriculture (DA) was given the mandate "to use a bottom-up, self-reliant, farm systems approach that will emphasize social justice, equity, productivity and sustainability in the use of

agricultural resources" (Dar, 1993 as cited in FAO, 1995). However, the same author admits that in various occasions, technologies from institutions failed the test of site realities.

Recently, as part of the centralization of the DA, Agricultural Training (ATI) Institute was mandated to be the lead agency to transfer information and technology to farmers (de Ramos, 2019; Pauig, 2018). In addition, Agricultural Knowledge and Information Systems (AKIS) model was being utilized. AKIS model is defined as the two-way flow of information and knowledge among the research, dissemination, and utilizer sub-systems play equally important roles in the system (FAO, 1995).

2.3c Role of Farmers in Information Sharing

Farmer plays vital role in experimenting and knowledge sharing especially information dissemination of farmer to farmers that have been used significantly in the Philippines and Central America since 1950s and 1970s, respectively (Franzel et al., 2015). Significantly, almost all traditional agriculture practices are the results of spontaneous spread of innovation from one farmer to another, from one village to another, and even clear across continents (Bunch, 1989).

2.4. Different Approaches and Analysis

2.4a Qualitative Approaches

Qualitative research is interpretative, very dynamic, free-flowing process and is not meant to have many structures or rigid approach to analysis. It is a scientific method of observation to gather non-numerical data. In general, it is used to understand the meanings, concepts, definitions, characteristics, metaphors, symbols, and description of things and not to their quantity, counts or measures (Babbie, 2014).

According to Given (2008), qualitative methods are best for researching many of the why and how questions of human experience, for instance to understand reasons or considerations in making decision and not just answering what, where, when, or who.

Based on Corbin and Strauss (2015), qualitative research and methodologies are being used to: explore the inner experiences of participants; discover how meanings are formed and transformed; investigate areas not yet thoroughly researched; uncover relevant variables that later can be tested through quantitative forms of research; and take a holistic and comprehensive approach to study phenomena.

Qualitative research and methods include the application of Life History Approach (LHA) and Grounded Theory Approach. LHA and GTA are qualitative methods to collect data that satisfies the desire to step beyond the known and enter into the world of participants, to see the world from their perspective, and in doing so to make discoveries that will contribute to the development of empirical knowledge (Glaser and Strauss, 2006).

2.4b Life History Approach

Life History Approach (LHA) is an approach that focuses on the lives of individuals as told through their own stories. It is a personal account of their life, in their own words and using their own personal timelines. The emphasis is on the story and typically both what and how are narrated. It measures “real world” with “real life problems”.

A life history is essentially telling or recounting of a string of events. LHA works with personal narratives that unfolds history of one person’s experiences. It takes into consideration the realist and the constructionist approaches. The realist approach has been interested in historical processes such as social mobility, generations, and the experiences of social classes and professions. The constructionist approach tends to focus on the presentations of ideas, identities and narrative configurations. An individual’s life history becomes an “entry point”

into understanding the social and economic structures which shape the individual's life (Abu Bakar and Hj., 2008).

According to Ssali, et al., (2015), LHA helped the researchers to explore and identify the dominant narratives of people's lives within events and situations. These narratives were contextualized and described how a specific event came to be significant, and how opinions and decisions change over time. In addition, life histories are found to be good at enabling people to recollect the past and document change, especially where some events could have been missed out through other methods requiring simple recall of facts. People may not remember the actual details but remember the significant events.

LHA's general purpose is to provide insights into the nature and meaning of individual or mutually related lives. The specific purpose is to analyze a particular life or lives for some specific reason. It begins with a life story related by someone but will build on the information provided. Large samples are unnecessary and maybe even inappropriate in LHA. Adequacy is dependent not upon quantity but upon the richness of the data and the nature of the aspect of life being investigated. Insight into the lived realities of specific lives is provided through this approach. (Abu Bakar and Hj, 2008).

Furthermore, it is participatory and gives the respondent more voice than other deductive methods. It empowers the respondent by giving them a more prominent role to decide what is significant, why it is significant and where is their location or position within the experience. It also helps people to evaluate their lives, clarify what life would have been and determine why it was so. At the same time, it provides a history beyond the personal aspects. The analysis helps to show that lives are not free floating but are occurring in a social context, hence are socially constructed (Ssali, et al., 2015).

Listening to the voices of the subject being studied, especially those belonging to marginal and minor groups can be met and be given an importance through LHA. It aims to penetrate and understand deeper the subject or topic being studied through allowing the subject

to narrate their stories and present their own point of views. Generally, LHA explores the subject's experience and the meanings he/she attributes and gives to the experiences. The voice, idea, and point of view of the small-scale farmers are important in this research.

2.4c Trajectory Equifinality Approach

Trajectory Equifinality Approach (TEA) as defined by Sato, et al. (2016) is an integrated methodology for cultural psychology that derives its basic ideas from Jaan Valsiner's cultural psychology. Integrated methodology as TEA consists of three major components which are trajectory equifinality model (TEM), historically structured inviting (HSI), and three layers model of genesis (TLMG) that are essentials for understanding the human life course within an irreversible time.

Trajectory Equifinality Model

Trajectory Equifinality Model (TEM) is composed of different points and notion or concept. The first concept, premise or foundation of TEM is the notion of irreversible time that originated in Henri Bergson. As compiled and cited by Sato, et al (2013), other papers include Kadianaki (2009), Mattos (2013), Sato, et al (2009), Sato, et al (2012) define TEM as the flagship of TEA, which is a methodology for describing life within irreversible time.

The core of TEM is the notion of equifinality where the same state or situation may be reached from different initial or starting conditions and in different ways or various possible pathways in a life trajectory or the course or flow of time. The final point or same state or situation is called the equifinality point (EFP). EFP is regarded as the research core or focus point (Sato, et al, 2013).

Aside from EFP, there are two other major points: bifurcation point (BFP) which is a point that has alternative options to go or move, and the obligatory passage point (OPP) which originated in the context of the sociology of science. OPP is a phase and/or event person inevitably or unavoidably or compulsorily experience. OPP has two types: indigenous and

exogenous. Indigenous OPP includes species-specific biological transition points – such as cutting of teeth in infancy, menarche (the first occurrence of menstruation), or menopause. The exogenous OPP, on the other hand, is set up by the environment and/or custom (Sato, et al, 2007).

In addition, TEM aims to describe the transaction between human and environment; and focuses or emphasizes on human experience of change or transformation within irreversible time in an individual's life course (Sato et al, 2013). Moreover, TEM expresses the idiographic life trajectories using many conceptual tools. TEM also aims to explain or describe the interaction of human and environment by construing or interpreting people's life courses through selecting one possible option from a range of options at one time.

Furthermore, it is important and critical to emphasize that equifinality does not imply sameness – which is an impossible condition in any historical system. Rather, it entails or involves a region of similarity in the temporal or chronological courses of different trajectories. Trajectories should be traced after establishing the equifinality point, (Sato, et al 2007).

Historically Structured Inviting (HIS)

Historically Structured Inviting (HSI) is from the concept of Historically Structured Sampling (HSS). Since social scientists are not forcing participants in the research, "sampling" was changed to "inviting". HSS is a sampling method of individual cases based on their previous and up-to-now knowable or coherent life course histories that are analyzed as a series of bifurcation points. It makes it possible to contrast individuals who have arrived at the present state (equifinality point) through vastly different life course trajectories (Sato et al, 2007 and Sato et al, 2009).

Furthermore, HSS is inevitably related to Equifinality Point (EFP) as a research focus. Researchers set their spontaneous interesting research focus by themselves. Then HSS makes it

possible to pick up participants who experienced the selected Equifinality point while arriving there through very different life course trajectories (Sato et al, 2013).

Three Layer Model of Genesis (TLMG)

The Three Layer Model of Genesis (TLMG) is useful for understanding the final level or the ontogenesis through the prisms of two other time frames that can be seen in Figure 3. The process of Aktualgenese (this German word was translated into English "microgenesis" by Heinz Werner) which is constantly at work is at the microgenetic level. Above the microgenetic level is the mesogenetic level where changes are combined or consolidated to be either taken as novelties (new findings or innovation) to the macrogenetic level or become regulators ("promoter signs") of the microgenetic processes. The upper level is the macrogenetic, also known as ontogenetic level, where nothing needs to change (Sato, et al., 2009 and Valsiner, 2007).

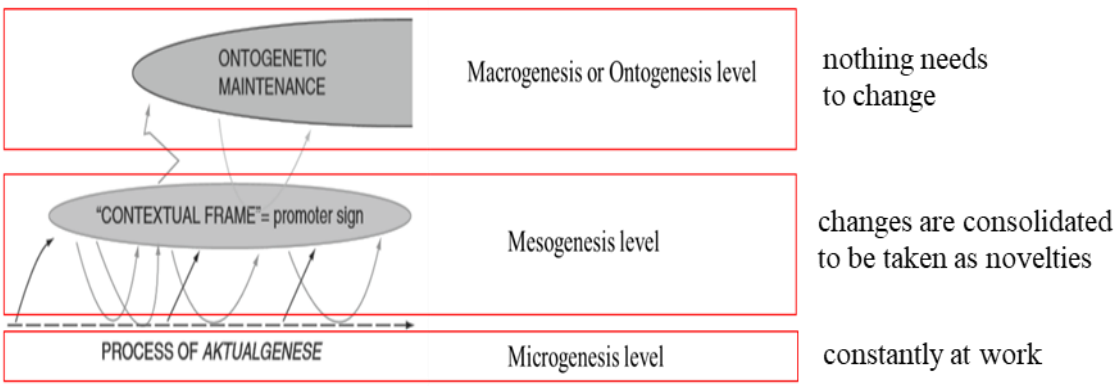

Figure 2. 1 The scheme of Three Layers Model of Genesis

(Sato, et al., 2009)

Microgenesis is a phase where the person first interacts or faces new moment or experience in his life. Mesogenesis, on the other hand, is an activity context dependent and a level consists of relatively repetitive situated activity frames or setting. These repetitions of activities will lead to "stableness"- constant or unchanging. Ontogenesis level is the phase where

selected experiences become into relatively stable meaning structures that guide the person within his life course (Sato, et al, 2013).

TLMG is important as it is the framework to understand the transactional nature of signs that is directly related to bifurcation points (BFP) in TEM. It aids in understanding how signs occur or develop at specific time and place (in each BFP) in a person's life trajectory (Sato, et al, 2013).

Furthermore, Sato (2006) stated that these layers with the aid of TEM are useful to understand the three levels of the process on irreversible time and not just only for understanding life history. The three levels include: history, life course development, and decision making which also falls to the three layers model of genesis microgenetic level, mesogenetic level, and ontogenetic level, respectively.

2.4 d Grounded Theory Approach (GTA)

GTA provides a tried-and-true set of procedures for constructing theory from data. It is used to uncover beliefs and meanings that underlie action, and it also examines topics and rational as well as non-rational aspects of behavior from different angles to gain insight and deeper understanding into old problem and new areas need of investigation. Likewise, GTA demonstrates how logic and emotion combine to influence how person responds to events or handle problems through action and interaction (Corbin and Strauss, 2015).

GTA strongly favored direct participant-observation of researchers and interactions between participants and researchers. GTA also use the field of symbolic interactionism and its focus on how people interpret the meaning of objects in the world, the dynamic interplays of human behavior, the lived realities of individuals, and the social construction of social behavior GTA. In addition, GTA is an approach that focuses not only to make truth statements about reality but, rather, to elicit fresh understandings about patterned relationships among social

actors and to explore how these relationships and interactions dynamically construct reality for the actors (Charmaz, 2005; Goulding, 2002)

According to Locke (2002), utilization of GTA as a research methodology provides ‘‘a set of systematic procedures extending and significantly supplementing the practices long associated with participant observations to achieve their purpose of developing grounded theories of action in context.

Even though GTA is comprised of various analytical tenets, it is the collective iterative cycling of these tenets that creates a holistic methodology for theory building. GTA is not a loose collection of tools for handling and analyzing data or simply a means by which to code data nor GTA as a synonymous descriptor for any emergent qualitative design (Strauss and Corbin 1998)

GTA encouraged the researchers not to depend on or follow the guidelines meticulously but freely using their own common sense. “Sometimes, one has to use common sense and not get caught up in worrying about what is the right and wrong way. The important thing is to trust oneself and the process. Students should stay within the general guidelines and use the procedures and techniques flexibly according to their abilities and the realities of their studies” (Strauss and Corbin, 1998). Researchers can learn the importance of being flexible in all aspects of the research pursuit. Straussian Version organize data collection and analysis in a simultaneous process. Firstly, interviews and observation are important instruments of data collection. Researchers learn how to code data and categorized using the constant comparative method.

The constant comparative method is a procedure in which two activities occur in tandem: naming data fragments and comparing of data incidents and names. The constant comparison enable data comparison as all new data are meticulously and carefully compared to earlier or previous data to enable adjustment of theoretical categories based on the ongoing analysis surrounding participant issues, problems, and concerns. As data are collected, the goal

is comparing incident to incident and then incident to concept for the purpose of generating categories and saturating their properties (Locke, 2002; Glaser, 2001).

2.5 Qualitative Research in different field of studies

Qualitative research has been used in different field of studies, most commonly in medicine, psychology, sociology, and education. Nevertheless, it is not limited in these field of studies as there are qualitative research that were done to understand some studies in business. Table 2.1 presents a compilation of the different studies in business and agribusiness fields.

Table 2. 1 Different studies utilizing qualitative methodology in business and agribusiness field

Citation	Title	Field of Studies
O' Reilly, et.al., (2012)	Demystifying Grounded Theory for Business Research	Business
Boadu and Sorou (2015)	On Utilizing Grounded Theory in Business Doctoral Research: Guidance on the Research Design, Procedures, and Challenges	Business/ Marketing
Keränen and Oinonen (2019)	Grounded Theory Studies in Industrial Marketing: Systematic Review and Implications for Future Research	Business/ Marketing
Leite, et al., (2016)	International Entrepreneurship in Agribusiness	Agribusiness

Note: Compiled by author

In addition, most studies utilizing qualitative approaches specifically LHA, GTA, and TEA are in educational, psychological, and health or medicinal fields. New publications applied these qualitative approaches, specifically the trajectory equifinality approach were found (Table 2.2).

Table 2. 2 Studies that utilized Trajectory Equifinality Approach (TEM)

Citation	Findings	Field
Hiromatsu and Ozawa (2020)	With the use of TEM, work values and beliefs of mid-level employees were understood and the support from senior staff helped them in the formation of work values	Business
Kiminami, et. al (2020)	Social entrepreneurship and social business in association to the urban agriculture in Japan	Business
Kawai (2020)	Japanese farmers' relationship with their crops and vegetables' seed-saving ethics of 10 Japanese Farmers	Agriculture (Food Ethics)

Note: Compiled by author

These clearly show that qualitative approaches are also being utilized in different fields outside their conventional domains.

2.6 Quality and Validity in Qualitative Research

As qualitative research deals with non-numerical data to understand meanings and concept definitions, quality and validity of data and research results are in questions and always an issue. Some literatures deliberated or discussed on how to manage quality and validity in doing and interpreting qualitative studies.

To attain a good quality qualitative research, a high-quality data should be gathered. According to Mason (2002), knowledge generated through high quality observation is usually rich, rounded, local and specific. In addition, 'scientific criteriology' do not always fit comfortably in qualitative research. The fact that arguments are expressed and are essentially relational means that researchers or scientists need to be concerned with how to interpret and put the arguments of the study. In checking the quality of qualitative research, reflecting on the quality of the methods in relation to the research questions, and on how well they produce relevant data which can be used in constructing explanation instead of demonstrating how and

why the methodological strategy is a valid way to pursue your research questions (which involves showing how particular methods, aspects of methods, or data sources).

In conducting interviews, or analyzing documents, researchers need to reflect not only on how effectively interviewing or documentary analysis as strategies can illuminate the concepts in which they are interested, but also on the capacity of interviewee or document, or set of questions, or the interaction. Validity of interpretation in any form of qualitative research is contingent upon the 'end product' including a demonstration of how that interpretation was reached. This means that researchers should be able to, and be prepared to, trace the route by which they came to their interpretation. They must spell out what basis they have felt. For example, interpret a piece of dialogue from an interview, or a set of observations from a particular setting, or a section of a document, as reflecting upon a particular ontological concept or set of issues (Mason, 2002).

In addition, according to Flick (2009), in validation of qualitative research, the general statements are made as independently as possible about the concrete cases that have been studied. Observed phenomena are classified on their frequency and distribution. In order to classify causal relations and their validity as clearly as possible, the conditions under which the phenomena and relations under study occur are controlled as far as possible. Studies are designed in such a way that the researcher's (as well as the interviewer's, observer's, and so on) influence can be excluded as far as possible. This should guarantee the objectivity of the study, whereby the subjective views of the researcher as well as those of the individuals under study are largely eliminated.

The goal of the research then is less to test what is already known but to discover and develop the new and to develop empirically grounded theories. Also, the validity of the study is assessed with reference to the object under study and does not exclusively follow abstract academic criteria of science as in quantitative research. Rather, qualitative research's central criteria depend on whether findings are grounded in empirical material or whether the methods

are appropriately selected and applied, as well as the relevance of findings and the reflexivity of proceedings (Flick, 2009 and Mason, 2002).

2.7 Systematic Review Analysis of the Study

To understand and justify the significance of this study, a systematic review analysis was made. This analysis vindicated and showed different studies on organic agriculture with great importance to the result of lack or few studies focusing on the intrinsic factors such as attitude and behavior.

With the guidelines set by the University of Edinburgh (2020) in conducting Systematic Review Analysis, the research question was made focusing on the attitude and behavior of farmers in adopting and sharing organic agriculture technologies. Following Cook, et al (2012) methodology, SPIDER was used as a tool for qualitative data synthesis. SPIDER stands for **S**ample, **P**henomenon of **I**nterest, **D**esign, **E**valuation, and **R**esearch Type.

- **S**ample- Farmers in Laguna, Philippines
- **P**henomenon of **I**nterest- Interpretation of attitude, and behavior of farmers affecting the adoption and information sharing of organic agriculture (technologies)
- **D**esign- Qualitative analysis utilizing Life History Approach (LHA), Grounded Theory Approach (GTA), and Trajectory Equifinality Approach (TEA)
- **E**valuation- Assessment of intrinsic variables through LHA utilizing TEA guided by GTA
- **R**esearch Type- Qualitative

The research question derived from the above SPIDER tool, was “How can an interpretation of attitude, and behavior of farmers affecting the adoption and information sharing of OA in the

Philippines?" From this research question as a guide, preliminary search was done to validate the existence of the study and to distinguish what studies are focusing on intrinsic factors affecting farmers OA's adoption and information sharing.

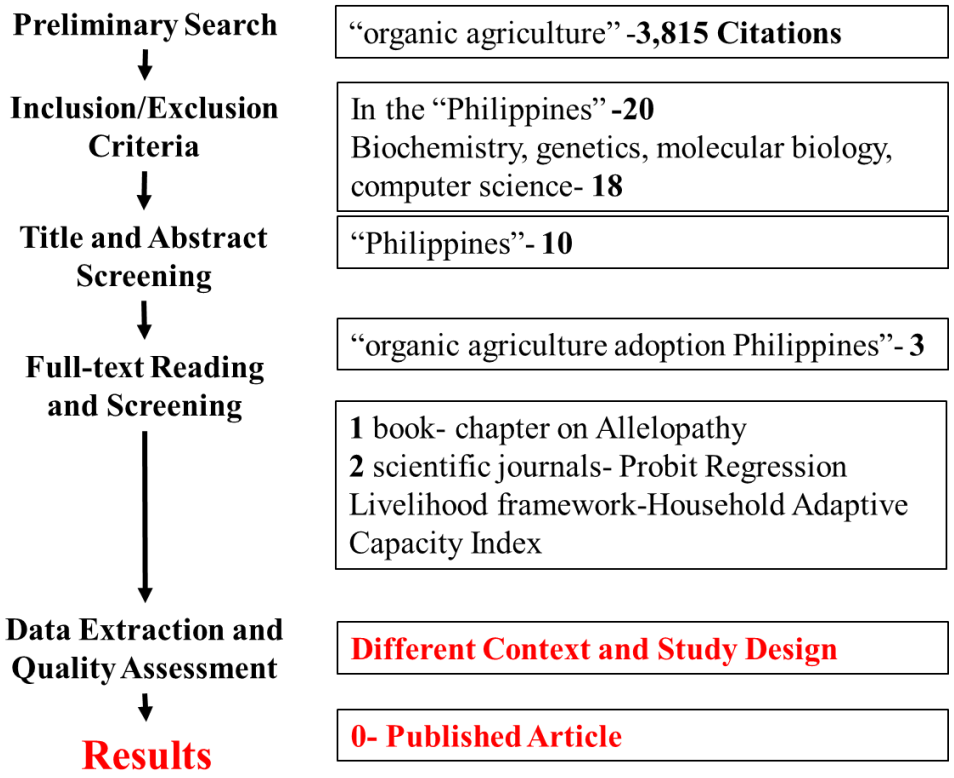

Figure 2.2 Systematic Review Analysis for OA adoption in the Philippines

Note: A systematic review analysis of the study following the University of Edinburgh (2020)

Preliminary searches to varied websites such as Scopus, Google scholar, were made. "Organic agriculture" gave 3,815 citation results (Figure 2.2). After removal of duplicates and the inclusion and exclusion criteria "organic agriculture adoption" gave 155 screened results, including the "Philippines" only 20 screened citations were remained. Out of these 20 publications, exclusion of journals focusing on biochemistry, genetics, molecular biology, computer science, resulted to only 18 remaining publications. Screening title and abstract focusing on studies conducted and fixated in the 'Philippines' only gave 10 articles. And from these published articles, only three (3) articles for full-text reading and screening were related to "Philippines organic agriculture adoption".

The three (3) articles qualified for the synthesis after data extraction and quality assessment presented different context and study design. Upon the full-text reading and screening, it showed that one of the three published article is a book chapter focusing on allelopathy, meaning the suppression of growth of one plant species by another due to the release of toxic substances of plants in organic farm. Other two remaining articles discussed the adoption of OA focusing on the utilization of Probit Regression and the Livelihood framework-Household Adaptive Capacity Index. Unfortunately, when "behavior and attitude" were included, there is zero article published.

Checking on the 155 citations on "organic agriculture adoption" excluding the "Philippines" and including the "behavior" and "attitude", upon title and abstract screening, there were seven (7) published journal articles that passed to the full-text reading and screening (Figure 2.3).

Studies all focused on the effect of attitude and behavior towards organic agriculture adoption in different countries including Croatian (which used the spatial analysis), Australia (focusing on consumer behavior and organic food adoption), Italy (on consumers' perception), two publications from Iran (on sociological factors and review of literature on challenges on marketing, certification, credits, and access of reliable technology information), Syria (on attitude of farmers towards organic agriculture using the Theory of Planned Behavior), and Germany (on the environment concern and adoption of organic agriculture).

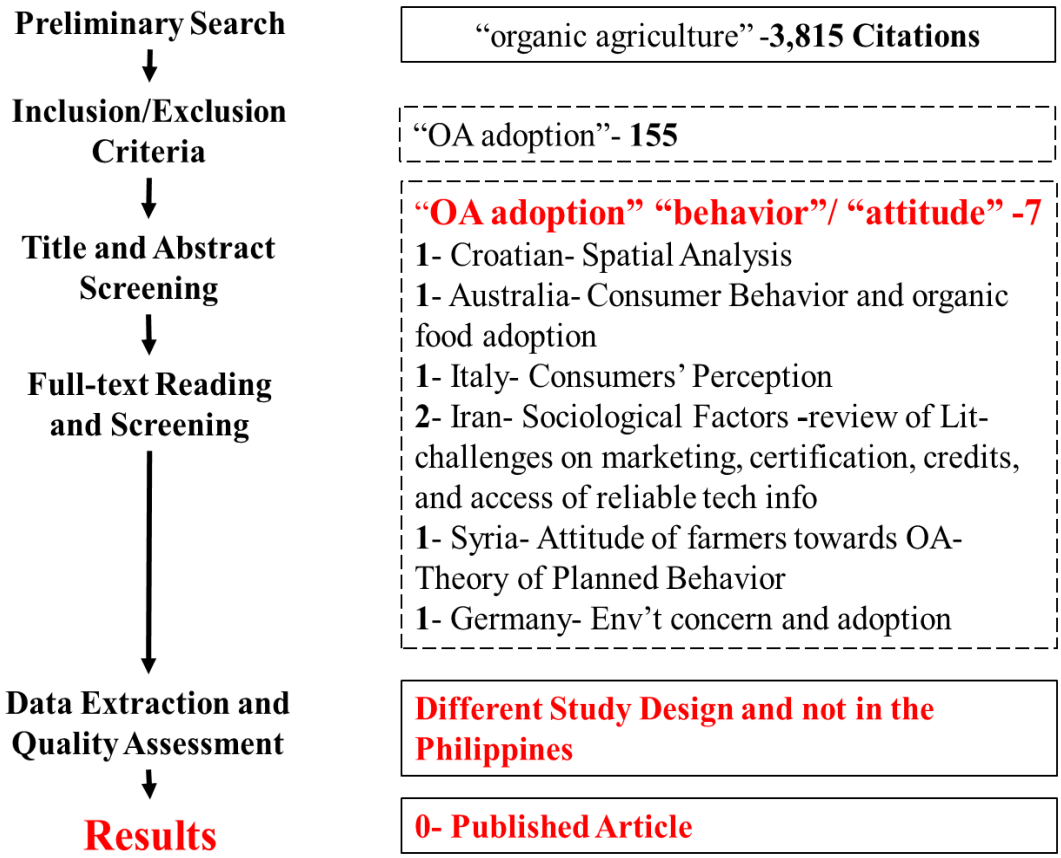

Figure 2.3 Systematic Review Analysis on OA Adoption including Attitude and Behavior

Note: A systematic review analysis of the study following the University of Edinburgh (2020)

All articles found seemed to be interesting and useful however, inappropriately these utilized different study designs and different areas or not within the Philippines. From these results, it shows that the study on the interpretation of farmers attitude and behavior on organic agriculture adoption and information sharing in the Philippines utilizing qualitative approaches specifically LHA, GTA, and TEA seemed to be original and unique.

Chapter 3: Categorization of Farmers based on Extrinsic and Intrinsic Variables

Chapter three focuses on the discussions of categorization of farmers. It has two sub-chapters- the classification of farmers based on their extrinsic variables (socio-economic and demographic characteristics) and the classification of farmers based on the intrinsic variables.

Introduction

There are different factors affecting information sharing and adoption of technology. Most studies focused on the extrinsic variables and less on the effect of intrinsic variables to adoption and information sharing. Understudied and less focused intrinsic factors such as attitude, knowledge, and perceptions play a key role in knowledge sharing and adoption of innovation (Meijer, et al., 2015). Also, Petrzelka and Korsching (1996) stipulated that attitude can be affected by various factors including the effect of extrinsic variables and the change on farmers' knowledge and belief. In addition, Laepple and Donnellan (2008) presented on their research that farmers attitude in converting to OA are affected and motivated by other actors. Moreover, this result is in line with the findings of Crawford, et al (2015) which conveyed that grower-to-grower networking is a highly effective information-seeking behavior. Hence, this chapter aims to identify and classify farmers based on their extrinsic and intrinsic characteristics that would also give a deeper comprehension on how categorization of farmers helps in understanding their attitude and behavior.

Methodology

In this research, factors were grouped into two parts: the *extrinsic variables* (includes characteristics of the farmer, external environment, and innovation) and the *intrinsic variables* (attitude, knowledge, perception, motivation- that will be understood through farmers' life histories). There were 30 farmers that were surveyed, interviewed, and observed from the period within 2018-2020.

Extrinsic factors were gathered through surveys of farmers. Socio-economic and demographic characteristics were collected through farmers' profile, family and farming history, and farm's profile. Data gathered were analyzed and explained using simple descriptive statistical analysis such as mean and percentages.

On the other hand, intrinsic characteristics were accumulated using open ended guided questionnaire, then transcribed, encoded, compared, compiled, and categorized utilizing LHA, TEA, and GTA. Transcribed and graphed information on their life histories affecting farmers' attitude and behavior were showed to farmers for verification.

Results and Discussion

3.1 Classification of Farmers based on their Socio-economic and Demographic Characteristics using extrinsic variables

Extrinsic variables such as age, gender, and agricultural education or experiences has indirect effect on the attitude of farmers in adopting sustainable agricultural practices. Data about the farmers' socio-economic characteristics were gathered and presented under farmers' profile, farms' profile, and external environment.

3.1a Farmers' Profile

Data about the farmers' socio-economic characteristics including age, gender, marital status, number of households, educational attainment, main job, and secondary job, farming experiences, organization / affiliations, farmer's dialects, and languages were gathered.

Age, Marital Status and Number of Household Members

Survey shows that the average age of the farmers in the study area is 51.57 years old with 30 years old as the youngest and 72 years old as the oldest. Hence, as can be seen in Table 3.1 farmers were categorized based on their age and gender. There were 15 farmers consisting

of 9 men and 6 women below 52 years old who were considered young farmers. While another 15 farmers comprising of 12 men and 3 women ages more than 52 years old were reflected as old farmers. Most of the older farmers tend to use traditional practices and younger farmers tend to explore more technologies.

Table 3.1 Distribution of farmers based on age and gender (n=30)

Age	Below 52	Average age	52 and up	Average	Total	Total
Gender	No. of Young	(young)	No. of old	age (old)		Average
Male	9	44.56	12	60.92	21	53.91
Female	6	39.67	3	59.00	9	49.33
Total	**15**	**42.11**	**15**	**59.96**	**30**	**51.57**

Source: Field Survey, July,2019; March-Aug.,2020

The average ages of the married women which was 43.29 years old and widowed women of 55 years old were lower than the average ages of married men (52.29 years old) and widowed man (67 years old). Single farmers both man and woman were not encountered during the survey.

In addition, the average number of household member per family was five (5). Farmers were also categorized based on the total number of household members. There were three groups: small size with only 1-3 family members; medium size which comprised of 4-6 household members; and the large family size with 7-10 family members. For the small size family, there were five (5) farmers in the study. Majority as 21 out of 30 farmers, belonged to the medium size family and the remaining four (4) farmers in the large family size with one farmer having a total of 10 household members living together in one roof.

Age, marital status, and number of households of the farmers in the study area found to be factors in information sharing and adoption of technology as most of the farmers keep sharing what they learned to their spouse and children. In addition, they work harder to provide the needs of their family especially safe food.

Educational Attainment

For the educational attainment, it can be clearly seen (in table 3.2) that male farmers tend to have more opportunities to attend higher education that their counterpart. One male farmer outside Los Baños (LB) was not able to earn an elementary diploma, but 10 (including 6 women and 4 men) farmers were elementary graduates, whom three women were able to attend high school but unfortunately, not able to graduate.

On the other hand, 16 farmers were high school graduates this included one woman who was able to attend college but not graduated, and from the 30 farmers, one (1) got a vocational diploma and three (including one woman) were college graduate.

Table 3.2 Distribution of farmers based on their educational attainment

Educational attainment	Elementary Level	Elementary Graduate	High School	High School	Vocational	College Level	College Graduate	Total
Male-LB		1	1	4	1	3		10
Male-non-LB	1	3		4		2	1	11
Female-LB		2	3			1	-	6
Female-non-LB		1					2	3
Total	1	7	3	8	1	7	3	**30**

Source: Field Survey, July,2019; March-Aug.,2020

For the farmers who were not able to graduate high school, they seemed to be more inclined to do farming and asked elder farmers or family members about the practices in their farm. On the other hand, college graduates' farmers specifically women inclined in organic agriculture because of its health benefits.

Agricultural Experiences and Attendance to Training

Aside from the educational attainment, gender, and marital status that affect the income from farming, farm experiences can also be a big factor. More than half of the respondents 21 out of 30 farmers were from the family of farmers who were mostly from childhood assisted the farm activities of their parents and around 20% or six (6) of them gained their farm experiences through trainings and seminars attended while the remaining 10% or three (3) farmers were from observing in work, learning by doing, and experimenting on their own.

Attendance to training was also gathered, farmers were asked whether they were able to attend training or not and table 3.3 shows the distribution of farmers based on attendance to training.

Table 3.3 Distribution of farmers based on the attendance to training

Attendance to Training	Yes	No	Total
Male-LB	6	4	10
Male-non-LB	5	6	11
Female-LB	5	1	6
Female-non-LB	2	1	3
Total	**18**	**12**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

Data shows that more than half of the farmers were able to attend training on organic agriculture but, 40% of the farmer-participants were not able to attend even one training. This number was still high, factors and reasons for these were also checked and assessed.

Profit in Agriculture as a Source of Living

For the monthly income in agriculture as a job was also noted. Main job was defined as the full-time or longer hour of works farmer-participants were spending on their occupation. Mostly 8 or more hours per day.

As can be seen in Table 3.4, agriculture as a main job or source of living can provide a family an average amount of P 10,571.00 (¥23,491) and as a secondary job of an average amount of P4,083.33 (¥9,073). Main job that was noted aside from farming includes as a public official, administrative aid (agricultural technician), businessman, and a housewife.

Agriculture as a secondary job for women in Los Baños gave higher average profit that the female farmers in Los Baños doing agriculture as primary job, based on the interviews the primary job of these women were housewives as they were spending more time tending and taking care of their family members especially their children than doing farm activities. On the other hand, female farmers have secondary job which also provide them additional income.

Table 3.4 Distribution of farmers based on agriculture as their main job per area

Monthly Profit	Agriculture as Main Job	Ave. Crop Unit Profit	Agriculture as secondary	Ave. Crop Unit Profit	Total
Male-LB	3	13,166.66	7	3,398.41	10
Male-non-LB	10	17,466.67	1	14,444.44	11
Female- LB	4	11,222.22	2	14,000.00	6
Female-non-LB	1	183,142.86	2	9,000.00	3
Total	**18**	**23,943.12**	**12**	**7,019.44**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

It can also be noted, that non-LB farmers of both genders get higher unit cop profit than farmers in Los Baños.

Language

Furthermore, mother tongue and other dialect or languages of the farmers were also noted. All of them use Tagalog as their mother tongue and most can understand at least 2 more dialects or languages. Other languages farmer participants can understand and speak include English, Bicolano, Bisaya, Ilocano, and Cebuano. Language or dialects play an important role in interpretation and information sharing.

3.1b Family and Farming History of Farmers

Family and farming history were included as it will give the background and reasons how and why the farmers adopt or doing specific technology or operation on his or her farm. It also served as a factor on how the farmer access the information provided by local government units or other institutions within the community.

Farmers' history of residencies

An average of 41.77 years farmer participants stayed in their respective municipalities in Laguna Province. Table 3.5 shows the distribution of farmers based on the years they reside on their respective towns. Based on the data collected, 66.67% or 20 of the farmers resides in their respective municipalities or towns for more than 41 years. Farmers who are native in specific town were also included. On the other hand, 26.67 % or eight (8) of them were living in their municipalities for 11-30 years, while only 6.67% or two (2) of the total sample size were staying for less than 10 years in their towns (one of the two stated that she is still trying to cope up with the other farmers as she is a newcomer in the organization, and she did not know about the organization at first).

Table 3.5 Distribution of farmers based on the years they reside on their respective towns

Years staying in the current municipality	within 10 years	in 11 years to 20 yrs ago	21-30 yrs ago	31-40	41 years to ever since	Total
No. of Farmers	2	4	1	3	20	30

Source: Field Survey, July,2019; March-Aug.,2020

Farmers initial hometown were also gathered, and they were grouped based their initial origins (Table 3.6). Nine (18) or 60.00% of the farmers are native dwellers of Laguna, two (6.67%) from outside Laguna but within Region IV (from Batangas Province).

Table 3.6 Distribution of farmers based their initial origins

Hometown	**Native in Laguna Province**	**From outside Laguna, within Region IV**	**From outside Region IV, within Luzon**	**From outside Luzon Island**	**Total**
Male-LB	6	1	3		10
Male-non-LB	10	0	0	1	11
Female- LB	2	1	3		6
Female-non-LB	0	0	2	1	3
Total	**18**	**2**	**8**	**2**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

Eight (8) or 26.67% from outside Region IV but within Luzon (mostly from Bicol Region), and two (6.67%) from Visayas or outside Luzon.

Farming History

The oldest farm from the respondents was established in 1972 or 48 years ago, there were two (2) farms outside Los Baños that were established within 31-40 years ago (1986 and 1887). Table 3.7 shows that nine (9) farmers started their farms between 21-30 years ago (1990-

1999) and five (5) other farms were founded between 11-20 years ago. Thirteen (13) farms were newly set up farms within 10 years ago including two latest developed farms in 2017.

Table 3.7 Distribution of farmers based on the establishment year of their farms

	2020-2010 (0-10 yrs ago)	2009-2000 (11-20 yrs ago)	1999-1990 (21-30 yrs ago)	1989-1980 (31-40 yrs ago)	1979-1970 (41-50 yrs ago)	Total
Farmers in LB	8	1	7	0	0	**16**
Farmers in non-LB	5	4	2	2	1	**14**
Total Farmers	**13**	**5**	**9**	**2**	**1**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

Distribution by Types of Farming

Data gathered and compiled in table 3.8 shows that 53.33% or 16 farmers were doing commercial farming (wherein they produced were mainly for selling and the remaining for their family consumption).

Table 3.8 Distribution of farmers based on farming types

	Subsistence and Commercial to Subsistence	**Commercial**	**Subsistence and Commercial**	**Total**
Farmers in LB	2	8	6	16
Farmers in non-LB	0	8	6	14
Total Farmers	**2**	**16**	**12**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

While 40% or 12 farmers were engaged in tending crops and livestock for family consumption and selling (subsistence and commercial) and 6.67% or two (2) farmers were growing vegetables family consumption and selling before but converted solely for the family's consumption.

It shows that more than half of the farmers both in Los Baños and outside LB were also concerned about their consumers, however, it should also be noted that seven of them converted to OA and converted back to conventional due to different reasons including the decrease of yield, profit from selling their produce, and land conversion.

Distribution by Farmland

From the data gathered, table 3.9 presents the farmers' distribution based on their initial farmland sizes. Survey shows that the average total initial land size of all the farmer-participants was 1.06ha (0.64 ha in Los Baños and 1.54 ha outside Los Baños) with 0.075 ha as the smallest and 4.0 ha as the largest initial size in Los Baños and outside Los Baños, respectively.

Table 3.9 Distribution of farmers based on their initial farmland

Initial land	<1ha	1-2 ha	>2ha	Total
Farmers in LB	10	6	0	16
Farmers in non-LB	2	10	2	14
Total Farmers	**12**	**16**	**2**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

It can also be seen that 40% or 12 farmers started with only less than 1 ha land and around 53% or 16 out of 30 farmers started with 1.0 -2.0 ha and (5 of whom with 1.0 ha land, 3 farmers with 1.2 ha, 6 farmers with 1.5 ha and 2 farmers with 1.8 ha and 2.0 ha). Two (2) farmers started farming with 3.0 and 4.0 ha, but the farmer with 4.0 ha land sold his 3.0 ha land and

continued farming with only 1.0 ha land. Remarkably, 80.0% or 26 farmers were not expanding their farms until the survey and in fact, one of them reduced his initial farmland from 4.0 ha to 1.0 ha and only 20.0% or six of them expand after 4 to 25 years. Expansion includes the additional land from 0.2 ha-10.0 ha land.

History of OA Adoption

Farmers were also asked when they started doing or practicing organic agriculture (OA) and what are the reasons for their initial decisions or shift to OA. It was noted that 56.67% or 17 of the farmers were doing OA since they started farming (11 of whom were from Los Baños (LB) and 6 were from non-Los Baños). The remaining 43.33% or 13 of them shifted from conventional farming to organic within 11-20 years (5 from LB and 8 non-LB). It should also be noteworthy that two (2) farmers from LB started OA but in 2020 they stopped farming for the meantime (as both have plans to resume OA in the future) and six (6) non-LB farmers shifted from conventional to OA and within a year or two they shifted back to conventional farming.

There were varied reasons in doing OA, about half or 86.67% (26/30 farmers) of the farmers stated that they were doing or shifted in OA because through OA they were sure that their family and the environment were safe from toxins and chemicals. In addition, extra income, for the sake of her customers, neighbors' demand, and incapable of buying chemical inputs were also noted as main reasons in practicing OA. Local government unit that provides training and some farm inputs also influenced the decision making of the small-scale farmers to practice and continue OA. Nine or 30% of the organic farmers were influenced by the municipal agriculture office or the Local Government Unit (LGU) to engaged in OA and about 70% of them decided on their own to adopt or try OA.

3.1c Characteristics of External Environment

External environments affect the farmers attitude and behavior in making decisions in receiving, adopting, and sharing technologies and information. For this study, the profiles of the farms were used. Data gathered include the surveys, in-depth interviews, and observations on the farms. Profile of the farms were recorded based on the survey and observations. Profile includes the current utilized land size, slope and topography, existing housing, or building, and water and electricity sources.

Farms' Profile: Land

As of August 2020, the farmers in the study area were utilizing an average of 1.2 ha with 0.075 ha as the smallest and 3.5 ha land as the largest. Table 3.10 shows the average utilized land by gender and location.

Table 3.10 Average utilized land in the study area

Gender	LB	Non-LB
Male	0.62	1.54
Female	1.08	1.73
Average	**0.79**	**1.60**

Source: Field Survey, July,2019; March-Aug.,2020

The non-LB farmers utilized bigger land than LB farmers as LB farmers only has an average of 0.79ha land compared to an average of 1.60 ha land on non-LB farmers. It should be noted that the smallest land of 0.075ha was from a male farmer included in LB while the largest which was 3.5ha belonged to a non-LB female farmer.

The slope and topography of farms were also recorded. In the research area, slope and topography varied. In order to categorize the farmers based on their land, group for the slope of land was created on how steep the area for planting and its accessibility. Flat means that the soil

the plants were planted, and animals were raised were in line or leveled to the infrastructures such as houses or any building in or near the farm. Partially sloped on the other hand, refers to the farms with gradient or incline but some parts were somehow levelled and fixed to maximize the planting area. Furthermore, the sloped in this research denotes that the land within the farm were barely levelled and plants were being planted in a slant or angled land. Table 3.11 shows the distribution of farmers base on the slope or flatness of their land.

Table 3.11 Farmers distribution by land's slope and location

Land's Slope	Flat	Partially sloped	Sloped	Total
Farmers in LB	5	1	10	16
non-LB Farmers	11	3	0	14
Total Farmers	**16**	**4**	**10**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

It should also be noted that farmers with flat land have a direct and easy access to a road, while two in partially sloped and all with sloped land have no access to a decent road. Moreover, 12 farmers were living in a mountainous area (with no vehicle access), 19 farmers were living in an area with poor or unstable signal, and 9 farmers were living in an area where there is no electricity. These conditions limit the transfer of produce, knowledge, and information to farmers within the area.

Farms' Profile: Existing Housing or Building

Housing or building and its type in the farm were categorized based on the materials they were made of such as wood and concrete. Table 3.12 shows that there were 40 % or twelve (12) farmers who owned or built a kubo (traditional Filipino house/ rest place mainly made mostly from woods and leaves of coconut palm or bamboo) within their farm. Around 17% or

five of them have a concrete house in the farm, while 23% or seven farmers prefer not to have any housing or buildings within the farms. Three remaining farmers were noted having more than 2 concrete facilities that were used aside from personal purposes.

Table 3.12 Farmers' distribution by type of building in their farm

Land's Slope	None	Kubo (made of wood)	Wood and concrete	Concrete	Concrete (not a house)	Total
Farmers in LB	2	8	3	3	0	16
non-LB Farmers	5	4	0	2	3	14
Total Farmers	**7**	**12**	**3**	**5**	**3**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

Farmers were also categorized based on the different ways of marketing or selling their produce (Table 3.13). In Los Baños, municipal trading post was noted as the highest way to sell their produce consisting of 56.25 % or nine out of 16 farmers in Los Baños or 30.0% of the total farmer-participants were depending on it.

Table 3.13 Farmers' distribution by type of market channel

Market	Neighbor/ Small Store Near House	Municipal Trading Post	Middleman/ Trader	Partnership/ Own Farm Store	Total
Farmers in LB	6	9	1	0	16
non-LB Farmers	0	0	11	3	14
Total Farmers	**6**	**9**	**12**	**3**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

Contrary, outside Los Baños, 79% or eleven out of 14 non-LB farmers sell their produce through middlemen or traders with additional one farmer in Los Baños, selling on traders made

40% or 12 total farmer-participants depending on traders or middlemen to sell their products. The 20% or six farmers all in Los Baños has their small stores near or in their house to sell their harvests to their neighbors. The remaining three farmers all from outside Los Baños, sell their harvest through their own farm stores and or in a partnership with domestic markets and or restaurants.

Markets or the way farmers sell their harvests affect their income and their attitude to adopt specific technology. One farmer stated that she continued to do OA, for the sake of her consumers.

New technology and information can be accessed through a membership in different organizations or affiliations. Table 3.14 shows the results of the survey conducted in the study area. On the survey, half of the farmer participants (6 LB and 9 non-LB farmers) were not affiliated in any organization or group in their community. They were only getting and sharing information and knowledge from their family or neighbors. On the other hand, 13 farmers were affiliated to different local group in their respective municipalities, it was noteworthy that in Los Baños, nine out of 10 farmers belong to the Los Baños Organic Fruits and Vegetable Growers and mostly non-LB farmers belong to different agricultural cooperatives. Two non-LB farmers were associated to national organization.

Table 3.14 Farmers' distribution by Affiliation/ Organization

	None/ Family/ Neighbor	**Local Government Organization**	**National Organization**	**Total**
LB Farmers	6	10	0	16
Non-LB Farmers	9	3	2	14
Total Farmers	**15**	**13**	**2**	**30**

Source: Field Survey, July,2019; March-Aug.,2020

This shows that farmers have different situation and several factors affecting their ability to get, adopt, and share information. External environment also has influence on how the

information or knowledge can be available and accessible to farmers. In addition, these extrinsic factors also affect the attitude and behavior of farmers in adopting and sharing information.

3.2 Classification of Farmers based on their Life Histories

Upon examining the extrinsic variables which were also affecting the intrinsic variables, this sub-chapter focused on the intrinsic variables specifically on the attitude and behavior of farmers that were analyzed using the Trajectory Equifinality Approach from the farmers' life histories. In order to fully understand and interpret the attitude and behavior of farmers that greatly affect their decisions in farm activities including adoption of OA and information sharing, each of their life history was noted and analyzed with the aid of the Trajectory Equifinality Model (TEM).

To make a TEM, different important points or stages in farmers' lives were noted and plotted. For this research, the bifurcation points (BFP) are the points in farmers' lives that can lead to different paths. The equifinality points (EFP) on the other hand, are the end points or the end-goals of the farmers' farm career such as "*sharing of OA to others or the next generation and engaging them*"; "*going back to conventional farming*"; or "*stop farming for the mean time*". In addition, the obligatory passage point (learned OA) is a point which every farmer-participants experienced.

The 30 farmers all learned the importance of OA in certain point of their lives through different sources. These farmers chose different life paths after deciding what to do upon receiving the information about OA. Their decisions were all based on different situations that can be understood through reviewing their life histories (Figure 3.1).

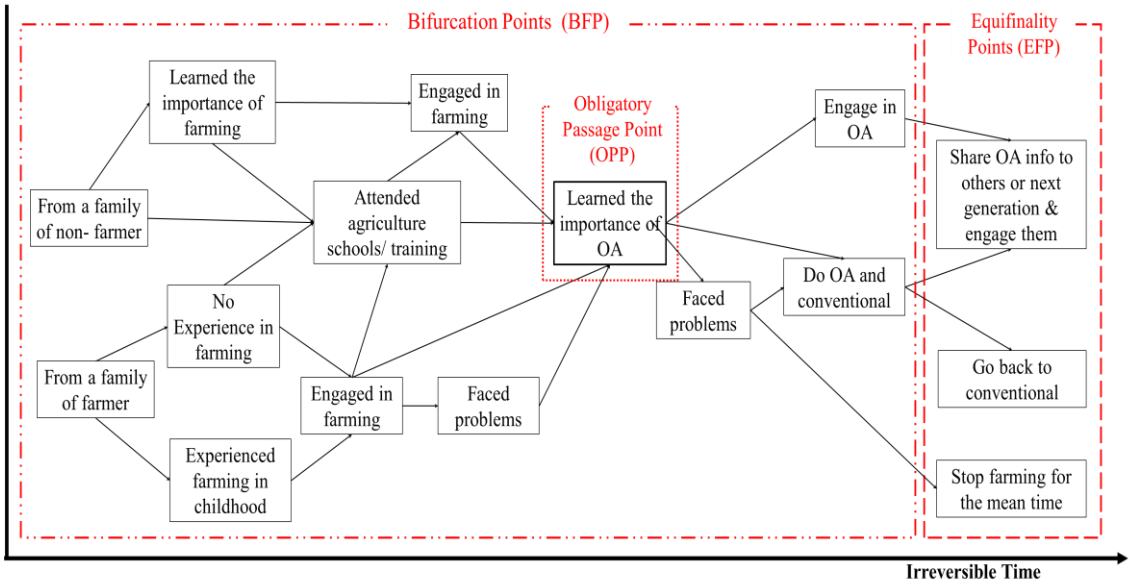

Figure 3.1 The Trajectory Equifinality Model of 30 farmers derived from their life histories

One of the important characteristics of TEM is the concept of irreversible time. As can be seen in the figure 3.1, this TEM represents the flow or path of life of 30 farmer participants from specific points of their lives in relation to their farming experiences and on how they started to be engaged in agriculture until their decision to adopt and share OA, stop farming for the meantime, or convert back to conventional practices.

With this TEM, farmer-participants were categorized into four (4) major categories (Table 3.15) shows the general life patterns of all the farmer respondents in Laguna, Philippines.

Table 3.15 Categorization of farmers based on their life histories

Category	Starting Point	EFP	No. of Farmers
1	From a family of farmers	Share OA info to others or/and next generation and engage them	16
2	From a family of farmers	Stopped farming for the mean time	2
3	From a family of farmers	Went back to conventional	6
4	From a family of non-farmer	Share OA info to others or/and next generation and engage them	6

Source: Field Survey, July,2019; March-Aug.,2020

The first category was composed of more than half of the participants. Second category is the two farmers in the middle of the research period stopped farming for the meantime but stated that they will resume farming if they get more enough time to tend plants. Third category is composed of six of the farmer-participants adopted OA but with varied reasons went back to conventional farming. Remaining six farmers, on the other hand, were considered newcomers who made up the category 4. These four categories were discussed thoroughly with figures of their pathways from the whole TEM.

Category 1 as can be seen in Figure 3.2 were farmers from a family of farmer, either experienced or do not practice farming since their childhood, when become adult, in certain point of their lives engaged in farming. Some attended agriculture schools, training, or seminars to get more knowledge in agriculture, others faced problems and from that different situation all were able to learn and accepted the importance of organic agriculture (OA) at a certain point of their life trajectories and are sharing OA information to others and or next generation and engage them. (Comprehensive discussion can be seen in Chapter 6 of this dissertation)

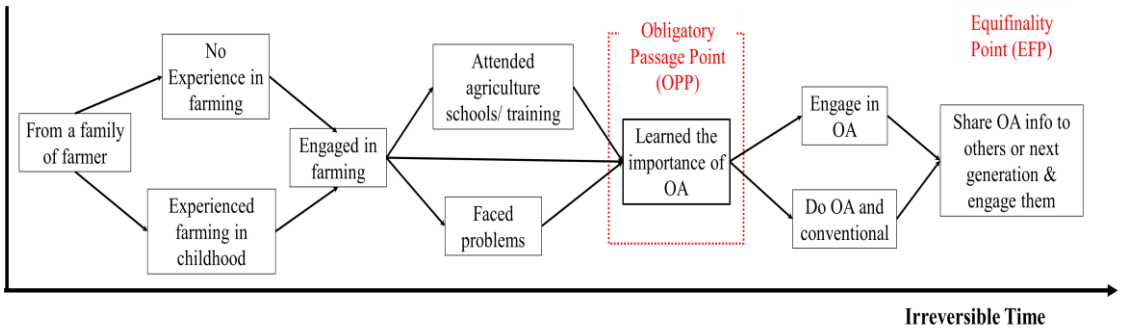

Figure 3.2 TEM of 16 farmers belonging to Category 1

It was also noted that these 16 farmers have an average age of 53.19 year old with 41 years old as the youngest and 72 years old as the oldest. There were 10 out of 16 or 62.5% of them were at least High school graduates with an average farming experience of 32 years (16 years minimum and 50 years maximum). There were 11 or 69% of them were doing farming as

their families' main source of income. For their faming type, 62.5% of them were doing subsistence and commercial with an average land of 1.24 ha (41% sloped; 37.5% flat), mostly producing fruits, vegetables, and rice and sold at their small stores, municipal post, or by traders. This category has an average of P19,978 (¥ 46,460) monthly profit.

Category 2 on the other hand, as graphed in Figure 3.3 were farmers from a family of farmers, both experienced farming in their childhood while helping on their parents' farms. After sometimes, they engaged in agriculture, one attended training and seminars and the other one faced problem that leads to both of them to learn, understand, and accepted the importance of organic agriculture (OA) at a certain point of their life trajectories but one of them, faced problems and tried to do both organic agriculture and conventional farming however, unfortunately both of them stopped farming for the mean time. Both farmers ages 49 and 60 years old, an Elementary graduate and vocational course certified with 41.5 years of farming experience, do farm activities for family's consumption, mostly grow only vegetables on their 0.02 ha flat land.

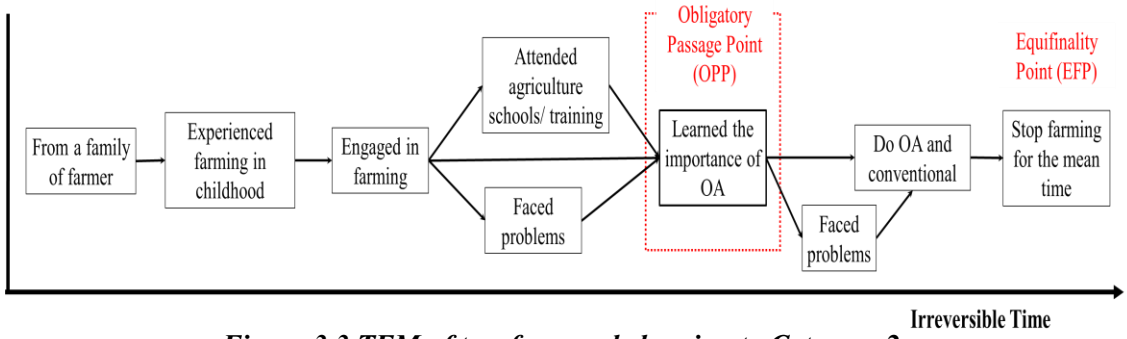

Figure 3.3 TEM of two farmers belonging to Category 2

Meanwhile, farmers on Category 3 as shown in figure 3.4 were farmers from a family of farmers, all experienced farming during their childhood, eventually engage in farming on their own, some of them attended agriculture schools, some faced problems, and all through training or neighbors, learned and accepted the importance of organic agriculture (OA). Unfortunately, all of them experienced difficulty or faced problems that forced them to do both OA and conventional practices on their farm, but after trying organic agriculture for one to two

years, they went back to conventional farming. Farmers on this category has an average age of 51 years old (44 years old as the youngest and 66 years old as the oldest) with 4/6 or 66.7 % of them at least graduated high school and with an average farming experience of 26.2 years (10 years as the minimum and 40 years as the maximum experience). It was noted that four of them (66.7%) were doing farming as their primary job and 50% of them were subsistence and commercial and another 50% focused on commercial farming with their average land size of 1.58ha (flat land). Interestingly, their different harvests were for selling through traders.

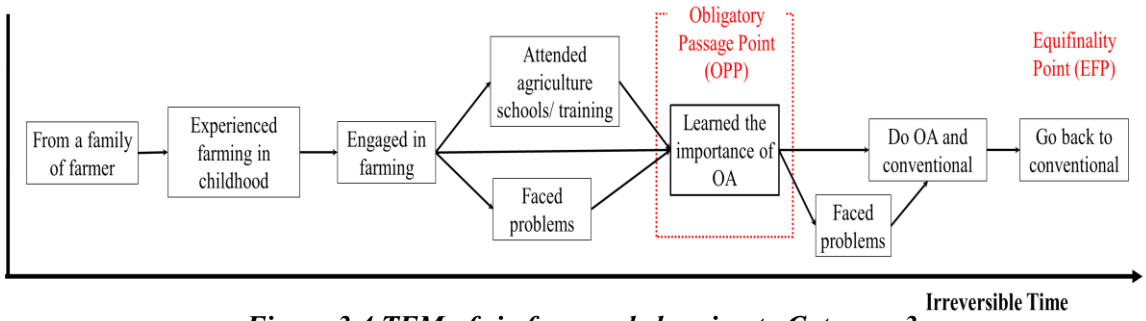

Figure 3.4 TEM of six farmers belonging to Category 3

The last group is the Category 4 (figure 3.5) which includes farmers from a family of non-farmer, at some point of their lives they were introduced to agriculture, and they learned the importance of agriculture, some of them attended training and seminars to know more about agriculture before engaging in farming, while some tried farming even without attendance to formal training and agricultural education. At a certain point of their life trajectories, they learned and accepted the importance of organic agriculture (OA) and fully engaged in OA, and soon after, they started to share OA information to others and or next generation and engage them.

Farmers from this category have an average age of 46.8 years old (with 38 years old as the youngest and 70 years old as the oldest). It is noteworthy that 5/6 (83.3%) of them at least graduated high school, with an average of 20.6 years farming experiences (4 years minimum experience and 50 years maximum). Most of their vegetables, fruits, and rice harvests from their average land of 0.98ha (flat) were being sold at their small store, municipal post, or through

trader with a monthly profit of P8,750 (¥ 20,349) as three of them (50%) were doing faming as their primary job and 66.7% of them do farming commercially, while the 33% as subsistence and commercial.

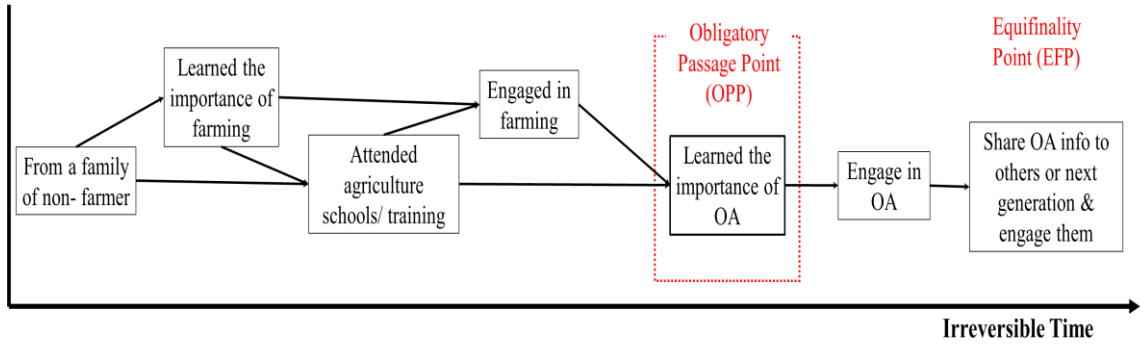

Figure 3.5 TEM of six farmers belonging to Category 4

These categories showed that farmers have different path or trajectories that can be understood through their life histories. Moreover, these categorizations indicated and clarified the background and experiences of farmers and how each factor and point of farmer's life affects farmers' decision making in farm activities and in farm succession in terms of their attitude in information sharing and engaging younger generations in farming.

Conclusion

This chapter shows that based on extrinsic categorization, age, marital status, number of household member, and external environment found to be factors in information sharing and adoption of technology. For intrinsic categorization, it helped to grouped farmers based on their background and experiences affecting decisions. Also, extrinsic variables also affect intrinsic behavior and both variables affect farmers in making decision in learning, adopting, and sharing of information and innovation hence, exploration of these factors will help the information provider to understand the attitude, needs, and interests of farmers in technology adoption and sharing.

Chapter 4: Sources, Contents, Methods, and Types of Information Sharing to and within Farmers

Chapter four focuses on the exploration and discussions of different sources, contents, and methods of information sharing to and within farmers. This chapter discusses in detail the diverse innovations that gave an emphasis on OA technologies gained, adopted, modified, and shared to and of farmers. In addition, varied approaches, and various procedures of the information flow are also tackled and assessed. Moreover, a section on the importance of farmer-to-farmer and farmers first is highlighted. Furthermore, a comparison of OA farmer-trainers in Japan and the Philippines is incorporated.

Introduction

The adoption of new technology in agriculture can lead to agricultural growth that will result to a vital impact on rural poverty alleviation (Mottaleb, 2018). Unfortunately, the adoption of new agricultural technology is seldom rapid as many factors can affect the adoption process (Pierpaoli, et al., 2013). In addition, new agricultural technologies are often correlated with risks and uncertainties about proper application, scale appropriateness and suitability with the prevailing environment, and importantly with farmers' perceptions and expectations (World Development Bank, 2008).

In the previous chapter, extrinsic and intrinsic variable as factors affecting adoption and information sharing were examined. However, innovation was excluded, and as supported by research in different countries that recommended to provide more capacity building to farmers stating that trainings are more valuable than provision of financial support (Murshed-E-Jahan and Pelms, 2011), this chapter aimed to explore all the aspects of innovation to farmers, specifically different sources, contents, methods, types of information sharing to and within farmers.

All the key factors affecting information sharing were explored since this study agreed to Ogar, et al. (2018) stating that quality information delivery is the right step towards the growth of agriculture, while good communication with the rural population enables better access to relevant information that can nurture their business desires supported with adequate skills acquisitions. Therefore, this information is critical and significant in the success of information sharing and increased adoption rate.

Methodology

Eleven (11) staffs form five (5) major institutions that directly and indirectly provide information on innovations to farmers of the study area were interviewed. Guide questionnaire was divided into two parts: profile of information provider and the information sharing where they were asked about the different types, contents, approaches, background of their institutions, and their motivation of their dissemination activities and initiatives. It should be noted that this research listed six institutions, since farmer-participants specified six major institutions but due to unavailability of the focal person, this research was not able to interview anyone from the 6th institution. Farmers were also asked if they were receiving various information in different types (forms) and the frequency of their use. All interview data were transcribed, compared, and compiled. Simple descriptive statistics was used for the data frequency.

Results and Discussion

Information plays a crucial role in all parts and processes of agriculture including the adoption and implementation of technologies. Therefore, in order to understand and interpret the attitude of farmers toward adoption and information sharing of organic agriculture, this chapter focused on the sources, contents, types, and methods of information sharing to and withing farmers.

4.1 Sources of information to and within farmers

Different institutions provide information and knowledge regarding varied technology or innovation on organic agriculture. For this chapter, different sources of innovation were included such as state university, national, and local sectors of the governments, private companies, and some farmer-scientist but will focus only on the government institutions as formal source of innovation focusing on OA.

4.1a Institution 1

Institution 1 is one of the research arms of a public research university located in the towns of Los Baños and Bay in the province of Laguna, about 69.1 kilometers southeast of Manila. According to the report of the Office of the Vice Chancellor for Research and Extension (OVCRE) (2018), the university was at the forefront of agricultural research, experimenting and generating knowledge on tropical agriculture when at that time, it was acknowledged there was virtually none. In 1960, 90% of all agricultural research in the Philippines was being conducted at the university.

In 2019, the university remained number one school in agriculture as awarded by the Professional Regulation Commission and Professional Regulatory Board of Agriculture. The award was given to top performing school with 50 or more examinees with at least 80% passing percentage. The university ranked top 1 with 99.46% passing percentage in the 2019 agriculturist licensure examination conducted in November 2019. The national passing rate is 41.05%. (PRC, 2019)

As an institute under a university which is a publicly funded academic, research and extension institution, Institution 1 is providing extension services to community. Some of their extension services include training, implementation of exhibits and demonstration gardens which provide information and hands-on activities on various technologies on organic agriculture. According to Rudulfo (2019), Institution 1 was established in 2008 as part of a

project of the municipality of Manila under the Corporate Social Responsibility initiative of the Philippine Amusement and Gaming Corporation (PAGCOR). The main goal of the project is to create green community by planting plants under bridges and public spaces of Manila. In addition, Puerto Princesa, in Palawan was also one of the beneficiaries of *Luntiang Pamayanan* or Green Community Project, where they assisted the beneficiary families in doing OA from planting, utilization of indigenous species, processing of produce until market linkages. After the project's termination in 2009, the project leader, Dr. Rodel Maghirang together with Ms. Gloria Rudulfo continue to explore innovations and to conduct trainings on OA. The 0.4 ha university land in the in Los Baños became their experimental station and demonstration area for their self-sufficient organic farm. To this date, Institution 1 continues to disseminate information and innovation about OA in coordination with local and national government units including Institution 3.

4.1b Institution 2

Institution 2 is one of the sectoral units of the Department of Science and Technology (DOST). The institution is responsible in formulating policies, plans, and programs for the development of research under science and technology. It also allocates government funds to support, coordinate, evaluate, and monitor the national research and development efforts particularly in the agriculture, aquatic, and natural sources sectors. (de Ramos, 2020)

With the increasing awareness of healthy food and concern on pesticide residues, Institution 2 gave an emphasis to OA through different initiatives including funding of projects, producing materials, and including OA to their banner program. This institution originally initiated the *Techno Gabay Program* (Technology Guide Program) (TGP) wherein OA is also included to promote technology dissemination and utilization guides and facilitate knowledge sharing among extension workers and farmers. Even after transferring the TGP to another institution, this institution continues to support research on OA including the project of local

government units. In 2009, Institution 2 has been mandated to transfer TGP implementation to Institution 5 (de Ramos, 2019).

4.1c Institution 3

Institution 3 is a local government unit that coordinates public and private organizations to provide technology to their farmer-cooperators to make sure that the grass root will be benefiting to different programs and supports from the government. For this study, only the local government unit of Los Baños was included.

Institution 3 in collaboration with a group of professors, researchers and extension agents of Institution 1 initiated project that aimed to help the under privileged families of selected barangays in Los Baños in 2014 with funding from Institution 2. Every family was provided inputs. Technology demonstrations were set-up in selected barangays. With regards to capability building, Institution 1 is the lead and did all the training, seminars, and implementing technology demonstrations.

With the five (5) barangays included in the program, there were two focal persons. During the project implementation, Institution 3 collected all the produce, and the Gender and Development (GAD) staff was the one selling them. Soon after, production increased, and the municipal mayor established a municipal trading hall to serve as the marketing channer for organic farmers. Emergence of satellite stores further improve the market availability of OA produce. (Rudulfo, 2019)

This initial project in 2014 was handled by a different office in the same institution and was transferred to another office during the second phase in 2015 even the coordination with Institution 1 was changed to Institution 6. Hence the focus, contents, and interaction with the farmers were also altered. (Rudulfo, 2019 and de Ramos, 2019).

4.1d Institution 4

Institution 4 under the OA Act of 2010 is mandated to be the lead agency in coordinating organic agriculture research, development and extension activities with other government agencies, State Colleges and Universities, and private sectors. Institution 4 has a program that focuses on technology and information dissemination from technology generators to users or beneficiaries. The program is known as *The Knowledge Products and Services Program (KPSP)* which enhances information flow among stakeholders in R&D system to the policymakers, research administrators, extension specialist, public and most especially, the farmers and fisherfolk. The institution's *Knowledge Management Program* focuses on the gathering of R&D results and their translation into multimedia R&D information packages. Institution 5, in turn, through its Development Support Communication program takes over and disseminates these R&D information packages in support of planned extension and training programs and related activities of the institute. Publications and other information sharing methods such as online training and seminars are also being utilized on different platforms such as webpage, Facebook, Instagram, and Youtube. (Lapitan, 2019)

Even before the signing of Organic Act 2010, in 2009, Institution 4 initially took the OA initiatives in coordination with the Regional Technical Directors of DA-Regional Field Units (RFUs) and the Regional Integrated Agricultural Research Center (RIARC). Research focusing on organic fertilizers was launched followed by a conference-workshop on *"GAP Analysis on the R&D of Organic Agriculture: Focus on Organic Fertilizer"* in October 2010 to identify the issues and concerns relevant to organic agriculture. (Lapitan, 2019)

4.1e Institution 5

Institution 5, being the training and extension arm of the Philippines' Department of Agriculture (DA) as their strategy to institutionalize the extension modalities in the agriculture and fisheries sector of the country received and continue to implement TGP from Institution 2. Institution 5 also, as the main agricultural extension service provider of the country, is

implementing a program for OA. According to Pagui (2018), the program includes four major categories such as: Capability-building Programs, School-on-the-Air, National Organic Agriculture Congress, and Extension Grants for Extension Service Providers.

Institution 5's capability-building programs ensures the development of adopting and practicing organic agriculture in the country in line with the Organic Agriculture Act of 2010 (Republic Act No. 10068). Institution 5 provide support to and conduct seminars and training activities on organic farming leading to National Certificate II in collaboration with Technical Education and Skills Development Authority (TESDA). TESDA is a government agency that manages and supervise technical education and skills development in the Philippines. In addition, TESDA offers Continuing Professional Developing (CPD) units that is a mandatory requirement in the renewal of professional license under RA 10912 (CPD Law of 2016). Licensed Agriculturist should gain 45 CPD units within 3 years for the renewal of professional license. (TESDA, 2020)

Institution 5 also supports the establishment of Learning Sites in Indigenous Peoples' community. School-on-the-Air on the other hand, uses radio to equip organic farming practitioners with the knowledge and skills they need to achieve competitiveness and sustainability. An annual National Organic Agriculture Congress, in collaboration with the DA and the Bureau of Agriculture and Fishery Standards, coordinates and gather various stakeholders in OA since 2003 to promote sustainable and healthy farming and showcase success stories of organic farming practitioners. Extension Grants for Extension Service Providers (ESP) that accredits private ESPs to provide a variety of extension activities to the stakeholders on organic agriculture as well as hasten and improve public-private partnership on extension services. (Pauig, 2018)

4.1f Other Sources

Aside from the public institutions, farmers listed other sources of information and technology. Some of the answered noted includes family members such as their farmer parents,

siblings, elder farmers (some were their elder relatives), neighboring farmers, farmer-leader, farmer-scientist, agricultural technicians, successful private farm owners, farmer association members, farm input companies (seed companies, fertilizer, pesticide, feed, and antibiotics corporation including farm shops). In addition, some of them were able to receive or utilized mass media sources comprising of printed and electronic Information, Education and Communication (IEC) materials mostly produced as a project output of different institutions or companies.

For this research, sources of information were categorized into 4 groups: public, private, personal, and mass media. Table 4.1 shows that aside from the six public institutions which were all using a Scientist/Researcher-Led training as the main method of information sharing and impart mostly the requested or showcased technologies, farmers tend to also get knowledge or and innovation to private sources on their Specialist-Led and Farmer-Scientist or Farmer Led training and demonstrations.

Table 4.1 Sources, methods, contents, and type of Information Sharing to and within farmers

Sources	Beneficiaries	Methods	Contents	Type of IS
Public Sources				
Institution 1	Everyone	S/R-Led Training and Demo	Request and ST	PM, Elec, F2F
Institution 2	Everyone (Trainers)	S/R-Led Training	Training manual	PM, Elec, F2F
Institution 3	Affiliated Farmers	S/R-Led Training	Projects	PM, Elec, F2F
Institution 4	Everyone (Farmers)	S/R-Led Training	Request of LGUs	PM, Elec, F2F
Institution 5	Everyone (Farmers)	S/R-Led Training	Request of LGUs	PM, Elec, F2F
Institution 6	Everyone	S/R-Led Training	Request and ST	PM, Elec, F2F
Private Sources				
Farm Input Companies	Farmers and Aspiring Farmers	Sp-Led Training and Demo	ST/ product	PM, Elec, F2F
Private Farms	Everyone	F-S/Farmer-Led	ST/ product	PM, Elec, F2F
Personal Sources				
Farmer-Family	Farmers	Farmer-Led	Needs and Interest	F2F
Farmer-Neighbors	Farmers	Farmer-Led	Needs and Interest	F2F
Farmer Assoc	Farmers	Farmer-Led	Available Technology	PM, F2F
Mass Media Sources	Everyone	S/R output	ST	PM, Elec, F2F

Source: Field Survey, July,2019- March-Aug.,2020

Note: ***IS****- Information Sharing;* ***LGU-*** *Local Government Unit;* ***S/R****- Scientist/Researcher;* ***Sp****- Specialist;* ***F-S-*** Farmer-Scientist; ***ST***- Showcased technology; ***PM****-Printed Material,* ***Elec****-Electronic,* ***F2F****- Face-to-face*

In addition, personal sources which are all Farmer-Led, focused on the needs and interest of farmers. While mass media sources were typically the output of institutions that promotes and aims to influence more people (not limited to farmers) to adopt OA. Other sources targeted everyone, but all of them include farmers and most prioritized them as their technology recipient. However, Institution 2 is more focused on trainers as they want Extension Agents and Agricultural Technicians to be more equipped to disseminate OA technology efficiently.

To make sure that the grassroot will be benefiting to different programs and supports from the government, Institution 3 as the local government unit, coordinates with public and private organizations to provide appropriate technology to their farmer-cooperators.

Based on the interviews and observations with farmers, most of them stated that they received and understood the OA technologies disseminated by Institution 1. Aside from public sources, farmers received OA technologies mostly from their family members and neighboring farmers. Compiled works of several social scientists including Chambers et al. (1989) and Franzel et al. (2015), show that farmer's participation in agricultural research and the concepts of identifying farmers' problems and giving feedback to them with alternatives are vital. These prove that systematic and active involvement of farmers in the research process give positive results to farmers' skills as they experiment and adopt the technology.

4.2 Contents, Methods, and Type of information farmers were getting

Farmers in Laguna have different sources of their OA knowledge and information. Most of them learned the importance of OA through trainings and seminars conducted by some specialists or researchers of different institutions most especially from Institution 1, while the technology and know-hows were already learned by most of the farmers from their farmer-parents, relatives, or neighboring farmers. On the other hand, some of them learned it through observing other farmers or agricultural technicians, before doing their own experiments.

Based on the interviews conducted with different institutions from 2018-2020, technologies funded and being disseminated by major institutions were the technologies developed by State Universities and Colleges (SUCs) and other government research agencies. Some of the research proposals submitted to funding agencies include development and dissemination of the technology. Technology dissemination comprises of training, seminars, implementation of demonstration gardens, promotion in exhibits, and the creation and production of Information, Education and Communication (IEC) materials. IEC materials include manuals, books, techno-based materials (leaflets, pamphlets, factsheets, techno-kits and booklets), and starter kits. Duration of projects usually lasts from 6 months to 18 months and might have an additional 6 months to 18 months extension without additional funding. Funding agencies is usually responsible for reproducing IEC materials for the farmers after each project's turn-over. These IEC materials will be readily available in each institution's showrooms and libraries and farmers and other target beneficiaries can request for a copy. (Lapitan, 2020; de Ramos, 2020; and Pagui 2018).

In 2019, Institution 2 started to digitalize all the IEC materials and they are now utilizing these materials that can be downloaded for free as a support for their e-learning programs. From the interview of Institution Staff 3 in 2019, she stated that *"During exhibits, we experienced that there were lots of farmers that were asking for printed books. At first of course we were so happy, they even wanted the thickest one. Then, when we asked them if they know the technology and what specific technology they want to learn (so we can help them get the best IEC materials), they kept answering: just give as the thickest one."* From then, they found out that some asking for the thickest one just want a copy to sell in a junk shop. Digitalizing the IEC materials preserves and improves accessibility and dissemination the technology around the country. Unfortunately, most of the farmers do not have the capacity to access the internet.

School-on-the-Air uses radio to equip organic farming practitioners with the knowledge and skills they need to achieve competitiveness and sustainability. Radio as a useful tool to reach farmers on a large scale is being utilized by Institution 5 and its regional training centers

(RTCs) to disseminate different technologies including OA in partnership with local radio stations. There is a package of technology that the institution per RTCs is featuring every month and are scheduled based on the quantity of topics per technology package (ex. for OA, they have producing of organic seeds, crop management (production of farm inputs: compost, plant juice extracts), vermicomposting, organic livestock production, etc.). Recently, due to COVID-19 pandemic that requires everyone to follow quarantine and social distancing protocol, Institution 5 relaunched their school-on-the air (SOA) program. However, the focus is now more on the package of technology for rice following the directive of the Department Secretary. The new SOA program focusing on rice started in June 23 and will last on August 27, 2020. Different regions have varied schedules from 5:00-6:30 am, Tuesday and Thursday to 10:30-11:00am, Wednesday to Friday, and from September to October, Wednesday, and Thursdays, at 11:00-11:30 am for CALABARZON. Furthermore, SOA will also be live on the region's respective facebook page. (Pauig, 2019 and DA-ATI, 2020)

E-learning is a promising alternative to other types of information sharing especially during this time of pandemic. Before pandemic, these institutions started to utilize the on-line platform to promote different technologies, training, seminars and other activities. Institutions are now doing adjustments to make sure that farmers and other target beneficiaries will still have the access to different technologies. It includes uploading the pre-recorded training and seminars and live consultations with the experts using video calls.

Institution 5 as the lead implementing agency of the major component of the Department of Agriculture's e-Extension Program in 2007 offers an e-learning for Agriculture and Fisheries. The e-learning is one of the three components of the e-Extension program. The other two components are the e-Farming and E-Trading. E-Farming is a support center for the clients of the Department of Agriculture to deliver farm and business advisory services using Information and Communications Technology (ICT). Main features are services through voice (call) and short messages (text) modes thru a pre-defined toll-free number specified across the country, as well as online communication like chat, online for a and e-mail. (DA-ATI, 2020).

This e-learning site is in collaboration with other government agencies, state universities and colleges and non-government institution. All courses are free, with certificates and are in local recommendations, however technokits are at P100.00 (¥ 223) each excluding courier fees. This e-learning site offers different courses which are categorized on: Technical Education and Skills Development Authority (TESDA) online program, Crops, Livestock, Marine and Fisheries, Social Technology, Sustainable Agriculture, and other courses. (DA-ATI, 2020). TESDA is a government agency that manages and supervise technical education and skills development in the Philippines. In addition, TESDA offers Continuing Professional Developing (CPD) units that is a mandatory requirement in the renewal of professional license under RA 10912 (CPD Law of 2016). Licensed Agriculturist should gain 45 CPD units within 3 years for the renewal of professional license. (TESDA, 2020)

The e-learning site (www.e-extension.gov.ph/elearning) has 103,433 users composed of agricultural extension providers, farmers, business owners, teachers, students, retirees, professional agriculturist who wants to earn CPD units, and others. The e-learning has 185 courses and resources that are divided into TESDA online program, Crops, Livestock, Marine and Fisheries, Social Technology, Sustainable Agriculture, and other courses. The sustainable agriculture has 17 topics or courses which includes: "*Growing Carrot the Natural Way"; "Growing Rice Organically"; "Climate-Change 101: Understanding Climate Change in Agri-Fisheries"; "Mokusaku: Wood Vinegar Production"; "Organic Fertilizer for Sustainable Agriculture"; "Vermicomposting: Turning Trash to Cash"; and "Integrated Rice-Duck Farming".*

As of July 15, 2020, aside from the e-learning site of Institution 5, they are also conducting online seminars and on May 8, 2020, they had a free online seminar on Organic Fertilizer and Pesticide. Institution 2 also has e-learning services that depends on their clients' requests. On the other hand, Institution 4 is still converting and making materials for OA for its online information sharing.

***Extension Grants* for Extension Service Providers (ESP)** that accredits private ESPs to provide a variety of extension activities to the stakeholders on organic agriculture as well as hasten and improve public-private partnership on extension services (Pauig, 2018). As the government cannot provide all the technologies and knowledge, they are collaborating with private ESP to cater what is lacking. Furthermore, if a specific technology was created in one area, farm leaders and *Magsasaka Siyentista* (Farm Scientists) will be invited to attend extensive training for them to learn and adopt the technology. These farm leaders and *Magsasaka Siyentista* will be the private ESP to their respective regions and areas.

Institution 2, 4, and 5 as the three major institutions providing capability building directly or indirectly to farmers play a very important role in the creation, extension, and evaluation of technologies and innovation. Table 4.2 shows the different programs, activities, support, publications, and other information sharing initiatives of the three major institutions.

Table 4.2 Summary of the three National Institutions and their Methods and Forms of Information Sharing on Organic Agriculture

Institution	Trainings	Methods	Contents	Beneficiaries	Radio	TV	e-learning	Training Module	Books	Comics	Farm News/ News Paper	Farm Primer	Information Bulletin	Congress/ Forum
Institution 2	Capability-building Programs	Scientist/ Researcher-Led Training	Based on their training manual	Farmers, fishers, extension workers, subject matter specialists, experts, extension managers, teachers, students	Farm News per region	Featured in different TV stations	Website is available	Organic Agriculture in the Philippines: A Training Manual	Three books on Organic Agriculture	Four Comics related to goat production	77 news article including farm news in OA	Organic Fertilizer Production	Eighteen (18) published info bulletins regarding OA	Agrilink and other national congress and forum
Institution 4	Capability-building Programs	Scientist/ Researcher-Led Training	Based on the request of Local Government Units (needs of farmers from previous feedbacks)	Farmers, fishers, extension workers, subject matter specialists, experts, extension managers, teachers, students		Featured in Mag-agri Tayo TV Program	Website is available	Newsletters, manuals, books, techno-based materials (leaflets, pamphlets, factsheets, techno-kits, and booklets)						National Technology Forum and Agrilink
Institution 5	Capability-building Programs	Scientist/ Researcher-Led Training	Based on the request of Local Government Units	Farmers, fishers, extension workers, subject matter specialists, experts, extension managers, teachers, students	School-on-the-Air	Featured in Mag-Agri Tayo TV Program	Website is available	Newsletters, manuals, books, techno-based materials (leaflets, pamphlets, factsheets, techno-kits, and booklets)						National Organic Agriculture Congress

** Note: Compiled by author based on interviews and websites of each institution*

Farmers from Los Baños gained their knowledge and experiences on OA from different sources. Members of farmer-cooperators or the Los Baños Organic Vegetables and Fruits' Growers Association (LBOVFGA) were able to attend and participate to different information sharing activities. Table 4.3 shows the activities including training, seminars, cross-visits offered to the members in 2014-2016.

Table 4.3 Training, Capacity Building and Cross Visits of Los Baños farmer-cooperators in 2014-16

Training and Capacity Building	Conducted by
Seminar on Organic Agriculture and Organic Vegetable Production	Institution 1
Hands-on Training on the Production of Natural Farm Inputs	Institution 1
Pest and Disease Management for Organic Vegetable Production	Institution 1
Culture Management for Organic Vegetable Production	Institution 1
Initial Consultation and Site Assessment for Marketing	
Initial Farm Visit at PAMANA Organic Vegetable Breeding Station	Institution 1
Organic Trading Post Observation at Lucena, Quezon	Institution 3
Interaction with other Quezon organic vegetable growers	Institution 3
Site Visit at TFARK at Tayabas, Quezon	Institution 3
Hands-on Training on the Production of Natural Farm Inputs	Institution 1
Training on Post-harvest Handling	Institution 1
Organic Vegetable Seed Production of Lowland and Upland Vegetables and Vermicomposting	Institution 6
Fermented Plant Juice Preparation and Concoction of Pesticides	Institution 6
Farm Record Keeping and Documentation	Institution 1
Capacity Building Training Workshop	Institution 3
Hands-on-Training on Community-based Mushroom Production	Institution 3
"Agriprenuership": A New Avenue for Agricultural Success	Private
Agri-Tourism	Private
Fruit Propagation	Private
Cross Visits to different Organic Farms	

Source: Amoloza and Gonzales (2019)

Institution 1 started and gave emphasis on the appreciation and introduction to OA, Institution staff 1 stated that *"Most of the farmers thought that just adding chicken dung is already considered OA. So, we first focus on the importance of OA, why do we need to do it, and what will be the benefits for them."*

Institution 1 provided at least 10-day trainings or 8 hours per day training for a total of 10 sessions including lecture, discussion, and hands-on activities for one year with different topics and technology in OA. After focusing on OA's definition, scope, benefits, history, development, and trends, they also taught farm planning and record keeping. High concentration of training contents and activities was on organic vegetable production, guided by the principles of Zero-Waste Farming.

Production and usage of natural farm inputs was the main technology disseminated. This include vermicast and botanical concoctions which comprises of fermented plant juice extracts, fermented fruit juice, and fish amino acid. They also put emphasis on teaching participants about seed production as they believe that these two major topics of innovations are very significant to attain sufficiency and sustainability in their farm.

After a series of trainings, Institution 1 staff constantly visited members' farms to monitor and check whether farmers were able to easily apply what they have learned. Based on the interview with Institution staff 1, she stated that *"It is like a consultation and evaluation activity by asking the farmers the status of their farms and what technologies they adopted and how they did it. At the same time if farmers were having problems especially in the field, we can also see it personally".* After then, they had a post-harvest handling training and other trainings in collaborations to other colleges in Institution 1. (Rudulfo, 2019)

According to the interview with Institution 1 staff, she stated that *"Most of the farmers did not continue, due to "wait mentality" and most of the men discontinue as they keep saying a lot of problems, while women tend to be more patient and try more."* Every stage of the vegetable production within a year, institution 1 were very hands-on in checking, visiting, and

monitoring different farms. After a year they transfer the responsibility to Institution 6 and to a new Institution 3 officer.

After compiling and categorizing all the data gathered from different sources, this research obtained that the contents and information being disseminated varied form each source (Table 4.4).

Table 4.4 Topics or technologies that sources in the study area offered

	Public Sources					Private Sources		Personal Sources		
Contents	Insti 1	Insti 2	Insti 3	Insti 4	Insti 5	Company	Farms	Family	Neighbors	Assoc
OA Definition, scope, benefits	o	o	o	o	o	o	o	o	o	o
OA/ Farm History, OA Development and Trends	o	o	o	o	o	x	o	o	o	o
Business side of the operation	x	x	o	o	o	o	o	x	o	o
Farm Planning & Record Keeping	o	x	x	x	x	x	o	o	o	o
Organic Veg. Production (Zero-Waste Farming)	o	o	o	o	o	o	o	o	o	o
Post-Harvest Handling	o	o	x	x	x	x	x	x	x	x
Food Processing	o	o	x	o	x	x	o	x	x	o
Fruit Trees Seedling Production	o	x	x	x	x	x	o	o	o	o
Livestock Production	o	o	x	o	x	o	o	o	o	o
Plant Breeding	o	x	x	x	x	x	x	x	x	x
Aquaculture	o	x	x	o	x	x	o	x	x	x
Orchard	o	x	x	o	x	x	o	o	o	x
Duckweed Production	x	x	x	x	x	x	o	x	x	x
Agri Tourism	o	x	o	o	o	x	o	x	x	o
Sales and Marketing	o	o	x	x	x	o	o	o	o	o
Farm Experience (Farm Tour)	o	x	x	x	x	o	o	o	o	o

Source: Field Survey, July,2019; March-Aug.,2020

Note: Insti- Institution; ***o****-included,* ***x****-excluded*

As can be seen above, Institution 1 provided almost all the technologies and information in OA, excluding the business side of the operation and the duckweed production. While other institutions offered the business side but not as much as technologies Institution 1 can provide (See Appendix 3 for complete contents of information/ technology each source was disseminating).

Institutions 3,4, and 5 have the capacity to open opportunities for farmers in a business side through inviting them to showcase their products and link them to private organizations during exhibitions. In addition, these three Institutions were in partnership with Institution 1 who research and serve as a resource speaker during their training and extension activities. Private sources on the other hand, focused more on the business side and experiences while personal sources were driven more on farm planning, and experiences. It can also be noted that all sources valued the benefits and determined to share the trends and practices of organic vegetable production (includes all management practices that focused on zero-waste).

Table 4.5 shows varied types of information sharing by different sources. Most of the farmers were not receiving printed materials and not using electronic sources and were not able to attend trainings but utilized the face-to-face type specifically the personal sources.

Most of the farmers were not utilizing electric sources because they do not have internet access nor electricity. In addition, they were not familiar nor knowledgeable on how to use and search through internet. Furthermore, farmers who were not affiliated to any organization and cooperatives were not being included to free training, other activities, and support from the institutions.

Table 4.5 Types of Information Sharing and the farmers' frequency of use

Types of IS	% Farmers		% Frequency				
	Received	Not	Always	Often	When needed	Sometimes	Never
Printed Materials							
Agri Book	17	83	0	20	0	10	70
Agri Magazine	17	83	0	13	0	3	83
Brochure/Leaflets	63	37	0	23	0	30	47
Lecture Notes	20	80	10	7	0	3	80
Electronic							
Internet	10	90	3	7	0	0	90
TV	23	77	7	13	0	3	77
Radio	20	80	3	7	0	10	80
Cell Phone	7	93	0	0	10	0	90
Face-to-Face							
Family Mem	77	23	3	60	13	0	7
Neighbors	90	10	27	33	30	0	10
Association	60	40	10	20	23	7	40
Demonstration	63	37	17	23	13	7	37
Field Visit	33	67	3	20	13	0	63
Exhibit	23	77	0	10	10	3	77
Farm Shops	30	70	3	20	20	0	70
Private Farms	23	77	0	3	17	2	77
Training from Institution 1	53	47	13	37	3	0	47
Training from Institution 2	23	77	0	10	10	3	77
Training from Institution 3	67	33	27	17	17	7	33
Training from Institution 4	17	83	0	17	0	0	83
Training from Institution 5	23	77	3	10	10	0	77
Training from Institution 6	53	47	17	20	10	7	47

Source: Field Survey, July,2019; March-Aug.,2020

Therefore, the main source of information was from their family members and neighbors. At this section, the study also tried to know if hours of formal training affect the unit income of farmer, hence, hours of formal training attended by farmers were also noted. Based on the p-value that was computed through regression analysis (with y variable: crop's unit profit and x variable: hours of formal training) as p-value=0.134815221, formal training had no significant effect on the farmers' profit. This can be explained that most farmers even those attending trainings were not able to learn or adopt the technology because it might not be related to their interests and needs.

Moreover, this chapter shows that farmers also tend to get information to other farmers including their family members, farmer-scientist, and farmer-trainers. In line with this interaction with farmers transferring information to other farmers, as part of the preparation for this research previous studies on farmer-to-farmers were completed and two papers were published. The first paper focused on the importance of farmer-first concept and movement to farmer-trainers in achieving environmentally friendly agriculture and rural development.

4.3 Significant Contribution of Farmer First in Farmer-Trainer for Environmentally Friendly Agriculture and Rural Development

With the huge number of mouths to feed, problems and challenges on food safety and sufficiency in terms of the decreasing number of new farmers and increasing number of aging farmers arises in Japan and the Philippines. Young generations do not see farming as a lucrative career. In order to attract the youth to engage into farming, one of the potential solutions is the farmer-trainer, which is a generic term used to address farmers that provides and conducts training to farmers, and other actors in a community. As a farmer-trainer, farmer also serves as an innovator and educator and promoter of indigenous knowledge that are environmentally-friendly and safe.

This sub-chapter aims to identify the stakeholders and their respective roles, and to review the development and contribution of farmer first movement that significantly affect the farmers to invent, try, and share the new knowledge and innovations to other farmers and actors in their respective communities since 1987.

Upon reviewing related literatures on farmer first and examining farmer-conducted trainings in the Philippines and Japan using case study approach, it became clearer that farmer first movement still plays a very important role in extending agricultural knowledge and technologies that are environmentally-friendly and contributes to rural development. This research highlights the importance of farmer first movement in boosting confidence of farmers

to conduct their own trainings and to spread safe, environmentally-friendly agricultural systems especially for rural development through the development of "theme-community".

4.3a Farmer First Movement

The idea of 'farmer first' was first introduced in 1987 when Chambers et al. (1989) compiled the work of several researchers that studied farmer participation in agricultural research. The concepts started by identifying farmers' problems and going back to them with alternatives. The idea proposed by social scientist in 1980s, was to involve farmers more systematically and actively in the research process to take advantage of farmer skills to experiment.

Farmer first movement was a result of gathering of small minority social and biological scientists that collaborated with farmers to further understand the reason for non-adoption of technologies in 1980s. According to Chamber et al. (1989), non-adoption of technology was more often attributed to ignorance of farmers that resulted to the prescription of extension education in 1950s to 1960s. On the other hand, non-adoption was ascribed to farm level constraints with the gaps in yield between research stations and farms that leads to a recommendation to modify and make the farm more like a research station in 1970s. In 1980s, analysis about non-adoption was interpreted as neither the farmer nor the farm is the problem, but the technology and the faults of technology can be traced to the priorities and processes which generate it.

Unlike the conventional Transfer-of-Technology (TOT) model which greatly favors the largescale or resource-rich farmers whose conditions are the same to those research stations, the farmer first prioritized farmers' needs first. It aims to provide the appropriate technology for the needs and opportunities of resource-poor farmers.

4.3b Stakeholders and Their Roles

In Farmer first, farmers were the ones who detected and assessed their problems, needs, and priorities in their farms. Upon evaluation of the needs and problems, farmers conducted

their own experiments in the farm. Successful innovations by farmers were transferred and spread to other farmers by farmer-to-farmer approach or by the "farmer-trainers" which is a generic term used to address farmers that provides and conducts research and training to farmers and other actors. Contrasting to the farmer first, the scientists were the main responsible in the assessment of problems, needs, and priorities of farmers, and key experimenters in TOT. Moreover, research and innovations generated in research stations and laboratories were transmitted to farmers by Extension Agents (EA). Table 4.6 summarizes the difference between TOT and farmer first. This clearly convey those farmers were in the center in every activity and serve as the main actors or stakeholders in Farmer first.

Table 4.6 Difference between Transfer-of-Technology and Farmer first

Activity Indicators	Transfer-of-Technology	Farmer first
Problems, needs, priorities, knowledge, and analysis (are determined by)	Scientist/ Researchers	Farmers
Main location of technology or action generation (are in the)	Research stations and laboratories	Farm
Transfer of technology (are done by)	Extension Agents	Farmers
Central experimenters	Scientist/ Researchers	Farmers

Note: Compiled by author based on Chambers et al. (1989); Franzel et al. (2015); Hocde (1997); Rhoades (1989); and Simpson et al. (2015)

Farmer-trainer does not rule out the need for scientific research, hence they open a new area of research. Chambers (1989) stated that farmers must be empowered to learn, adapt and do better on their own and on their farm field, outsiders such as scientists, EAs or NGOs should just assist and give them principles, methods, and technology choices. Moreover, Franzel et al. (2015) acknowledged that farmer-trainer needs coaching and technical supervision and assistance from scientists and EAs, otherwise they may perform poorly.

4.3c Farmer First in Farmers' Innovation and Technology Dissemination

In experimentation, farmers are more prepared to take risk and go into the unknown than conservative researchers. Chambers et al. (1989) discuss about the interest and involvement of farmers in experimentation in a holistic approach, wherein farmers seek interactions within the whole farm system, rather than redesign the whole farm at once. This approach also includes experimentation with solutions that lay within farmers' own capacity than experimenting with conventional high-input solution. Experimenting farmers are starting to believe more in themselves, and in their ability and strengths. The experiments are theirs. Farmers are participating in the construction of something new and feeling happy and proud to discover new horizons, to broadcast their work and teach their neighbors (Hocde, 1997).

The attitude of having the conviction that outsider knowledge has a universal validity and application which should override whatever the farmers know, prevent learning from farmers. Reversals of attitude are essential complements of the farmer first method. Respect for farmers, a sensitive interaction with them, a recognition of them as fellow professionals and colleagues were necessary for them to maximize their potential (Chamber et al., 1989).

Farmers are driven to satisfy their thirst for knowledge hence, salaries and allowances are not needed to motivate them to volunteer in serving as lead farmers or 'farmer-trainer' (Hocde, 1997 and Simpson, et al, 2015). Significantly, almost all traditional agriculture is a result of spontaneous spread of innovation from one farmer to another, from one village to another and even clear across continents (Bunch, 1989). Farmers experimenting and disseminating innovations is not a new approach. According to Franzel et al., (2015), farmer-to-farmer extension programs have been used significantly in the Philippines since 1950s and in Central America since 1970s. In the Philippines, successful and outstanding farmers with knowledge on innovations are recognized as Magsasaka Siyentista (MS) or Farmer-Scientist by the Department of Agriculture (DA). According to Qamar (2012), MS play vital roles in serving as researchers and EA in their respective areas by showcasing and promoting indigenous and science and technology-based agriculture, forestry and natural resources

technologies based on their own farming experiences. These farmers are not only active participants but also serves as facilitators and initiators of technology transfer process.

Table 4.7 shows the similarities and differences of the three farms selected in Japan and the Philippines. C Farm was established in 2006 as a hobby farm of a former IT executive with no agriculture background. The farm has been performing and conducting experiments and trainings on Organic Agriculture (OA) production management.

Table 4.7 Similarities and Differences between Three Selected Farms

Name of Farm	**C Farm**	**S Farm**	**K Farm**
Ownership Type	Family Owned	Family Owned	Family Owned
Farming background of owner	From a non-farming family but attended trainings in the country and abroad	From a farming family; but in OA: develop the techniques and methods through trial and error	The family graduated from an agricultural university in Tokyo; in OA: trial and error
Location	Majayjay, Laguna, Philippines	Ogawa Town, Saitama Prefecture, Japan	Nakayama, Tochigi Prefecture, Japan
Established Since	2006	1971	1981
Farm Management	OA	OA	OA
Modified/ Innovations	Zero-waste farming, vermicomposting, farm integration	Cycle-based organic farming: plant, soil, and animal nutrients, circulating energy	Tunnel type plastic houses; rejected crops as feeds, and animal dung for composting
Training Program/ Training conducted	Lakbay aral tour, green salad tour, and trainings for days; Agri-tourism workshop	One day seminar plus farm tour and farm stay (6months-1 year)	One day seminar and tour; Farm stay, Field works, once a week meeting (2-3 years)
Trainees	Farmers, teachers, students, government workers, EA, businessmen, and hobbyist	Farmers, teachers, students, government workers, EA, businessmen, and hobbyist	Farmers, teachers, students, hobbyist and those who wants to do and establish OF

Source: Farm visits and Farmer-trainer interviews, 2017

Based on the observation of trainings and farmer interview, C Farm performs modifications and experimentations of different innovations that will suit their farm's condition and needs. Dissemination of these innovations through trainings are conducted in their own farm to their neighbors and other interested individuals and groups. As part of the interview the Farmer-trainer said that "at first we just wanted to produce safe food for family consumption, we don't want to feed our children toxic and chemicals".

The farmer-trainer added, "When we started, it was very hard for us to do OA, we even needed to go abroad to attend trainings and to adopt different technologies, and a lot of Filipino farmers does not have the capacity or means to study abroad and attend trainings". Therefore, farmer-trainers are very motivated to share the knowledge and innovations to others to promote the spread of OA for safe and healthy food and environment.

On the other hand, farmer-trainers of S Farm and K Farm were both from farming family and received formal education on agriculture in Japan. Established in 1971, S Farm conducts experiments and trainings in Ogawa Town, Saitama Prefecture. The farmer-trainer delivers his motivation and philosophy of OA, the development process and practices of his farm and how OA transformed the community through the years.

Training observation showed that the farmer-trainer is really determined to encourage the community and other stakeholders; he offered the advantages and positive effects of practicing OA. He also pointed out that it must be a community adoption because it will be no effect if it is just one farm. Aside from conducting his own training in his farm, the farmer-trainer supports different activities to promote OA not just in his community but in the whole country.

K Farm in Tochigi Prefecture was established in 1981. Participation, observation, and interview revealed that the main objective and mission of the farm are to educate new farmers and assist them in putting up their own organic farm. The farmer-trainer delivered his short lecture about the history of their farm and some data about the diseases, and nutritional contents of their organic crops. During the interview, he said that they are doing OA because it is safe

for humans and the environment, and they are involved in the Teikei system, wherein customers trust them to produce safe foods. “There are many people who are interested to do OA, and they just need someone to assist them”, he added when asked about his motivation to conduct trainings.

Based on observations, successful farmers in Japan and the Philippines seem to play important role as trainers in offering and conducting trainings to further disseminate innovations and experiences regarding the success of their farms. Even if their farms are not easily accessible, trainees are willing to travel all the way to their farms just to attend their trainings. These farmer trainers are proof that farmer and outside actors such as researchers and EA needs to work complementarily. Farmer-trainers, assisted by researchers and EA have the confidence to do their own innovation and share it to other farmers and beneficiaries. Therefore, farmer first still plays a very important role in farmer-trainers in experimenting and disseminating innovations.

4.3d Farmer First in Environmentally Friendly Agriculture and Rural Development

As shown also in Table 4.7, all farmer-trainers practice OA and their agricultural innovations are more for the conservation of the environment. Innovations include the zero-waste and cycle-based farming. Based on the farm-interviews and observations, zero-waste farming can be defined by utilization of waste as the main ingredient for one of the inputs in the farm. It can be easily understood by the observation done on the farmer-trainer at the C Farm in the Philippines, where farm waste such as trimmings, weeds, and animal dung were collected and used as the main ingredient of compost for organic fertilizer in the farm. Similarly, the K Farm in Japan also utilizes rejected crops as feeds and animal dung as compost. Cycle-based farming, on the other hand is closely related to zero-waste farming, as it also follows the same concept of utilization of farm waste and other farm inputs to produce natural fertilizers and pesticides. The farmer-trainer of S Farm in Japan believes that in nature, everything is part of the cycle, and even without the help of mankind, nature can maintain its own. The three farmer-trainers’ common goal is to have self-sufficiency in the community and spread it

nationwide. Self-sufficiency in a way that they can provide the needs and demands for food of the current generation by utilizing indigenous knowledge, available resources, and innovations such as zero-waste and cycle-based farming, that place back nutrients to the soil. Through this environmentally friendly agriculture, the capability to produce of the future generation is not at risk. To achieve their goals, these farmer-trainers also acknowledge the importance of enhancement of "theme-community" for rural development. Their aims to bring people together who shares common interest, objectives, and passion motivates them to conduct trainings. Through these trainings, their passion, motivation, and experiences are being transferred and disseminated to small-scale farmers and other actors including younger generations in the community that will eventually be persuaded to engage themselves in an environmentally friendly agriculture that will hopefully lead to rural development.

This sub-research concludes that farmer first movement still plays a very significant role in boosting confidence of farmer-trainers in Japan and in the Philippines to invent and modify innovations and conduct their own trainings as they are the main actor and center focus of the farm activities. In addition, farmer-trainers are more motivated and passionate to spread safe, environmentally friendly agricultural systems using their innovations in organic agriculture. Farmer-trainers also acknowledge the importance of enhancement of "theme-community" that brings people with common interest and passion together. Farmer-trainers' passion, motivation, and experiences are being disseminated to small-scale farmers and other actors including younger generations in the community that will eventually be persuaded to engage themselves in an environmentally-friendly agriculture that will hopefully lead to rural development.

It shows that the result of this sub-chapter was still in use and significant during the research study as farmer first movement still plays a very substantial role in boosting confidence of farmer-trainers not only in the Philippines but also in Japan. The movement encouraged the farmers to invent and modify innovations and conduct their own trainings as they are the main

actor and center focus of the farm activities. This result also is timely needed for OA adoption and information sharing as OA is location specific.

After the exploration of the significance of farmer-first, the second publication focused on the comparison of farmer-trainers in Japan and the Philippines.

4.4 Comparison of Organic Farmer-Trainers in Japan and the Philippines

As defined from the previous sub-chapter, farmer-trainer is a generic term used to address farmers who provide and conduct trainings not only to farmers, but also to other actors such as agricultural extension agents, students, teachers, hobbyists, and businessmen in a community. They play very important roles in the dissemination and adoption of technologies. Through these farmer-trainers, younger generations will be encouraged and motivated to engage in organic farming, and issues related to decreasing number and aging population of existing farmers in Japan and the Philippines can be partially solved. This sub-chapter aimed to qualitatively explore, interpret, and understand perceptions, experiences, and motivations to compare organic farmer-trainers (OFTs) and institutions in both countries. Using Life History Approach (LHA) and Grounded Theory Approach (GTA), this qualitative study analyzed collected data from interviews and observations of purposively selected four OFT and two institutions.

4.4a Farmer-Trainers in Japan

Since the Japanese government acknowledged the importance of veteran farmer (rōnō) (Minami, 1986), there is a need to comprehend how and why they have continued to conduct trainings. Table 1 summarizes the profile, duration, strategy, and method of trainings based on LHA and GTA. Established in 1971-1981, they had an average of 43 years OA training experience.

Both OFTs had formal agricultural education and came from farming families. Moreover, both serves as key speakers prior to conducting proper trainings. As training

methods, laboratory method (LM; where participants will be actively involved by experiencing the technology or innovation through hands-on activity) and inquiry-based method (IBM; OFTs will only share knowledge on specific topics or technology to trainees if they were asked) are identified. On the other hand, researchers and staff serve as resource speakers prior to the LM for the institution.

Table 4.8 also shows that OFTs and J institution have interrelated innovation that they disseminated interconnected reasons why they conducted OA trainings, and linked motivations to do trainings. Interestingly, all training strategies led to persuasion but differed from the initial focus (e.g. value appreciation, OA appreciation, and model showcase). Moreover, they focus on OA technologies specifically to attain sustainability. Food safety and sustainability are their common denominators as reasons to conduct OA trainings. LHA application on the life experiences of OFTs leads to the clear understanding of their motivations, philosophy, and reasons to conduct trainings.

LHA and GTA in J Institution: The J Institution focused on sustainable agriculture which utilizes methods of integrated OF to help uplift the poor peoples' living condition. Trainings on servant leadership (emphasizing on leader who serves and works at the level of the people, and inspires, motivate and empower them), and how to organize and develop their community (emphasizing on ways to persuade the whole community to participate fully in decision making and contribution abilities) were also included.

One training batch commonly involves 30 selected individuals. The institution believes that working, teaching, and learning together for nine months will provide trainees mutual growth and experiences.

The concept of "learning by doing" is also employed to encourage the application of the knowledge they gained during lectures and field trips. Moreover, the idea of "food life" is the center of their training. Trainees also enjoyed the experience of sharing meals prepared from their community farm where every member puts efforts to grow and produce crops and livestock.

Table 4.8 Profile, duration, strategy, and methods of trainings conducted by selected OFTs and institution in Japan

Farm's Name	**J Institution**	**S Farm (OFT)**	**K Farm (OFT)**
Resource Speaker	Researcher/ Staff	Owner	Owner
Established since	1973	1971	1981
Method of Training	LM	LM and IBL	LM and IBL
Training Packages	Lecture, Tour, Farm Stays	Lecture, Tour, Farm Stays	Lecture, Tour, Farm Stays
Duration	1 day- 9 mos [1 day/8hrs]	½ day-12mos [½day/4hrs]	2-3 yrs [½day/4hrs]
Training Fee (1 day)	¥1,000 ($8.8 for 2 meals)*	¥2,200 ($19.36)*	N/A
Training Strategy	Value appreciation then persuasion	OA appreciation and model showcase, then persuasion	OA model showcase then persuasion
Training Contents	- History, Philosophy, Visions, and Motto	- Food and Energy of Local Production/ Consumption	-Introduction and Benefits of OA
	- Enrichment of "Food life" through OA	-Philosophy and motivation on OA	- Farm History and Motivation
	- Servant Leadership	-OA as Cyclical System	- Zero-Waste Farming
	- Community Building	-Regional Collaboration	- Tunnel Plastic Houses
	- Practices in OA	- Practices in OA	-Farm Integration
Reason why OA	Safe and sustainable	OA is a lifestyle	Safe food and production,
		Sustainable in cyclical system	Trust and good farmer-consumer relationship

Source: Field survey, 2017 and 2018
Note: Exchange rate: ¥1=USD0.0088 (Dec 12, 2018)

This study found that the selected institution conducts trainings to provide servant leaders the capacity to uplift living conditions of poor people through sustainable integrated OA guided by the idea of "food life" towards the community empowerment.

LHA and GTA in S Farm

This OFT shared his motivation and OA philosophy, farm development process and practices, and how OA transformed his community through the years. Training observation revealed that FT was highly determined to encourage the community and other stakeholders by unconditionally sharing his OA knowledge and experiences. He also offered farm stays to any individual including the youth who wish to learn and/or engage in sustainable and integrated OA. He is also involved in Teikei system, a mutually beneficial relationship between producers and farmers. Aside from these, OFT proactively supports different OA promotion activities not only in his community but also in the whole country. He also emphasized that community adoption is the key to create an impact. His determination, philosophy, experiences and motivation are the reasons why he conducts trainings and support different OA activities

LHA and GTA in K Farm

Participation, observation, and interview revealed that the main objective and mission of this farm are to educate new farmers and assist them in putting up their own organic farm, respectively. OFT commonly gives a short lecture about the farm history and diseases, and nutritional contents of their organic crops. LHA revealed that they have engaged in OA because it is safe for humans and the environment, and they are also involved in Teikei system. He has been motivated because "Many people are interested to do OA, and they just need someone to assist them," which he personally encountered.

4.4b Farmer-trainers in the Philippines

Aside from the institutions in Laguna, C Farm and A Farm are the two major organic farms that conducts trainings, owned by the two farmer-scientists. Table 4.9 summarizes the profile, duration, strategy and method of trainings based on LHA and GTA.

Table 4.9 Profile, duration, strategy, and methods of trainings conducted by selected OFTs and institution in the Philippines

Farm's Name	Institution	C Farm (OFT)	A Farm (OFT)
Resource Speaker	Researcher/ EA	Owner and Training Staff	Owner and Training Staff
Agriculture Background	Agricultural School Trainings and Experiments	Trainings and Experiments	Trainings and Experiments
Established since	2008	2005	1987 (OA in 2007)
Method of Training	LM	IBL	IBL
Training Packages	Lecture, Tour, Hands-on	Tour, Lecture	Tour, Lecture
Duration	10 sessions (8hrs/session) [1day/8hrs]	1 day - 6 months [1 day /8hrs]	1 day - 6 months [1 day /8hrs]
Training Fee (1 day)	Free	P 1,275 ($24.23)**	Government Funded
Training Strategy	OA appreciation then persuasion	OA model showcase then persuasion	provision of options then persuasion
Training Contents	- definition, history and importance of OA	- definition, advantages of OA, farm history	- definition, advantages of OA, farm history
	- natural farm inputs	- zero-waste farming	- zero-waste farming
	- natural farm inputs	- vermicomposting	- fruit propagation
	- seed production	- farm integration	- farm integration
Reason why OA	safe and sustainable	not to feed toxic to her family, safe and sustainable	safe food and production, trust and good farmer-consumer relationship

Source: Field Survey, 2017 and 2018
Note: Exchange rate: Php1=USD 0.019 (Dec 12, 2018)

In institutions, researcher, and extension agent (EA) serve as speakers, while owner and/or training staff serve as speakers in the private farms. Agricultural background, method of trainings, training duration and packages also varied.

Related innovations and training contents mainly focused on OA technologies to attain sustainability. It was also observed that training strategies led to persuasion but differed from

the attention such as appreciation, model showcase, and provision of options. Food safety was the common denominator of trainers for their reasons to conduct OA trainings.

LHA and GTA in P Institution

LHA revealed that P institution "starts training by appreciation then persuasion," conveying that farmer needs to appreciate first what they are doing for them to understand the importance of each technical or theoretical lecture in the training. After understanding the importance, persuasion is done using video presentations and true-to-life story sharing. Technical discussions of innovation will follow and focus on production of natural farm inputs such as bio pesticide, botanical concoctions as fertilizers, and how the farmers can produce their own seeds. The trainer from the institution also added that "Farmers are proud of themselves as they were given a chance to uplift their morale and boost their confidence. Every time they share their experiences, they feel important." These were some of the observations she encountered during the interaction with the farmers. These were also the reasons why she continues to conduct trainings on OA.

LHA and GTA in C Farm

Initially, C farm harvests were only for family consumption to feed their children fresh, nutritious, toxic- and chemicals-free food. With no farming background, OFT had difficulty in starting OA. They even needed to go abroad to attend trainings and to adopt different technologies. Since most Filipino farmers do not have the capacity or means to study abroad and attend trainings, OFT decided to share their learnings and technologies to farmers and interested individuals. Moreover, their own experiences and struggles motivated them to share what they know through trainings.

LHA and GTA in A Farm

A Farm also catered to farmer-participants in their farm. Their philosophy and motivations pushed them to conduct training and share what they discovered to other farmers. They also have the passion and hope that there will be more people who can benefit and enjoy

the advantages of OA, while ensuring safe food for the consumer and safe management production for the farmer and environment. This OFT believe that OA creates trust and good farmer-consumer relationships.

4.4c Comparison between OFT in Japan and the Philippines

LHA and GTA revealed that OFTs in Japan and the Philippines have varied training methods, packages, duration, and contents. Japanese OFTs have formal education as agricultural background, while Filipino OFTs only have trainings and experiences of experimentation in their farm. Different training strategies were identified but all led to persuasion in adopting OA practices. All OFTs in both countries are motivated and recognized the importance of OA in food and environmental safety, and sustainability. Japanese OFTs are hands-on trainers as they personally conduct every training that utilizes both laboratory method and inquiry-based learning method to ensure that their trainees really understood and can apply what they learned. On the other hand, the Filipino OFTs need support of their respective staff in conducting trainings and are focused on inquiry-based method. Therefore, their technology or innovations, reasons of practicing OA, and philosophy and motivations are interrelated.

Based on observations and interviews, this study concludes that OFTs in Japan and the Philippines have varied training methods, packages, duration, strategy, and contents. In contrast, their technology or innovations, reasons, and philosophy and motivations of practicing and conducting trainings in OA, are interrelated, and basically grounded in disseminating the advantages of OA in safe food and production, environment conservation, and attainment of sustainability to further persuade adaptors.

In general, it can also be concluded that being hands-on farmer-trainers in Japan that utilizes both laboratory method and inquiry-based learning method, guarantees a better understanding and application of the subject matter to another farmers. Filipino OFT should consider and adopt the philosophy and uniqueness on how Japanese OFT conduct the trainings and impact the community.

This sub-paper showed that Japan and Philippines have diverse topics or focus, different methods, packages, duration, and strategies in disseminating the OA technology, but all of them have interrelated and interconnected reasons and motivations for their varied initiatives.

Conclusion

To conclude this chapter, there were varied sources of OA information and each source has their own target beneficiaries that were highly influenced by the institutionalization of DA to improve agricultural system in the country. Sources offered diverse contents or technologies for farmers, each source had their own specialty and focus, hence cooperation between stakeholders is highly necessary. It is also noteworthy that types of information sharing should be available, accessible and complement the needs and interests of farmers.

Farmer-to-farmer movement is still playing a very substantial role in boosting confidence of farmer-trainers not only in the Philippines but also in Japan. The movement encouraged the farmers to invent and modify innovations and conduct their own trainings as they are the main actors in the farm activities. This result also is timely needed for OA adoption and information sharing as OA is location specific.

In addition, farmer-trainers are more motivated and passionate to spread safe, environmentally friendly agricultural systems using their innovations in organic agriculture. Farmer-trainers also acknowledge the importance of enhancing of “theme-community” that brings people with common interest and passion together.

Moreover, it also showed that not only in the Philippines but also in Japan, Farmer-trainers have diverse topics or focus, different methods, packages, and strategies but they have interconnected reasons and motivations for their varied initiatives in the dissemination and persuasion of other people to adopt the OA technology.

Chapter 5: Impacts of Information Sharing to Farmers and other Actors in the Community

Introduction

Organic agriculture (OA) has changed unsustainable habits around the globe by inspiring producers and consumers. Concerned organizations and institutions are continuously working to meet the principles of health, ecology, fairness, and care at the core of the organic philosophy (Arbenz et al. 2016). In the Philippines, OA was given priority as one of the essential technologies and farm practices to address current issues on sustainable agriculture, environmental degradation, and climate change. Republic Act No. 10068 (more commonly known as the Philippine Organic Agriculture Act) was enacted on 6 April 2010 to devote five percent (5%) of the agricultural land to organic farming (del Rosario 2018). Despite the efforts of the Philippine government to promote and adopt the technology, the OA adoption rate is still low. The Department of Agriculture (DA) has set a target of 200,000 ha to be devoted to OA, equivalent to five percent (5%) of the estimated 4 million ha cropland (Pantoja et al. 2016). However, the reported 17,156 ha of OA managed land (0.17%) in 2017 by Willer and Lernoud (2019) conveys that the situation is still far from reaching the government target. Various challenges such as policy gaps, lack of production support, promotion, and awareness activities, fragmented and inadequate research and development, extension and capability building activities, and poor market systems may have attributed to low adoption rate of OA (del Rosario 2018; Pantoja et al. 2016).

Research and extension are critical to attaining and achieving the desired outcomes on agricultural development in the Philippines (Aquino et al. 2011). However, in reality, the weak research and extension connections restrict the full implementation of successful agricultural development efforts. Upon reviewing past literature, most studies focused on the economic aspect and production (Piadozo et al. 2016; Shimoguchi and Mojica 2016), while only a few studies about farmers' attitudes and behavior affecting information sharing. Furthermore, there

are few in-depth studies of the non-monetary effects of information sharing on farmers. Thus, research models are necessary for developing countries, especially those adequately emphasize the impact of knowledge and information sharing by individuals, organizations, and their respective intentions to technology adoption (Kettinger et al. 2015).

Information is critical in agricultural development as it connects all components, activities, and operations in a value chain network and is a tool for communication and coordination among stakeholders. It also serves as a channel for assessing trends and shaping decisions (Chisita 2012 and Lotfi et al. 2013). Agricultural information sharing has two main actor groups: the institutions as the major sources of information and the farmers as the main receivers or beneficiaries. However, having this kind of conventional major actor group, certain studies acknowledged the vital role of farmers in experimenting and knowledge sharing, especially information dissemination by farmer-to-farmer that has been used significantly in the Philippines and Central America since the 1950s and 1970s, respectively (Chambers et al. 1989; Franzel et al. 2015). In fact, almost all traditional agriculture practices result from the spontaneous spread of innovation from one farmer to another, from one village to another, and even clear across continents (Bunch, 1989). Hence, focusing on the effect or impact of knowledge and information sharing to different actors in agriculture, specifically in developing countries, is needed (Kettinger et al. 2015). Therefore, this study utilizes three main actor groups on OA information: the institution as the main source, the farmers as the primary receivers and main beneficiaries, and the farmer's family members who directly affect farmer's decision and as the secondary receivers or indirect beneficiaries.

To address the problems in mismatched technologies, policies, and programs, farmers should be adequately heard and understood. This initiative can result in effective information dissemination that will eventually lead to adopting the technologies they need. In addition, farmers sharing their motivation and aspirations with younger generations may persuade them to engage in agriculture. Furthermore, promotion and adoption of OA are vital initiatives to uplift the lives of the poorest populations and attain agricultural sustainability, specifically in

Asia; however, empirical evidence on its impacts on poor organic farmers is limited, particularly in developing countries (Setboonsarng 2015). Thus, this study attempts to clarify one of the possible solutions to achieve agricultural sustainability through assessing the impact of information sharing to farmers and other actors in the community. This study specifically sought to explore different factors affecting actors' attitudes that affect farmers' decisions, distinguish differences among actors on the value of factors, and assess the degree and interaction of impact of information sharing to farmers.

Methodology

This qualitative study specifically determined how information sharing influences different actors' decisions to share and adopt organic agriculture technologies in Laguna, Philippines. There were five institutions, 30 farmers, and six family members who were interviewed at least twice between 2017 and 2020 using Historically Structured Inviting as a sampling method. This study also utilized different data collection methods and diverse data sources accessed over time for data triangulation to ensure the validity and reliability of the research.

Research participants were asked to specify and rank the factors or reasons they individually considered when choosing a technology to learn, adopt, and share. Main actors were also asked about the influences or changes to their lives after receiving OA information. All answers were noted, encoded, and grouped using Atlast.ti. Codes were set based on varied quotations from the interviews with main actors. These quotations linked to a code of each valued factor were referred to as "groundedness" or the code frequency. For this study, the "groundedness" was divided into three groups: High: 67%-100%; Moderate: 34%-66%; Low: 33% and below, based on the percentage of occurrences of codes per actor group.

Results and Discussion

Factors affecting actors' attitudes that affect farmers' decisions must be explored to understand and assess the impact of information sharing on farmers and other actors in the community. Afterward, the differences among actors on the value of factors can be distinguished. Subsequently, the degree and interaction of impact of information sharing to different actors can be assessed.

Profile of Participants. Main actors in this study included 11 staff-participants from five institutions (as the main information sources), 30 farmer-participants (as the main receiver or beneficiaries of information and innovation), and six family member-participants (who were the main factor or reason affecting farmer's decision in adopting specific innovation) referring to children and spouses of some farmer-participants. Staff-participants were composed of seven female and four male respondents ages 35 to 62 years old with an average age of 48 years old. Years engaging in formal OA information sharing for staff-participants ranged from 5 to 19 years with an average of 11 years. On the other hand, farmer-participants consisted of 21 male and nine female respondents ages from 30 to 72 years old with an average age of 52 years old. Their farming experiences ranged from 4 to 50 years, with an average of 29 years, while organic farming experience seemed shorter with an average of 10 years. It should be noted that organic farming experience ranged from 1 year (those farmers who tried OA but went back to conventional) to 30 years.

Factors affecting actors' attitude and the differences of valued impacts. Different factors affecting actors' attitudes were identified from the study. These factors were grouped into two parts: the extrinsic variables (e.g. characteristics of the farmers, external environment, and innovation) and the intrinsic variables (e.g. attitude, knowledge, perception, motivation-that will be understood through participants' life histories). For this study, only intrinsic variables are utilized.

Staff-participants from institutions valued highly the importance of innovation, including OA's safeness for farmers, consumers, and the environment (Table 5.1). The sustainability of OA and the easiness to learn and adopt were ranked second and third, respectively. For the staff-participants of five institutions, OA is a sustainable agriculture method and the adoption of the innovation itself can be sustained because OA is site-specific which also leads to the easiness to learn and adopt as all inputs are available in the farm. Likewise, farmer-participants and their families tend to value their needs and interests more or the beneficial or positive influences that they will be getting from the innovation. Positive impacts include improved livelihood and family relationships and gained trust from their consumers and neighbors. These results are in line with the study conducted by Aquino (2019), which presented that aside from increased income and profit, small-scale organic farmers in the Philippines had different reasons and needs in adopting specific technology that included the safeness of the family and the environment.

Table 5.1 Rank of different factors affecting actors' attitude in information sharing and adoption of innovation

Rank	Institutions	Farmers	Farmers' Families
1st	importance of innovation	needs, interest (benefits)	needs, interest (benefits)
2nd	sustainability of innovation	pressure from neighbor-farmers and family members	sustainability of innovation
3rd	easiness to learn and adopt	availability and easiness to adopt	easiness to adopt

Sources: Survey data in 2018 and 2020

Farmers' attitudes towards receiving and adopting OA technology also tended to be affected by the pressure from neighbor farmers and their family members, followed by the availability of information about the technology and its easiness to adopt. As farm successors, farmers' families tend to value the sustainability of innovation more than easiness to adopt. Thus, these three main actors had different but connected reasons or factors affecting their attitude in sharing or receiving information and adopting OA innovation.

5.1 Impact of information sharing to different actors in the community

Based on the main actors' quotations from the validated transcribed interviews, codes were set and categorized, GTA analysis revealed that there were three major categories or themes, with respective sub-categories consisting of different codes. Groups included economic (monetary and non-monetary influences or positive changes from information sharing), well-being (enhanced relationship and improved mental health), and environmental (ecological benefits gained) impacts (Fig.2).

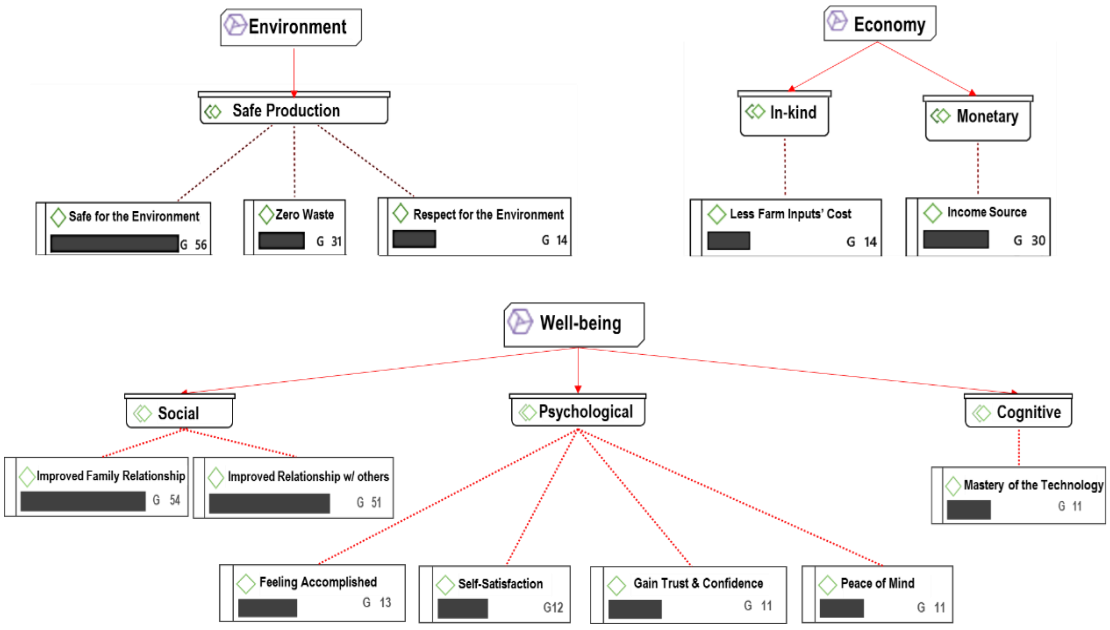

Figure 5.1 Categories, codes, and "groundedness" of codes from the impact of OA to different actors in Laguna, Philippines derived using GTA analysis in Atlas.ti

The economic impacts are the positive effects or gains of different actors financially, whether in-cash or not, while practicing and sharing OA. It has two sub-categories: "monetary benefits" and "in-kind". Economic benefits such as additional income, improved profit, and livelihood through less cost of input were noted. Some had enough savings to send their children to college or buy tricycle or small piece of land. Economic benefits consisted of two sub-categories: "in-kind" and "monetary" with each code of 'less farm inputs' cost' (with 14 linked quotations) and 'income source' (or improved income with 30 linked quotations),

respectively. “Groundedness” or code frequency refers to the number of times each quotation is linked to specific factor’s code valued by the participants. Thus, the higher the code frequency, the higher the participant values the specific factor’s code.

The environmental impact had a sub-category of “safe production” with three codes: ‘safe for the environment,’ ‘zero-waste,’ and ‘respect for the environment’ with 56, 31, and 14 linked quotations, respectively. “Safe production” contained the tag of quotations from farmers related to producing food that is ‘safe for the environment,’ such as using natural fertilizers and pesticides or farming without synthetic chemicals. In addition, ‘zero-waste’ referred to tags on the process of recycling nutrients and ‘respect for the environment’ representing tags on their efforts or contribution in saving the environment were also included.

On the other hand, the well-being impact is composed of three sub-categories and seven codes. The “social” sub-category considered the participants’ desire to have a role in and help their family and community. The “cognitive” sub-category focused on how participants positively processed the information, knowledge, and learnings they were getting to be more effective and successful in their farm and information sharing activities. The “psychological” sub-category covered farmers’ positive sense of purpose or self-satisfaction.

Positive feelings brought by OA to their lives became their reasons to continue and eventually adopt the OA technologies. Codes belonging to this category were ‘improved family relationship,’ ‘improved relationship with others,’ ‘mastery of the technology,’ ‘feeling accomplished,’ ‘self-satisfaction,’ ‘gain trust and confidence,’ and having ‘peace-of-mind.’ Quotations such as *“This changed my life as the feeling of fulfillment that I now have another role for my family”; “through OA, I was able to be an important family member”; “trust and a good farmer-consumer relationship are also created”; “I am not worried if they [his children] do farm activities with me because I am using natural pesticide and fertilizer, so I am sure that it is safe even for my kids”* were tagged under these codes and category.

Participants were able to get positive benefits specifically on their well-being, knowledge on environmental protection, and economic advantage from the OA information received, practiced, and shared with others. Valued impacts of information sharing on different actors (Table 5.2) revealed the differences of these impacts to different actors in the study area. All the interviewed staff-participants valued highly the "well-being" impact, and the code impact included 'gain trust and confidence,' 'self-satisfaction,' 'peace-of-mind,' 'feeling accomplished,' and 'mastery of the technology.' In addition, they also valued 'safe food and production' that they shared and imparted to their beneficiaries. They emphasized the importance of the ecological or "environmental impacts" of practicing OA.

Table 5.2 Valued impacts of information sharing on different actors

Impacts	Farmers Gr=76	Impact to Farmers Gr (%)	Institution Staff Gr=28	Impact to Institution Staff Gr (%)	Farmers' Family Members Gr=16	Impact to Farmers' Family Members Gr (%)	Total
Economy Gr=44; GS=2	35	Moderate 46	3	Low 11	6	Moderate 38	44
Environment Gr=101; GS=3	67	High 88	23	High 82	11	High 69	101
Well-being Gr=103; GS=7	72	High 95	20	High 71	11	High 69	103
Total	174		46		28		248

Sources: Survey data in 2018 and 2020

Notes: Gr- Groundedness of codes (number of quotations coded by a code) or documents (quotations created in a document); Gs- Number of codes in a code group. Impacts were based on the "groundedness" of each valued factor from Atlas.ti (High: 67%-100%; Moderate: 34%-66%; Low: 33% and below)

The economic impact to staff-participants was lowest among all actors because it did not matter if there is an honorarium or additional pay for extending knowledge and information about OA. They thought that receiving tokens of appreciation from farmers, or local

government units are just additional benefits, but they treasured more the trust and self-satisfaction they are getting through imparting the OA innovation to others.

Likewise, the 30 farmer-participants valued well-being and environmental impact greatly on social (improved family and neighbor relationship), psychological (boost confidence, feeling valued), and safety for the environment. Some farmer-participants increased their yield, which led to increased income, but some farmers who could not improve their income believed that other positive impacts (e.g., improved family and neighbor relationships and environment protection) were more important than having a better income. On the other hand, family members-participants, especially the children who were doing gardening in school, valued well-being and environmental impacts the most (e.g., enriched school social relationship, feeling valued). They even often boasted to their other classmates that OA was easy and beneficial. Surprisingly, even though some farmer-participants were not making a high profit from practicing OA, farmer-participants valued well-being and environmental impacts of knowing and understanding OA through information sharing more than its economic impact.

Effective information service delivery or dissemination, specifically to the grassroots, could be achieved when adequate attention is focused on how the information is received, processed, communicated, and used positively for the benefit of all the actors. Ogar et al. (2018) stated that information delivery with good quality is the right step towards the growth of agriculture through good communication with the rural population that will enable access to relevant information. In addition, Heeks (2018) pointed out that information communication technology positively impacts poverty alleviation concerning rural development and food security.

5.1a Impact on the institutions' staffs as main information sources

Resource speakers tended to try first the different OA technologies before they share these. From the interviews conducted, extension agents, heads, and project staff from the institutions seemed to continuously check the technology for its effectiveness and easiness of

application. Also, they seemed to adopt and apply each OA technology to their backyard gardens because they believed in OA's health benefits. The staff-participant from Institution 1 mentioned: *"We want that if we are healthy, they [farmers] should also be [healthy]. I always try and apply the technology in my garden. I want to verify because sometimes it is not doable…"*. In addition, staff-participant from institution 2 declared: *"I do not have a large area, but I can use recycled materials. When persuading other people, it should start with oneself. Also, with this [experience], one can be assured that own crops are free of chemicals and safe to eat while [having the opportunity] to save money. Working eight hours [a day] and five days a week in front of the computer, this [home gardening] is [also] a good physical activity"*. Furthermore, the staff-participant (division head responsible for information sharing) from Institution 4 stated: *"Aba, I also need to have my garden wherein I can adopt technologies that we are disseminating. How can we encourage others if we are not practicing it?".* Hence, for this study, staff-participants emphasized on importance of sharing their own experiences to others.

Information providers essentially do, try, and practice the technology first in order for them to understand quickly what the farmers or beneficiaries will be experiencing and be ready for all the questions and challenges the farmers or beneficiaries will ask. These convey that institutions' staffs were able to have peace of mind, mastery of the technology, and confidence in what they are sharing that leads to gaining beneficiaries' trust, feeling accomplished, and self-satisfaction.

5.1b Impact on farmers

Farmer-participants seemed to value well-being and environmental impacts of the OA information more than its economic impacts similar to the staff-participants. Their main reason for OA practicing and sharing was the safeness of the technology. Notably, most farmer-participants stated that OA was safe for them, their family, and the environment, which fell under the "well-being" and "environmental" impacts. Transcripts from farmer-participant 3 and

farmer-participant 17 highlighted the impact of OA information on most farmers, specifically for becoming aware of the importance of nutrient cycling and the effect of OA on the health of farmers, their families, consumers, and the environment. Farmer-participant 3 stated: "*Synthetic pesticides negatively affects humans, so why do I still need to use them. [Moreover,] if natural pesticides and fertilizers can be found just around here [within the farm], there is no reason for using synthetic ones? OA is safe for everyone [and] safe for the consumer's health. We can also help our environment by not using synthetic chemicals"*. Also, farmer-participant 17 mentioned: *"I am practicing OA because of the flow of nutrients. It is just in a cycle. Everything can just be found within the farm…"*.

In addition, farmer-participant 4 stated: *"Yes. [Practicing] organic is very hard, laborious, time-consuming, and tedious. However, I realized that it would be more beneficial in the long run because it is safe for me, my children, consumers, and the environment. I am at ease that my children, unlike me when I was their age, now know the importance of organic. They are even bragging in their school about how to do it. They often say that they saw me doing it, and it is easy to do."* In addition, farmer-participant 18 said: *"I want to change not only their [neighbors'] farming ways but also on how they live. Most of the mothers here spend the whole day chatting and talking about others' lives. [When given the opportunity,] I try to teach them what I know from my experiences and own farm practices"*.

Transcripts from farmer-participant 4 and farmer-participant 18 indicated that aside from being aware of the safety of the technology, improving and touching the lives of the people around them matters remarkably. As a parent and concerned neighbor and relative, these farmer-participants were also inclined to share the positive impacts of OA information they are receiving to those they care for who live near them.

On the other hand, some farmer-participants were also able to maximize the economic benefits and impacts of OA information and technology in their lives as they could save some money and even buy a parcel of land. For example, farmer-participant 7 stated: *"Farming is*

important. During this pandemic, we have something to eat. Unlike others, we do not need to go down [to the market] to buy food. Farming and OA have many advantages. Also, after engaging in OA, my husband and I were able to purchase a small [piece of] land through monthly installments." These statements also emphasized that their OA farm helped them survive and be less exposed to other people, especially during the pandemic.

Farmers seemed to value more the well-being and environmental impacts of OA information sharing, being knowledgeable about the nutrient cycle and the health benefits or safeness of OA to people, and the opportunity to teach and help their family members and neighbors matters notably for the farmers. Moreover, farmers seemed to be satisfied and happy with having safe and accessible food for their respective families, most especially during the pandemic.

5.1c Impact on farmers' family members

Family members of farmers were also interviewed to represent secondary or indirect beneficiaries of OA information sharing. Family member-participants also valued well-being and environmental aspects. The wife and son of farmer-participant 3 were interviewed regarding the effects of information sharing and engaging in OA. His wife shared that after engaging in organic farming and attending several OA training, her husband changed positively in terms of having a better family relationship and gaining self-worth as he can decide on his own. The family member-participant 1 (wife of farmer-participant 3): *"It [Our family situation] is better [than before his OA engagement] now, because he has time for us, especially for our children. He is free to decide on matters regarding his farm. He has no boss because he is the boss. He is always with us, but he can still provide for the needs of the family. I also feel proud that students and other (future) farmers are visiting our farm to learn and experience farming."*

The family member-participant 2 (youngest son of farmer-participant 3) shared his personal feelings and preferences as he said: *"I like it now. I can always see my Papa. He can play with me now."* As a 4-year-old son, he needs his parents' attention and affection, especially

his father that he rarely sees and remembers when his father was still working as a security guard. Based on their statements, positive effects on the quality of life were also apparent, specifically in terms of improving family time and relationships, boosting confidence and morale, and providing for family needs.

Children of farmer-participant 4 were also interviewed. Based on the observation during the interview, family member-participant 3 (grade 6 son; 12 years old) was shy at first, but when asked about his mother, OA and the effect of the OA training to her, he expressed positively and courageously his feelings: *"I am proud of my mother. I usually do garden activities in school, [similar to what] she is doing on our farm. I can confidently tell my classmates that organic agriculture can be fun and easy if we do what my mom is doing."* In addition, family member-participant 4 (grade 4 daughter; 10 years old) eagerly answered: *"I am happy that my mother is doing better now. She also has more time for us and can help us in school activities."*

Family time greatly matters for these children who had working parents. Engaging in OA seemed to contribute to having better family relationships, while proud children boosted the morale and confidence of their farmer parents. Therefore, it could be concluded that information sharing and engaging in OA seemed to positively affect the farmer-participants through the impact to their families.

5.2 Degree of impact on the effectiveness of information sources

Identification of the different information sources and the problems the receivers were facing showed that most farmer-participants were not receiving the needed printed materials. A pamphlet, brochure, or leaflet on the institution and the disseminated technology are often received. Farmer-participant 30 mentioned: *"We often received a pamphlet or brochure that the institution made for us. During the training, they [the institution conducting training] asked us what we learned. They usually [summarized the discussion and] printed it on paper and gave it to us. We already know what the content is. We want something new that will interest us in*

reading, like new information, knowledge, or technology. So, for me, the printed materials I am receiving are not that effective. However, I am still getting it for the sake of my neighbor farmers."

Another farmer stated the need for materials more than a brochure. Farmer-participant 18 shared: *"We received a pamphlet or brochure, but we already know what the content is. If possible, I want a book or manual. I keep requesting that, but until now, there has been none. Books will be effective because everything is already there. You will not be lost because it will be your guide for everything. I need a refreshment."* Farmers keep requesting, but until March 2020, they have not received the printed materials. With the pandemic, further delay of the printed material is expected.

Regarding electronic sources, only 14 out of 30 farmer-participants were using electronic sources. Only four used primarily TV to get information about natural or organic crop production practices and weather updates. farmer-participant 19 affirmed: *"I frequently watch the news on TV about the weather updates. I need to know if there will be a typhoon coming to prepare and adjust farm activities. In the past, I could not harvest anything because I was not aware of an incoming typhoon. I mainly focused on the harvest schedule."* The main electronic information sources were radio (four farmer-participants), cell phone (three farmer-participants communicating about training schedules or orders), and internet (three farmer-participants watching YouTube on OA).

The face-to-face sources seemed to show positive results as all farmer-participants could rank at least two of the most effective means. Specifically, the most effective information sharing method is training for 15 farmer-participants, and family members for 11 farmer-participants (Table 5.3).

Table 5.3 The frequency distribution of the face-to-face information sources by rank of effectiveness for farmer-participants (n=30)

Information Source	Rank of Effectiveness			Total
	1st	2nd	3rd	
Training	15	4	4	23
Family member	11	2	4	17
Neighbor-farmers	2	9	5	16
Exhibition	-	2	1	3
Demonstration	-	4	1	5
Field visit	-	5	-	5
Farm shop	-	2	2	4
Others	2	2	1	5
Total	30	30	18	

Source: Survey data in 2020

Notes: Farmer-participants initially answered questions on their source of OA information and innovation. Then, they ranked their answers based on the effectiveness of each source or method. Some farmer-participants only gave two sources of information.

Available information sources seemed to be diverse in the study area (Fig. 3). To further understand the information sharing between different stakeholders, information sources were divided into four major categories: personal information sources, public information sources, private information sources, and mass media sources. The impact of information sharing can be divided into three types: Strong impact (refers to complete, effective and efficient transfer of information to the receiver), Moderate impact (refers to the transfer of information with certain assistance for the receiver to understand) and Less impact (refers to transfer of information with no assistance; often contains shallow information of what the intended receiver is looking for).

The personal information sources, including family members, neighbor farmers, and farmers' organizations or association members, were noted to have strong interaction and

impact. Based on the previous transcripts, this result could be associated with farmers' attitudes and interests to share information with people who were close to them and knew them well. It was noteworthy that some farmer-participants in Los Baños had strong interaction and impact with the researchers and Extension Agents (EAs) of Institution 1 and the staff from Institution 3. This result was in line with Toma et al. (2018) research that stated access to technical information and knowledge transfer were among the key influences on adoption behavior and information sharing.

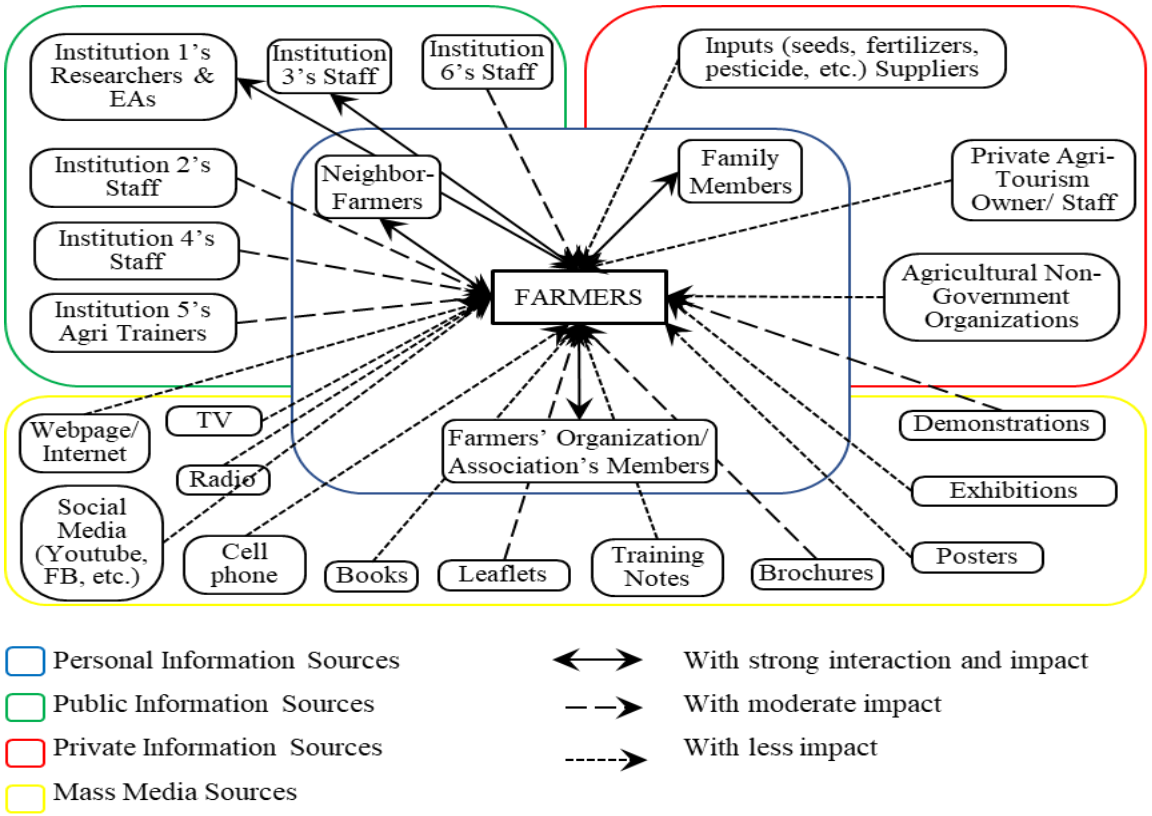

Figure 5.2 Information sharing impact to actors by degree and interaction

Source: Survey Data in 2020

Notes: *The impact was determined using the frequency percentage of each information source: Strong Interaction and Impact (67%-100%), Moderate (34%-66%), and Less Impact (33% and below). Institutions 1, 2, and 6 are all located in Los Baños, Laguna. Although there was no interview conducted in Institution 6 due to the unavailability of the focal person, this study included Institution 6 for this particular analysis because more than half of the farmer-participants mentioned the effectiveness of their staff.*

The remaining public information sources and some mass media sources (e.g., leaflets, brochures, and demonstrations) had moderate impacts, while the remaining mass media sources and private sources had a low impact. Contrary to the expected positive impact of mass media (Ali *et al.* 2016 for Zambian farmers on TV usage), the farmer-participants could not utilize these sources. Notably, the effectiveness of TV, radio, and webpage/internet sources were only 23%, 20%, and 10%, respectively.

Farmer-participants used a cell phone to contact someone about training or availability of produce. This result is similar to the study conducted by Labonne and Chase (2009), which revealed that cell phones provide Filipino farmers more access to information, specifically on various transactions, including selling their goods. However, the cell phone had moderate to low impact since only 10% of the farmer-participants owned one. Moreover, most farmer-participants did not have internet access, and some did not even have electricity. These conditions can be considered reasons for the low usage of electronic sources under mass media. Therefore, improvement in the accessibility and availability of information and sources may increase the degree of impact.

The strong interaction and impact for the farmer-participants also had something to do with the future of their farms. Since farmer-participants usually seemed to want the best for their children, they tended to be interested in the technology that would benefit them and their respective families, especially their children who will inherit their farm in the future.

Conclusion

The importance of interpretation of the farmer's attitude and behavior towards OA adoption and how these attitude and behavior affected information sharing and technology adoption were clarified. Life History Approach, Trajectory Equifinality Approach, and Grounded Theory revealed needs, importance, sustainability, pressure from others, availability, accessibility, and easiness to adopt as factors affecting actors' attitudes toward learning, sharing, and adopting OA technologies. The factors affecting the attitude of the three main

actors (e.g., farmers, institutions' staff, and farmers' families) in sharing information and adopting OA innovation were different but interconnected. Interaction and degree of impact of OA information sharing were also influenced by and associated with the attitudes and interests of the beneficiaries to accept, share, and adopt information they were receiving. The degree of the economic, well-being, and environmental impacts varied. However, the main actor groups seemed to value OA's well-being and environmental impacts more than economic impacts. Although personal information sources had the strongest interaction and impact, improvement in the accessibility and availability of other sources (e.g. mass media sources) might increase the degree of the impact.

Furthermore, farmer-participants tend to be interested in the technology that will benefit them and their respective families, especially their children who will inherit their farm. Thus, there is a need to plot the life paths of farmers who adopted and know their reasons of continuing or discontinuing OA using the Trajectory Equifinality Model (TEM). This study may formulate new ideas or ways to increase the number of organic farmers and persuade the youth to participate in agriculture.

Acknowledgement

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Chapter 6: Effect of Farmers' Attitude and Behavior towards OA

Chapter six focuses on the discussions of how attitude and behavior of farmers affect OA adoption and information sharing. As per the previous chapters and literature, different factors affected the adoption, and the need to focus on intrinsic variables such as attitude and behavior is a must.

Introduction

Meijer, et al. (2015) stated that understudied and less focused factors such as attitude, knowledge, perceptions play a key role in knowledge sharing and adoption of innovation. In addition, Rose (2018) reported that the underlying principle to focus on farmers' behavior tends to the belief that by understanding farmers better, their behaviors can be influenced and ultimately convince them to adopt recommendations. Therefore, this chapter aims to assess the effect of farmers' attitude and behavior towards OA adoption and to the information they are sharing. This chapter was divided into 4 sections: Interpretation of Farmers' Attitude and Behavior; Farmers' Interests and Needs; Reasons Farmers Adopt and Share OA Practices; and Effects of Farmers' Attitude and Behavior in Farm Succession.

Methodology

Farmers' interviews and observations were continuously transcribed, categorized, encoded, and analyzed using grounded theory approach (GTA), life history approach (LHA), and trajectory equifinality approach (TEA) with the aid of ATLAS.ti and Trajectory Equifinality Model (TEM). Life histories of each farmer were made and verified. Life histories were plotted in a trajectory equifinality model which also included its main component such as irreversible time, obligatory passage point (OPP) which is to learn and accept the importance of OA, and the three equifinality points: share OA info to others or/and next generation and engage them; stop farming for the meantime; and went back to conventional farming. From the

in-depth interviews, reasons, situations, attitude, and behavior were noted and included in the final TEM.

Results and Discussion

6.1 Interpretation of Farmers' Attitude and Behavior

To interpret the attitude and behavior of farmers, this in-depth study utilized GTA, LHA, and TEA. Whereas life histories of farmers were created from their interviews. Based on the categorization in intrinsic part of chapter 3, farmers were categorized into four groups (Table 6.1).

Table 6.1 Distribution of Farmers based on their life trajectories

Category	**1**	**2**	**3**	**4**
Description	From a farmer-family, learned the importance of OA, Share OA	From a farmer-family, learned the importance of OA, stop farming for the mean time	From a farmer-family, learned the importance of OA, went back to conventional farming	From a non-farmer family, learned the importance of OA, Share OA
Farmers	1, 2, 3, 4, 5, 7, 9, 11, 16, 17, 18, 20, 26, 27, 28, 29	12, 13	14, 21, 22, 23, 24, 25,	6, 8, 10, 15, 19, 30
No. of Farmers	16	2	6	6

The first Category is composed of 16 farmers who were all from a farmer-family, with or without experience or knowledge in farming. But in a certain period of their lives, each farmer learned the importance of OA and soon engaged in OA and share OA information to other people including the next generation and made some efforts to engage them in agriculture. The second category has two farmers, who were from a family of farmer, experienced farming, learned the importance of OA, faced problems, and decided to stop farming for the mean time. The third category on the other hand, has six farmers, who were from a family of farmers,

practiced and experienced agricultural activities during their childhood, learned the importance of OA, and tried OA. But unfortunately, they ended up going back to conventional farming. The last category, category 4 is comprised of 6 farmers, who are from a family of non-farmers, they were informed about agriculture, learned, and accepted the importance of agriculture, learned the importance of OA, engaged in OA and share OA information to others.

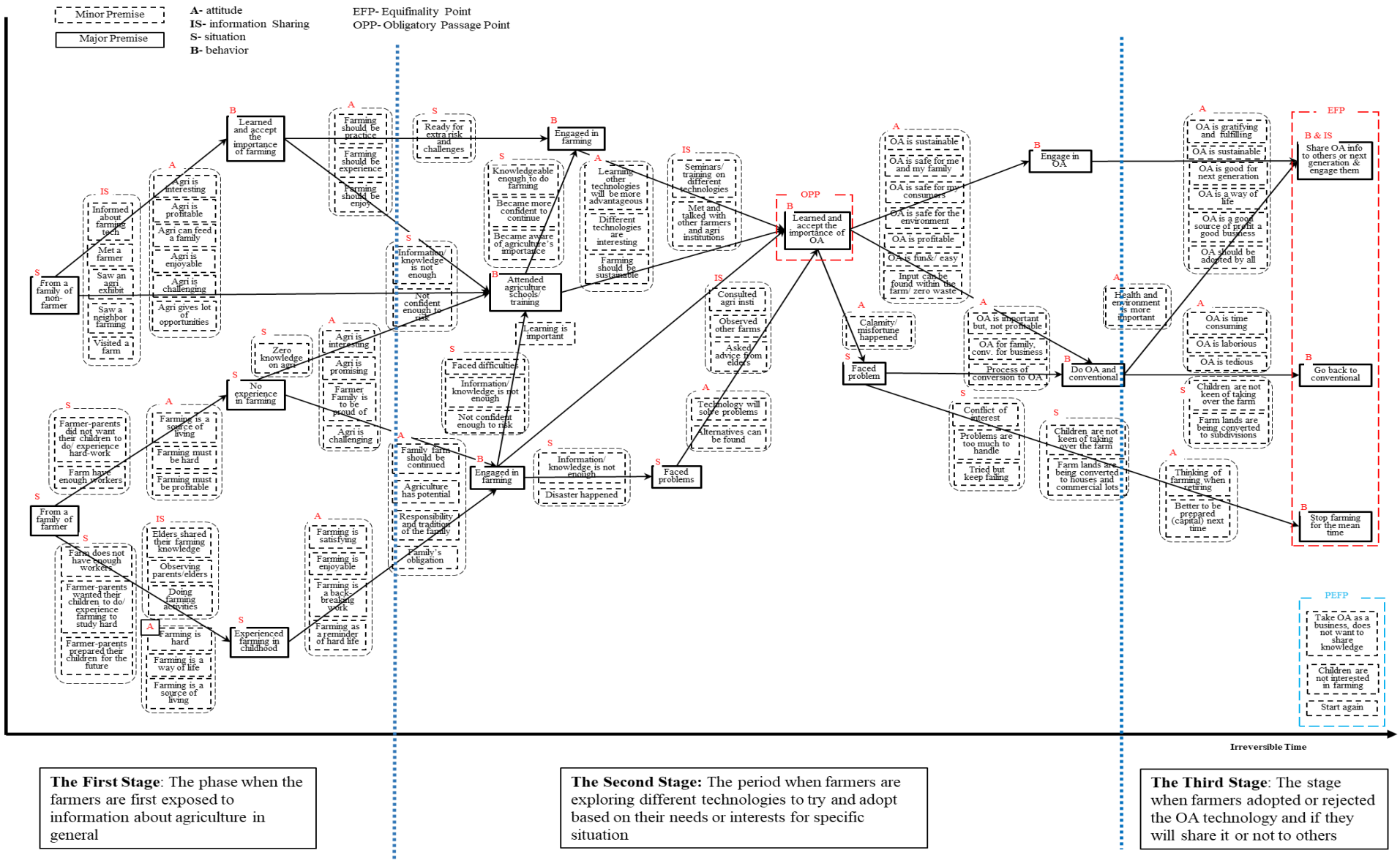


Figure 6.1 TEM of 30 farmers' attitude and behavior affecting OA adoption

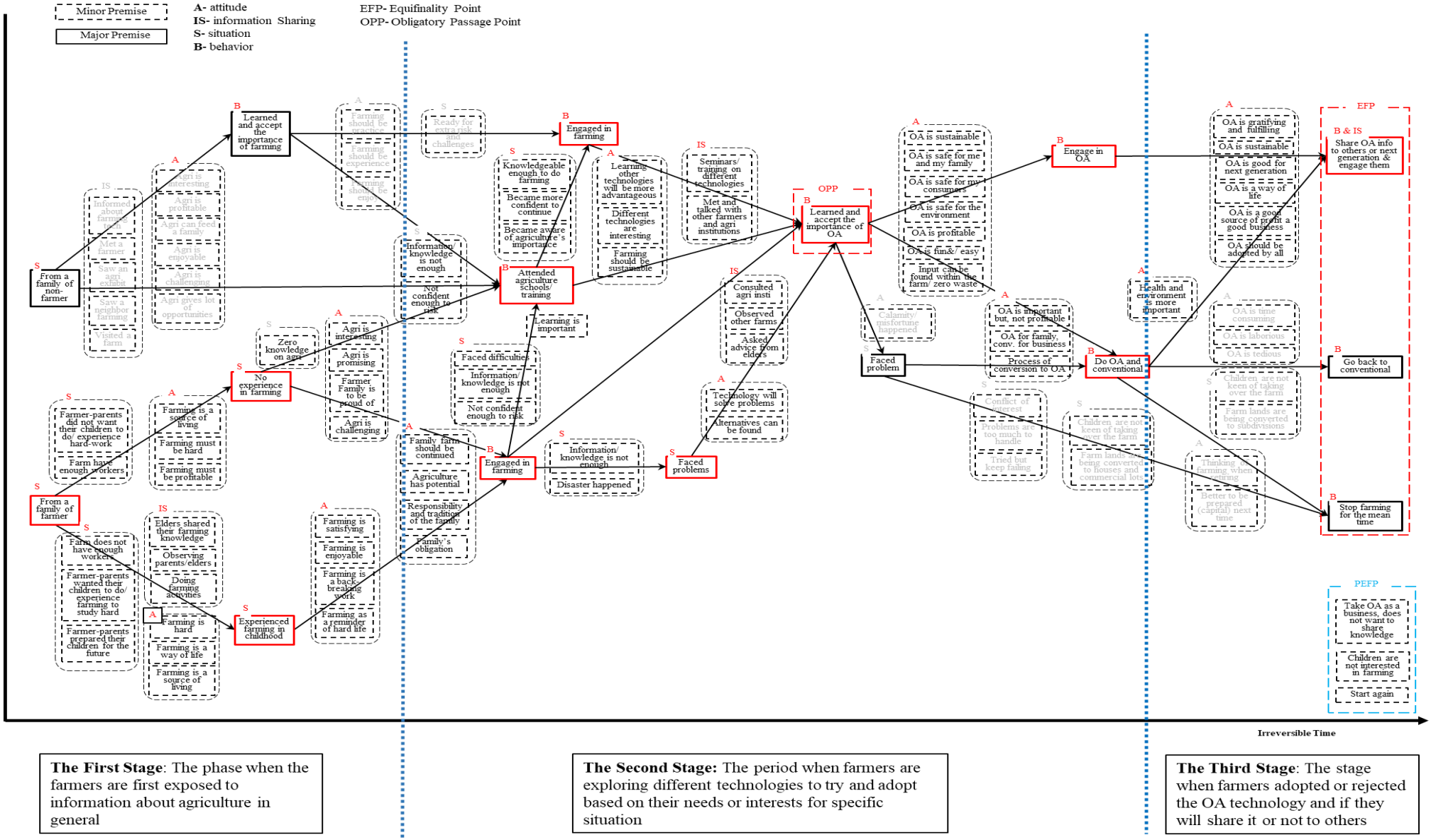


Figure 6.2 TEM focusing on 16 farmers' belonging to Category 1 on the attitude and behavior affecting OA adoption

Category 1

All farmers are from a family of farmers but some farmers from this category did not experience farming before they decided to have their own farm. Thus, category 1 was further sub-divided into two sub-categories: (1a) no farming experience, and (1b) experienced farming in childhood. Category 1a did not experience farming mainly because these farmers are from a farmer-family with enough workers in their farm. For these farmers, they have the perception that farming must be profitable and can be a source of living. Also, if their parents did not want them to experience hard work, farming must be hard. On the other hand, farmer-parents of category 1b, do not have enough workers. Some of them want their children to experience farming for them to study hard and succeed in life (by not continuing farming as a career as it is very hard). Some parents want their children to be prepared for the future as farm successors. In time, these farmers learned farming activities from their elders who shared knowledge and experiences with them, or through observation to their parents and other elders and learning by doing (Transcript a1). For these reasons, farmers have the impression that farming is hard, a way of life, and a source of living.

Transcript a1: *"I really enjoyed helping in the farm when I was a kid, for me it seems like I was just playing. I also keep observing my father and old people while they were doing farm activities. I clearly remember, I saw my father compiling farm waste and drying it, then he mixed the dried farm waste with soil, and he poured the mixture to the soil after land preparation, the remaining mixture will be applied to the base of fruit trees. Ah! One more, I also learned from him the technique of smoking the branches and leaves of mangoes to help in fruiting and fruit ripening. That is how I started my own farm, I learned and applied different techniques that are available."* -Farmer 5

Category 1a farmers think agriculture is interesting, promising, challenging. They were proud to be from a farmer family. Even though with zero knowledge in agriculture, and positive attitude towards agriculture, farmers attended agricultural training. Some of them, mainly from category 1b engaged in agriculture with their attitude that farming is satisfying, and enjoyable. Others think that farming is back-breaking work and a reminder of hard life, but due to the situation that they need to inherit the farmland and continue farming, they do not have a choice

but to continue and engage in farming. This is their way of facing the fact and having a mindset that family farm should be continued, to preserve the family tradition, their responsibility and obligation.

Since farmers commonly faced difficulties (especially category 1a) because of insufficient information and or knowledge and lack of confident to take bigger risk, most of them think that learning is important thus, they attended agriculture school or training/ seminars. After attending training/ agricultural school/ seminars, farmers had the perceptions that there are lots of interesting technologies and learning other technologies will be more advantageous. Farming should also be sustainable, hence learning technologies towards sustainability is a must. In addition, some who faced problems, considered that technology will solve their problems and alternatives can be found (Transcript a2). So, they consulted an agricultural institution, observed other farms, and asked advice from elder farmers. All farmers from this point, learned and accept the importance of OA. And perceived that OA is sustainable, safe for them and their family, safe for consumers, safe for the environment, profitable, fun and or easy, and input can be found within the farm- zero waste. Most farmers engaged in OA and stated their perception that OA is gratifying and fulfilling, sustainable, good for next generation, a way of life, a good source of profit and a good business. Thus, OA should be adopted by all. These attitudes encourage farmers to share and engage others especially youth to OA (Transcript a3 and a4).

Transcript a2: *"Fruit trees need at least 3 years to be profitable, I cannot let my employees to starve for three years. That time, I thought to plant vegetables, but vegetables require good soil to give me a good harvest, so I decided to engage in OA".* -Farmer 2

Transcript a3: *"I want to change not only their farming ways, but also on how they live. Most of the mothers here spend the whole day chatting and talking about others' lives. I tried to teach them what I know from my experiences and my own farming systems that I am doing in my farm".* -Farmer 18

Transcript a4: *"Everyone should know the importance of OA, it is safe for health, no chemicals, and safe for the family especially for my kids, I can also share what I learned to others including the benefits and advantages I have because of this."*- Farmer 7

Other farmers who encountered loss of profit had a different opinion. For them, OA is important but not profitable, thus, OA is for family consumption, conventional is for business. Moreover, some farmers were still in the process of conversion, therefore, they did both OA and conventional but in time, realized that health and environment are more important consequently share OA information to others and next generation and engage them.

Category 2

Both experienced farming in childhood, mainly because farmer-parents need additional labor in the farm (Transcript a5). They learned from elders by doing farm activities with them. They engaged and experienced handling and tending different kinds of crops and were exposed to different kinds of technology. Farming for them is hard but it is a source of living and a way of life. Upon learning the importance of OA, they tried to do it even for their own family consumption and tried selling it within their neighborhood and workplace. But as a full-time employee that demands 8 hours plus over time even weekends, both had the hard time balancing their time as practicing OA is also a laborious and time-consuming activity. As they were not able to look after their organic crops, in addition, agricultural lands are being converted to commercial lots that pushed them more to decide to stop farming for the mean time (Transcript a6).

Transcript a5: *"I experienced everything in the farm, from land preparation, planting, weeding, fertilizing, until harvesting. I even remember after our harvesting, another farm asked my father's help because they need additional labor, I don't have a choice but to join."* – Farmer 12

Transcript a6: "*Agricultural land here, is being converted to commercial lots and subdivisions, so I am now interested to know more about soil-less media, grafting-as I am doing it when I am free (it is like my hobby), more on how to maintain plants; and hydroponics-as I have available motor to use and I do not have enough space and soil."*- Farmer 13

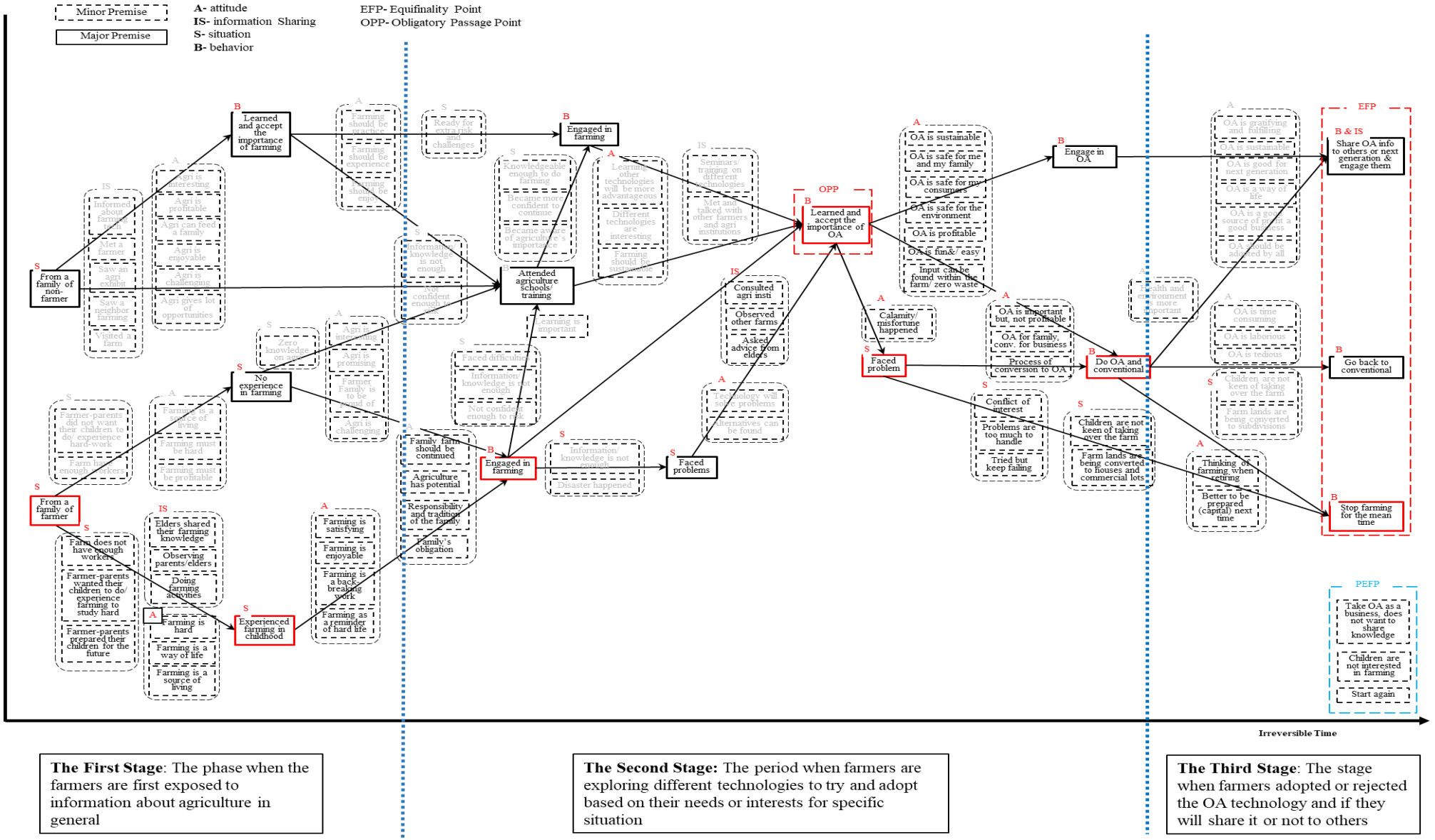


Figure 6.3 TEM focusing on 2 farmers' belonging to Category 2 on the attitude and behavior affecting OA adoption

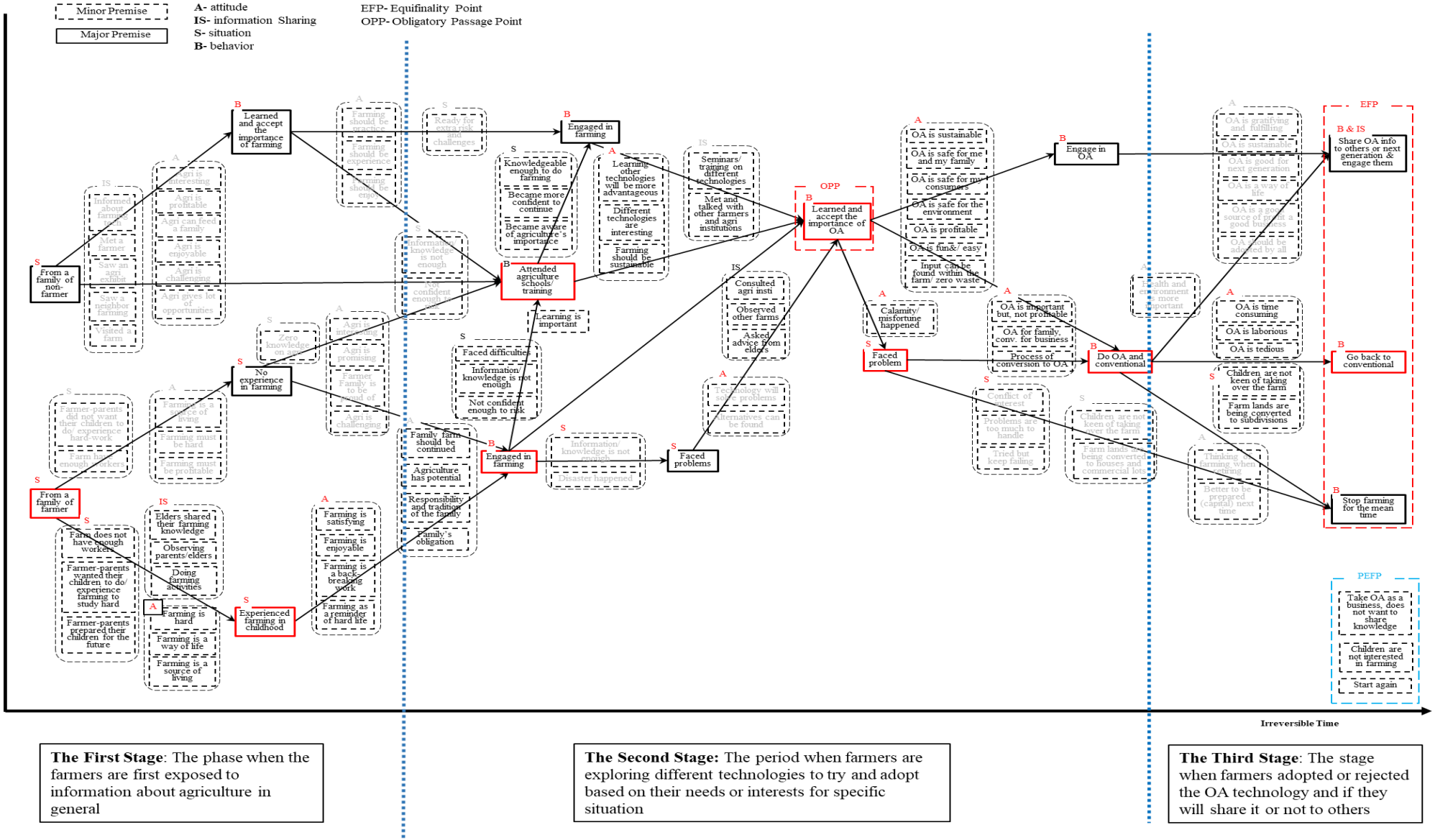


Figure 6.4 TEM focusing on 6 farmers' belonging to Category 3 on the attitude and behavior affecting OA adoption

As both of them works in an institution that creates and provides innovation, it is easy for them to get the information they needed. they also tend to try technologies that interests them but due to their situation, they did not fully adopt OA. Accessibility of information and easiness to adopt the technology play important roles for these farmers. Even though they were knowledgeable about the importance, it is easy for them to stop adopting the technology or farming for the meantime in case they face any problems because they have the mindset that the information about the technology is easily accessible to them, and they can return to farming and do OA when they get the chance or time.

Category 3

Some farmers in this category inherited the farm from their parents (Transcript a7). It is basically their obligation to inherit the farm and learned the farm practices from their parents. Farmers seemed to be very experienced and already used to the conventional practices. But upon learning the importance of OA, they tried to do OA while doing conventional farming at the same time.

> **Transcript a7:** *"I inherited my farm from my parents that is the main reason why I chose agriculture. I started farming through my parents' guidance. I did not attend any agricultural school, but my parents taught me how to farm."* -Farmer 21

Some were doing OA in a small plot in preparation for conversion, while others allotted OA for their family consumption. Some were saying that doing OA is too laborious, time-consuming, and hard to do. Even the information they are getting from training or seminars are mostly inapplicable in their farm (Transcript a8).

> **Transcript a8:** *"I am doing farming as I grew up in a farm. I learned the importance of OA and tried but it is too hard to do and laborious. Sometimes the information I am getting is not doable in my farm".* -Farmer 25

Most of them were forced to go back to conventional farming because of the pressure from their farmer-neighbors who were not practicing OA. In addition, most of them stated that areas near their farms are being converted to land development making subdivisions and

commercial establishments. In time, their farm will soon be bought from them and will also be converted.

For this reason, most of them feel that it is unnecessary to convert or adopt OA as full conversion also takes time. Furthermore, they do not see their children keen in taking over their farms.

As OA technology takes time to fully adopt, farmers seemed to be hesitant especially when they are unsure about the future of their farm. In addition, even the technology's importance was well transferred to farmers, factors such as peer pressure, situation of the farm community, and issues on successors played important roles in fully adopting the technology.

Category 4

These are the new farmers who are from a non-farming family. Most of them learned the importance of agriculture through information sharing whether it is directly from a farmer (through meeting them), institutions (through attendance of symposium, seminars, or training) or other actors in the community.

Some farmers from this category tend to meet other farmers and were exposed to agriculture. Other were informed and invited to attended symposiums, training, seminars that gave them information about agriculture. Upon learning the importance of agriculture, most of them felt that they want to plant, and it makes them happy so as a hobby, they did engage in planting. And soon they decided that agriculture should be practiced for all its benefits and advantages. Without any knowledge on farming, and with some situation that they were facing during the decision making, some farmers engaged in agriculture (Transcript a9). Some initially make it as their hobby and after attending trainings and seminars, they get the confidence to fully engage in agriculture, then in OA (Transcript a10). As a result, they reap the advantages of it as it became their source of income.

Transcript a9: "*Deciding to settle in Laguna and do farming is a big decision for me and my family, especially that I do not have knowledge or know-hows on planting. But for my health and the potential I saw in farming, it was worth risk taking. Also, I will be able to live with my family and will be able to breath fresh air."* -Farmer 19

Transcript a10: *"I do not have background on agriculture, but I really like planting. In 2001, when I moved to Los Banos, my landowner helped me to attend a16-weeks training. Both of us (pertaining to his landowner) are very fond of plants and he offered me a vocational course in agriculture. From then, I learned crop production and started my small farm. Before planting was just my hobby, but once you put so much effort on it, it can be your livelihood."* -Farmer 30

For these farmers, after learning and benefiting from OA, they think that the information and knowledge on OA should be transferred or shared to others specially to the next generation. Making the agriculture sustainable with a safe management practice that OA offers.

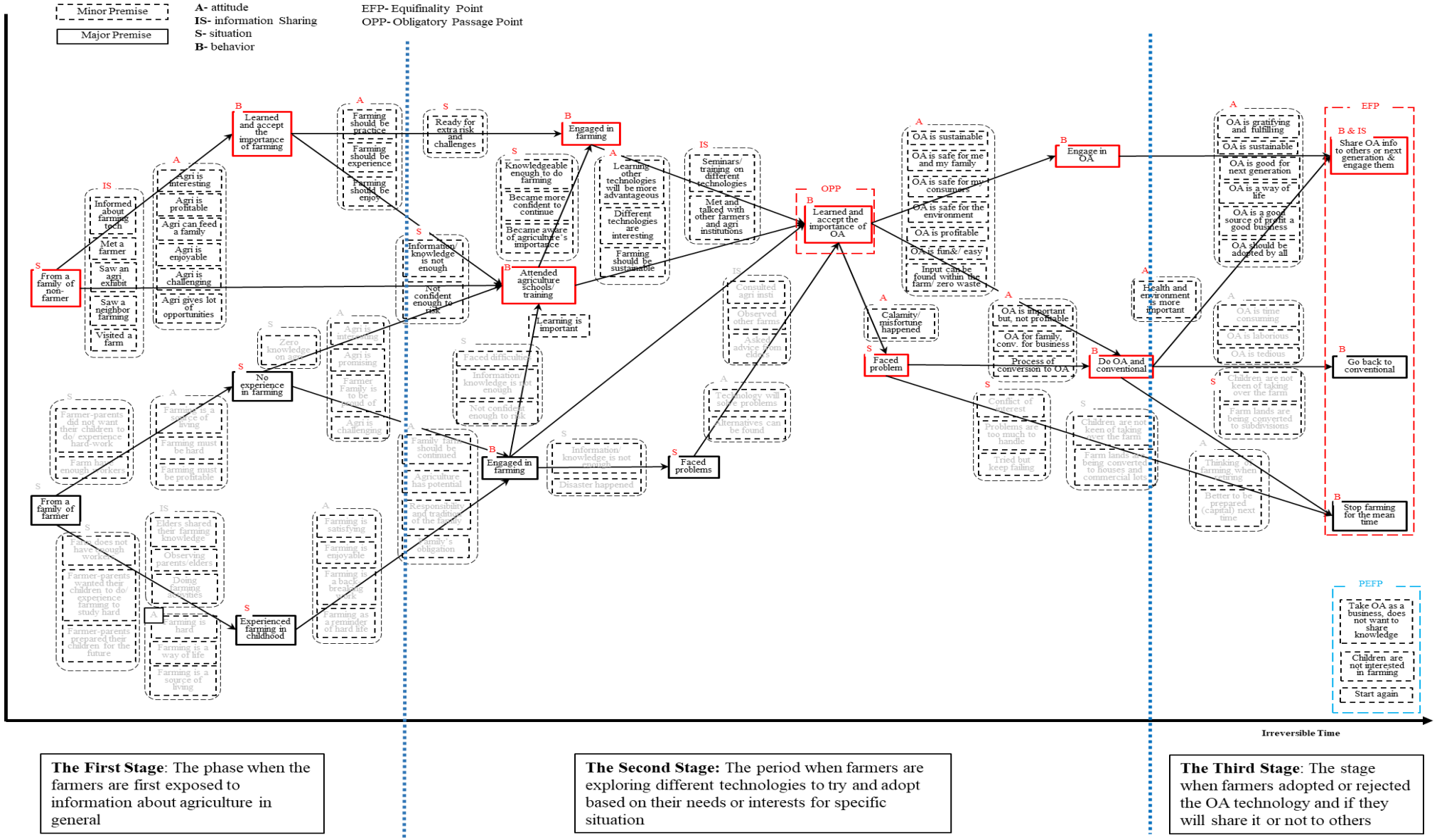


Figure 6.5 TEM focusing on 6 farmers' belonging to Category 4 on the attitude and behavior affecting OA adoption

6.2 Farmers' Interests and Needs

Upon the interpretation of farmers' attitude and behavior, farmers' situation and condition were also explored, hence, their interests and needs were also captured and understood. Farmers' perception to different challenges, support, and innovation were additionally examined.

As part of the information sharing and adoption portion of the questionnaire, farmers were asked open-ended questions to have an insight on their interests and needs. Questions include: "*Do you think the information disseminated really answers your needs and interest? Why?", Are there any other factors affecting you in information sharing and adoption? What are those and why do you think so?", "Do you wish to learn a specific technology? What would it be and why?" What are the benefits from being updated about agricultural technologies through information sharing?", "Are there constraints or hindrances why you cannot get enough information regarding agriculture? What are those?", and "How do you think these constraints will be answered?"*

In addition, observations from farmers during the interview were added as some of the farmers were not able to adopt or do specific technology and or activity due to some reasons. However, it was noticeable that they were very interested on the specific technology they were talking about.

As can be seen on Table 6.2, almost half of the farmers (14 of them) on the study area wants to learn more on the updated technology on OA. This includes fertilizer and pesticide management. Five (5) farmers on the other hand, stated their interest on crop propagation because they want to incorporate or /and expand the number of fruit-bearing trees and plants in their farms, three of them stated their interests and needs to learn on how to prolong shelf-life of vegetables, how to add more value on their products and how to sell it more effectively. Four (4) farmers in contrast, were attracted to learn other technologies including plant medium, farm design, or efficient farm lay out, livestock technologies, and technologies from abroad. These

farmers believe that learning is continuous. On the other hand, four other farmers were contented and stated that they are already accustomed of their practices of producing and tending crops, and are already doing what they want, thus, they do not need any technology.

Table 6.2 Rank of technologies needed by farmers

Rank	Technology/ Innovation	No. of Farmers
1st	Updated technology on OA crop production practices (esp. farm management practices- fertilizer and pesticide)	14
2nd	Crop propagation practices (grafting, ratooning, marcotting)	5
3rd	Post-harvest handling, value addition, marketing	3
4th	Other technology (media, design, livestock, tech abroad)	4

Source: Field Survey, 2020

Aside from these technologies that farmers needed and were interested to, some of them specified monetary needs capital (e.g. money, seeds, water, facilities, etc) and reading materials (Transcript b1- 3).

Transcript b1: "*We have problems regarding water supply. Especially during the dry season, it is very hard for us to tend our plants"* -Farmer 3, 4, 16, 18

Transcript b2: "*For me, the farmer needs an everlasting and a permanent composting facility, I am very interested about vermiculture and composting. I hope to have a permanent vermiculture facility. Also, farmers should know how to produce his own inputs such as organic pesticide and fertilizers. They should also know how to use garbage in farming, those plastic containers and rubber wheels can make a good planting container, especially to those mothers that are just chatting the whole day".* -Farmer 18

Transcript b3: *"We only got brochure from Institution 3, and for me it is not effective as we already know what is printed on it. They usually asked us what we learned, and from then, I think, they pattern the brochure. I was hoping that they will add more, or even they should highlight the important ones so we will have an interest to read it. But of course, we are still getting the brochure for the other members who were not able to attend the training or seminar."* -Farmer 30

These needed variables are very important especially to new farmers. As a farmer from a non-farming family, F30 is dependent on the information he can get from the institution and other sources he thinks that might help him. Institutions that were being coordinated and in

partnership with Institution 3 includes are also providing printed materials. But as per the interview from F30, they do not usually get any printed materials from them and only from Institution 3.

Moreover, their needs were in line with the needs of the study conducted with rice farmers which mentioned that rice farmers need to be sustainable. The Philippine rice farmers often experience lack of sufficient capital, post-harvest facilities, and insufficient knowledge on management and technology (Palis, et al., 2012). The problems and needs of farmers from this study almost 10 years ago is still predominant not only for rice farmers but also for organic farmers in Laguna.

Being updated to different agricultural technology through the support from respective local government units gave positive benefits to most of the farmers. Unfortunately, not all farmers are being able to get this kind of support (Transcript b4).

Transcript b4: *"Local government unit does not really care about us. For us with a lot size of more than a hectare, we are not getting enough support from them. We are the least priority."* – Farmer 21

For these reasons, some farmers are not getting the information on the technology they need and when asked "*Do you think the information disseminated really answers your needs and interest? Why?"*, 15 farmers stated yes and another 15 stated sometimes no. Farmers who answered yes, gave the explanation that they *"have learned a lot and became successful", "can apply everything, if not applicable, it can be modified to suit my needs", "It really helps my family a lot; I can also share the knowledge to other farmers".* Most of the satisfied farmers who answered yes were able to adopt and share the information they are getting (mainly from institutions) to other farmers (Transcripts b5-7).

Transcript b5: *"Yes, it matches my interests and needs. It (information she is getting) really helps my family a lot; I can also share the knowledge to other farmers"* - Farmer 7

Transcript b6: *"Yes. Because we were also able to share the knowledge to other farmers-* Farmer 14

Transcript b7: *"I am gaining new knowledge; I am learning a lot and I am happy to what I am doing. The information I am getting matches my needs and interest, during harvesting it is a big help as I can also sell some."* - Farmer 20

On the other hand, farmers who said no and sometimes stated that *"other technologies are hard to do or apply", "I cannot do or apply the technology in the farm", "because, the farm's environment is different from the technology's requirement (technology does not suit the farm)", "not all, there's some information that is needed but because there is no budget it is not accessible and attainable", "the support from the government for the farmers is not enough".* Most of the reasons were on the applicability, accessibility, and availability of technologies they were introduced to (Transcripts b8-11).

Transcript b8: *"Sometimes, I cannot adopt other information or innovation because it is hard to do. And sometimes, I cannot understand as I am not a member of farmers' groups that are attending seminars… I learned about OA from my farmer-neighbors and even knowing the importance of it, I cannot continue to adopt the technology as it is hard for me to do."*- Farmer 22

Transcript b9: *"In my own opinion, the information I8 am getting sometimes is not matching my interests and needs because the technology cannot be applied to my farm and my farm is totally different from their experimental area."* -Farmer 23

Transcript b10: *"No, not all, there are some information that are needed but because there is no budget it is not accessible and attainable." "No, the support from the government to farmers is not enough".* -Farmer 11 and 26

Transcript b11: *"I still want to learn a lot of things, new technologies from other countries too. So, we know, we are sure, and it will be easy for us to share to the next generation. Being updated to new technologies in agriculture gave me the confidence that I will not cause harm to others. Also, I gain other farmers' trust."* -Farmer 30

Even though, there were 15 farmers who stated their satisfaction, seven of them asked first, whether the interview was known and allowed by the local government unit office. They were very careful of their answers, and they were thinking that they were being evaluated and need to always say positive things. Unfortunately, when asked about the technologies, three of

them were not sure of what they were discussing. Moreover, through continues interviews, trusts from farmers were gained and some farmers stated that they are not allowed to be interviewed unless they are very trained and knowledgeable about the topic of the interviewer. From this insight, farmers were not given the opportunity to say what they really mean, hence, gaining farmers' trusts and an in-depth interview and un-biased observation are necessary.

This can be one of the reasons why farmers' real voices are not heard. The Philippines' agricultural information system is still top-down approach and the Department of Agriculture (DA) as the main institution responsible for the development of agricultural sector in the Philippines is located in the capital- Metro Manila and cannot extend service to all the farmers around the Philippines. In this regard, respective Regional Field Units (RFU) are tasked to monitor farmers, but RFUs only supervise the Office of the Provincial Agriculture (OPAg) down to Municipal Agriculture Offices (MAO). MAO, as the smallest government unit organizing farmers, they are very careful about the evaluation.

Farmers' Interests, Needs and Perception in Learning Technology

Upon asking questions related to the technology they are interested in and needed, most of the farmers stated their response, while four of them specified that they are already satisfied of the practices they are doing on their farm. Hence, the previous Table 6.2 shows the categories farmers answers to the question: "Do you wish to learn a specific technology? What would it be and why?".

Follow up question about the technology they wanted to learn was what were their reasons? Answers were grouped and presented in Table 6.3. Most of the farmers wanted to solve their problems in terms of pest infestation and diseases. They wanted to know how to control pest that affected their produced. Some on the other hand wanted to improve their production.

Table 6.3 Main reasons of farmers in learning technology

Rank	Main Reason Farmers Want to Learn Specific Technology	No. of Farmers
1st	To be equipped in own production	17
2nd	To satisfy interests and curiosity and share with others	6
3rd	To be equipped in sharing updated technologies to others	3
	Contented and not looking forward in leaning another technology	4

Source: Field Survey, 2020

In addition, being equipped in their own production, farmers have the perception that upon being knowledgeable on the updated technology on crop production and management, they will be able to develop more their farms and be successful (transcript c1-3).

Transcript c1: "*I want to learn more on crop production, specifically pest management, as insect pest is the main problem in the farm."* -Farmer 5, 7, 9, 14,16, 17

Transcript c2: "*I want to learn more on crop production, easy strategies so I can apply it and it will not be too hard for me. If I can apply it properly, hopefully, it will be able to increase my production"* -Farmer 8

Transcript c3: "*Learning new technologies in crop production in order my farm to be more developed and successful"* -Farmer 19, 22, 24

Other farmers (specifically non-OA farmers 21, 23, 25), stated that they want new technologies that will give them more or high income. This can also be noted that their reason for not adopting OA is related to low income.

Six farmers on the other hand chose technologies that moved their curiosity. Seeking answers and finding fascinating technologies, they perceived those innovations that are

captivating will also aid them in persuading and influencing people around them to engaged in agriculture (Transcript c4-5).

> **Transcript c4:** *"Yes, I want to know more about plant rejuvenation and multiple grafting- where you only need 1 rootstock + different scions. So that others will see that it is possible, and you only need one tree but with several fruits* -Farmer 7

> **Transcript c5:** *"I am amazed that it (pertaining to grafting of tomato and eggplant) is possible. Also, with this, it will be easier to persuade my children, neighbors, and visitors (in planting)".* -Farmer 20

In addition, three of the farmers, mainly want to get an updated technology so that they can be sure that they are sharing an updated information to other farmers and next generation (Transcript c6-7).

> **Transcript c6:** *"Yes, we want an updated technology in OA. Of course, we want our trainees to be always updated about new technologies."*- Farmer 1

> **Transcript c7:** *"Yes, I still want to learn a lot! Such as different technologies from different countries. It will be for the next generation, so we can be sure that we are knowledgeable enough and we can easily transfer the technologies* -Farmer 30

Farmers in the study area have different reasons and perceptions why they want to learn specific technology. It can also be seen that each farmer values different things and factors in seeking innovation. Some farmers also were satisfied and not interested to change or adapt and or adopt to new technologies.

Farmers' Perception in Being Updated to Technologies

Farmers were also asked about their experience and insight of the benefits they are getting from being updated about agricultural technologies through different information sharing. In Table 6.4, some farmers answered monetary or material things, but in relation to self-satisfaction.

Table 6.4 Farmers distribution by the benefits from innovation updates

Benefits	No. of Farmers
Assurance (knowledgeable of crop management practices)	16
Self-Satisfaction (feeling fulfilled, happy, and useful)	5
Confidence (self-assured and certain of what they are sharing)	3
Monetary benefits with self-satisfaction (child education, income for family needs, farm tools)	6

Source: Field Survey, 2020

Most farmers stated that being able to get updated innovation helped them to know what to do on their farm, especially on how to make actions on certain problems including pest infestation. Farmers feel reassured or secured that they can manage their farm appropriately if they will be getting knowledge on updated technology, (Transcript c 8-9).

Transcript c8: *"It is a big thing for us. We are continuously learning, and we can do the necessary action for our own production."*- Farmer 4, 5, 14, 15, 18, 24, 29

Transcript c9: *"I need to be updated on innovations and learn everything the most because, I am a newbie farmer."*- Farmer 15

Five (5) farmers on the other hand, felt that they are fulfilled, happy, and useful to their family when they are updated and knowledgeable to new technologies. As can be seen to transcripts c 10 and c11, both farmers benefitted not only financially but also emotionally.

Transcript c10: *"Starting a farm was really tiring so we wanted to give-up. But being updated on new technologies help us to develop our farm and when we saw the results it was really satisfying, and it relieved our fatigue"*- Farmer 3

Transcript c11: *"I feel really happy- as now I can understand planting and I can contribute to my family."* - Farmer 8

Furthermore, three (3) farmers stated that they are more confident to share to others especially to other farmers if they know and are being updated on technologies (Transcript c12-14). As a farmer who share information and technologies to other farmers, these farmers value

their confidence that the information or knowledge they are sharing to others will not cause harm instead it should also help their beneficiaries to be more productive and successful.

Transcript c12: *"We need to be always updated because other farmers are also learning from us."*- Farmer 1

Transcript c13: *"Learning is continuous, you need to know more, so if other farmers will ask you, you can help them."*- Farmer 2

Transcript c14: *"Updated technology will help you, as you will not put in danger the farmer or neighbor asking you"*- Farmer 30

Some farmers also stated the monetary benefits they are getting but still connected to psychological benefits. Farmers 12 and 21, were able to send their children to school through farming, in addition, updated technology helped them to improve their production which also improved their income (Transcript c15-16). They were satisfied and fulfilled as they were able to do their obligation to their children. Some farmers stated that they were also able to receive planting materials and tools when they are attending seminars or training about new or showcased technology.

Transcript 15: *"I was able to support my children's education."* - Farmer 12

Transcript 16: *"Big money. My children were able to finish college. I hope they can work in an air-conditioned office."* - Farmer 21

Even with different benefits gained, farmers were aware of the importance of being updated on new technology. More than half of the farmers valued the significance of knowing crop management production as most of them are facing difficulties regarding insect pest infestation. Most of the farmers were also thinking other people (such as their family, farmer-trainees, farmer neighbors, and friends) when they made decision in checking and receiving information on technologies or innovation.

Furthermore, farmers were asked about the hindrances of getting information. *"Are there constraints or hindrances why you cannot get enough information regarding agriculture? What are those?", and "How do you think these constraints will be answered?"*

During the interviews with the farmers, 21 of them stated that there are no hindrances or barriers for them to get enough information on agriculture, however, as per the discussion on the extrinsic variables (chapter 3), environmental characteristics are also factors affecting farmers' access and frequency of receiving information and technology. In addition, the statement from nine (9) farmers who answered there are hindrances and specified what are the factors restraining them to get enough information were also explored. Furthermore, their perception on how to respond on factors restraining them were also reviewed.

Transcripts from the interviews and notes from the observations show that the main hindrances were the availability, accessibility, management, and some monetary factors that greatly influences the information sharing in the study area.

From the wife of farmer 1, she stated that when they were starting their organic farm, information on different technologies on OA were not easily available and accessible in the country, they needed to go abroad and attend training. They also decided to conduct their own training as a solution to the unavailability and inaccessibility of different technologies (Transcript d1).

Transcript d1: *"Before, it is not available in the Philippines, we were blessed enough to be able to attend training outside the country. So, we want to share it to Filipinos who are eager to know but lack of financial capability to attend international training".* -Farmer 1.5

Four (4) farmers stated that it was the lack of time that inhibited them to get enough or additional information. As a farmer who sells her produce, Farmer 5 has limited free time as she spends her early morning and late afternoon in the farm and whole day in her store (Transcript d2), in addition her farm and house is in a mountainous area which is also a factor in getting formal training. She thinks that the only way to solve her problem on time is to have someone who will help her on the store.

Transcript d2: *"I used to attend farmers' meeting at the Municipal Office before. Maybe twice, but neng (young girl), my store is here, I live just there, my farm is still far from here, how can I go and leave my store to attend meetings and training. It is far, very inconvenient for me to go down, also, I do not have free time at all. I am tending my plants early in the morning and sometimes, even in the late afternoon. There is no one who I can entrust my store. If there will be someone who can look-out for my store, I think I will be able to join the organization, attend meetings, and training."* -Farmer 5

Two (2) other farmers had full-time jobs, and one (1) had part-time job, and they could not attend training or seminars on weekdays, one of them stated that he used to watch to an agricultural TV program but due to time constraints he was not able to do it continuously. All requested for reading materials but could not get any (Transcript d3). Two (2) farmers think that it will only be solved if they managed their time properly, and the other one finds more sources of information.

Transcript d3: *"Hindrance, I think it is my time. Time constraints, before the time of the show was around 11am on Saturdays, so even when I was working on weekdays, I can still watch it. But they changed it in the morning, and that is the time that I can sleep more. The schedule of the TV show is also my time that I can rest more. So, I think, reading materials will suit me more as I can read it whenever I have the time. Just go personally to the office in QC (Quezon City, Manila - where agricultural head offices are located) to get reading materials"* -Farmer 11

In addition, other farmers were also requesting for printed reading materials to learn more and to aid them in the implementation of the technology in their own farms. Unfortunately, some of them stated that even they keep requesting, until the day of the interview they were still not receiving anything. One farmer disappointedly gave up on asking and requesting as he already lost hope and trust that they will still receive any (Transcript d4).

Transcript d4: *"The problem is the availability and accessibility of books and other reading materials. We need those, the easy to understand and step-by-step procedure. We keep asking, requesting, and keep doing follow-ups. But no, their answers were always the same- next time, noted on that. Years passed and until now, nothing. That is why I am not hoping anymore. If they will give it. We would still appreciate it. Thank you."* -Farmer 18

Other farmers also shared their problems regarding the lead-farmer and his way of managing the organization. But only one of them stated that it affected them in getting information, technology, and support from the organization (Transcript d5).

Transcript d5: *"Management. The way he distributed some materials especially the water hose was unfair. He (pertaining to their lead-farmer) tends to prioritize his neighbors even they are not members of the organization. I do not think there will be an answer or solutions to that as we already reported it, but nothing happened."* -Farmer 4

Lead-farmer was also asked indirectly about the complaints of the members. He stated that Institution 3 let him to decide who will be the beneficiaries or receivers of the government supports. He, therefore, shows his neighbors that if they will be members, they can get support like water hose. Unfortunately, other farmers- member farmers were also in need of this support. It turns out that he also shares other technology-related information to neighbors before other members as he thinks that members received the same information already.

Aside from the problems within the organization, other farmers, especially new farmers were having the hard time absorbing information they were getting. As per Farmer 15, 22, and 30, understanding the knowledge and information was a hindrance for them (Transcripts d6, 7, 8).

Transcript d6: *"I do not have the background in agriculture, so everything is new, especially terms and technical processes are hard for me to understand. I think, to solve this, I try to search all what I cannot understand and ask questions to farmers and experts."* -Farmer 15

Transcript d7: *"Yes. Sometimes I cannot understand (the technology or practices). I am also not a member of those (organizations) who are attending training. For that reason, I usually asked other farmers (those who are older than me) for guidance and advice."* -Farmer 22

Transcript 8: *"Yes. I think there are hindrances, like capital, knowledge, sustainability, and farmland. If farmers will have access or information on the projects or loans, it will be a great help to add on the capital. So, I think availability and accessibility also sustainability of the information and knowledge are needed."* -Farmer 30

Some farmers, on the other hand who stated that there is nothing that prevents them in getting information explained that organization supports them, and it is on their motivation (Transcript d9, 10).

Transcript d9: *"None as we have our farmers' group, and it is supported by the Institution 3"* - Farmer 19

Transcript d10: *"None, if there's a will, there's a way."* -Farmer 2

It shows that even from a non-farming family, Farmer 19 is satisfied from the support he is getting from their farmers' group that is also supported by their Institution 3. Farmer 2 on the other hand, unlike other farmers, he believes that his motivation will help him in getting information he needs.

From these results, it shows that farmers in the study area have different problems, needs, and perception on how they can find solution on the hindrances they are facing in terms of getting information. However, this research also observed that external environment characteristics play an important role in farmers ability to get the information. As it was observed that 19 farmers are living in an area with poor or unstable signal, 9 farmers are living in an area where there is no electricity, and 12 farmers are living in a mountainous area with no vehicle access. These external environment characteristics also inhibits the farmers to avail and access information and technologies.

Thus, these factors and stated hindrances also explain why most farmers are not receiving printed materials, not using electronic sources and were not able to attend trainings. Furthermore, information sharing should be available, accessible, and can complement the needs and interests of farmers.

6.3 Reasons Farmers Adopt and Share Organic Practices

To answer the specific objective on the assessment of the effects of farmers' attitude and behavior towards OA adoption and information sharing, reasons farmers adopt and share OA practices were explored. Even though all farmer-participants learned and accepted the importance of organic agriculture, some of them did not fully adopt the technology. Hence, farmers were asked of the details or reasons why they did or did not they adopt and share OA technology.

Based on the interviews with farmers, the main reason is that OA is a safe farming technology not only for the producers (farmer and their family), and consumers (farmer, famer families, and customers), but also to the environment. Aside for this main reason, each farmer has their own additional or detailed reasons why they adopted and continued to share the technology. Table 6.5 shows the grouped reasons of farmers in adopting and sharing OA technologies with four (4) major categories.

The major categories include *environmental benefits*, *farmers' well-being*, *economical benefits*, and *technological* advantages. Farmers were all aware of the OA ***environmental benefits***, because this is one of the rewards that the institution or technology provider kept pointing out. The two sub-categories under this major category, are the "safe production" and the "environmental connection". "Safe production" contains the tag of quotations from farmers that are related on producing food that are 'safe for the environment', such as the use of natural fertilizers and pesticides, or a production with no synthetic and or toxic chemicals. In addition, the 'zero-waste' production which some farmers stated in detail specifically a phrase of recycling nutrients was also included. The "environmental connection" on the other hand with 'respect for the environment' as a label, basically focus on the tags that farmers stated that were pertaining to their effort or contribution in saving the environment.

Table 6.5 Grouped reasons of farmers in adopting and sharing OA technologies

Category	Sub-Category	Label	Ex. Tag (Interviews and Observations)
Environmental	Safe Production	Safe for the Environment	Safe for the environment as no chemical fertilizer
		Zero-Waste	recycling of nutrients, decomposed leaves are used as fertilizer
	Env. Connection	Respect for the Environment	save the environment
Farmers' Well-being	Cognitive	Additional Learning	Kids are knowledgeable too and lead in school
		Tech Modification	Can alter the technology to complement the farm
	Psychological	Gratifying and fulfilling	Fun, feeling accomplished, feeling important, feeling valued
		Way of Life	Philosophy
		Personal Goal	to help others
		Boost Confidence	Own boss
		Peace of Mind	retirement, children know how to plant
		Contentment	From my parents, I am already comfortable and at ease of the old practices
	Physical	Safe Food and Production	Safe food and Production, no chemicals
	Social	Improved Family Relationship	More time with his children
		Safe Food for the Family	Not to feed their family toxic and chemicals
		Safe Food for the Consumers	Households and Customers' Safety
		Customers' Trust	customers tend to go back saying it is tastier, no chemicals, all natural
		Good Neighbor Relationship	neighborhood safety
		Improved Relationship with Co-Farmers	I can also share what I learned to others
		Relationship with Others	for the sake of my workers' family
Economical	Monetary	Improved livelihood	additional income and safe food and production
		Income Source/ Profitable	Income is safe in farming
		Additional Profit	gives me additional income, I can now help my family even if I am at home
	In-kind	Less Food Expenses	we do not need to buy vegetables
		Less Farm Inputs' Cost	it is effective and less cost for the input
		Subsidized Input/tools	sometimes seeds are free
Technological	Effective	Easy to Adopt	OA is fun and easy to do
		Sustainable	Safe and protecting the environment that makes it sustainable
		Useful/ Effective	More effective and safe for all
		Efficient	with OA I will retire and will be sitting-pretty

Source: Field Survey, 2019-2020

Farmers' well-being as the second major category has four (4) sub-categories: "cognitive well-being", "psychological well-being", "physical well-being", and "social well-being". The "cognitive well- being" is focused on how farmers positively processed the information, knowledge, and learnings they are getting to be more effective and successful in their farms. This comprises of 'additional learning' and 'technology modification', wherein farmers were able to thoroughly understand the information or technology and they can share it to others including their children. Also, they mastered the technology to the point that they can easily modify it to be efficiently adaptable in their own farm.

"Psychological well-being" engrossed on farmers' positive sense of purpose or self-satisfaction. Positive feelings brought by OA to their lives became their reasons to continue and eventually adopt the OA technologies. Labels are comprising of 'gratifying and fulfilling', 'way of life', 'personal goal', 'boost confidence', 'peace of mind', and 'contentment'. These labels tagged the different quotations and observations from the farmers during field survey mainly focusing on the positive feelings they are getting in engaging in OA. Positive feelings include having fun, feeling accomplished, important, helpful, and having serenity.

"Physical well-being", on the other hand is driven on physical or substantial benefits from practicing OA. For this sub-category, two labels were made: 'improved health' through physical activities and less time to work (doing stationary movements), and the 'safe food and production' in which farmers and their families are not being exposed to harsh synthetic chemicals.

"Social well-being" is fixated on the farmers' desires to have a role and be of help on their family and community. It is composed of seven (7) labels such as 'improved family relationship', 'safe food for the family', 'safe food for the consumers', 'customers' trust', 'good neighbor relationship', 'improved relationship with co-farmers', and 'relationship with others. These labels show that farmers are more conscious and careful of their relationship with their family and others, and they want to improved not only themselves but also, they want to contribute positively on the community through a good relationship with other people.

Economical or Economic benefits engaged on the financial or money-related benefits gained by farmers and their families in adopting and practicing OA. It has two sub-categories: the "monetary benefits" and the "in-kind". Aside from the environmental benefits and a good farmers' well-being, economic benefits were also noted during the interviews and observations. Farmers were able to have additional income, improved profit, and livelihood through less cost of input and less food expenses. These were all tagged under six labels (with 3 labels each sub-category): 'improved livelihood', 'income source/ profitable', 'additional profit' (for "monetary") and 'less food expenses', 'less farm inputs' cost', 'subsidized input/tools' (in-kind).

Technological advantages are more on the effectiveness of the technology for the farmers. Hence, the sub-category is named "effective", and the labels include 'easy to adopt', 'sustainable', 'useful/ effective', and 'efficient'. In adopting OA, farmers check its easiness, sustainability, usefulness, and efficiency of the technologyis efficient.

On the other hand, Table 6.6 shows the grouped reasons why farmers who tried OA but later on decided to reject the adoption of OA technologies. Environmental reasons specifically environmental degradation through the conversion of farmland to subdivisions affected the farmers attitude in adopting OA. Farmers think that OA takes time to fully adopt, and it will be a waste if the farm will soon be converted to commercial lots. Even they knew, understood, and accepted the importance and benefits of OA, these farmers were taken back because of the current and irreversible situation as the neighboring lots were already being converted.

Table 6.6 Grouped reasons of farmers in rejecting OA technologies

Category	Sub-Category	Label	Ex. Tag (Interviews and Observations)
Environmental	Degradation	Farmland's Conversion	Farmlands being converted to subdivisions
Farmers' Well-being	Cognitive	Inflexible	I cannot adopt... because it is hard to do, and I cannot understand
	Psychological	Indifferent	OA is laborious, tedious, time-consuming, and profit is low
			He does not want his son to be like him- physically working hard in the farm
	Physical	Difficult	I tried OA but it is too hard to do and laborious
Economical	Social	Reluctant	My sons are all lazy and I cannot depend on them helping in the farm.
	Monetary	Low Income	It is safe but hard and tedious and low income
Technological	Ineffective/ Inefficient	Time-consuming	It is safe but laborious and time-consuming
		Hard & Tedious	It is safe but OA is hard and tedious
		Laborious	It is safe but laborious and time-consuming
		Not Effective	It was really hard and tedious; harvest became low

Source: Field Survey, 2019-2020

Same categories were used as the farmers reasons why they do not fully adopt OA were in line and some contradicting to its benefits. Under the **environmental** category, a new sub-category was made- "degradation" as the label implies 'farmland's conversion', croplands and grazing areas are being converted to commercial and or residential lots. Farmers who stated this reason, do not have option of continuing OA, hence most of them were forced to just go back to conventional farming.

Under the **farmers' well-being,** same sub-categories were used but the labels were opposing to the reasons of adoption. Labels include: 'inflexible' under the "cognitive" (as some farmers were having a hard time understanding the how's and why's of OA technology), 'indifferent' under "psychological" sub-category (because some farmers used to feel bored and uninterested while waiting for the effect of the technology, and some do not have children to depend on to farm activities); 'difficult' and 'time-consuming' under the "physical well-being" (for the reasons that OA requires more labor or work and time to achieve the technologies full benefits); and 'reluctant' under the "social" category as farmer became unsure if their children will continue tending their farms.

In addition to the contradiction of benefits from other farmers, those who did not fully adopt OA technology stated that the main reason was more on economic as OA gave them less or smaller profit, some of them stated that it was more on the technological aspect of the technology as they find OA ineffective and inefficient due to their observation and experienced that OA consumes more time, tedious, hard, laborious, and not effective.

It shows that farmers opt to adopt the technology based on its environmental, economic, technological benefits and for the sake of farmers' well-being, it can also be noted that not all of the farmers who were informed, learned, understand, and tried the technology fully adopted it as the benefits and advantages differs.

6.4. Effects of Farmers' Attitude and Behavior in Farm Succession

To change the discernment of society towards farming and to boost the confidence of farmers to bequeath their farm to their children, this sub-chapter aimed to understand and interpret farmers' attitude and behavior towards farm succession. Specifically, this clarified the farmers' actual situation on the ground, their attitude and behavior, and their family's perception about farming. Organic farmers in Laguna, Philippines, were interviewed and observed utilizing different qualitative approaches.

6.4a Farmers' perceptions in transferring knowledge and motivations to their successors

Different factors affect farm successions, such as farm's profile (e.g., land size, accessibility, commodities grown) and farmer's profile (e.g., age, educational attainment, farming experiences). This paper focuses on the farmers' attitude and behavior on transferring knowledge and motivation that affect farm succession. Table 6.7 shows that most or 13/17 of the farmers are from a farm family, but two of them admitted that even they are from a farm family, they had zero background in farming when they first engaged in agriculture. In contrast, the 11 farmers assisted and were involved in their family farms and later took over the farm. The remaining four farmers were motivated to do farming after learning the importance of farming and organic agriculture (OA). Four out of 11 farmers from a farm-family are still using their farming knowledge obtained from their farmer-parents, while seven of them utilizes the information gained through their attendance to trainings. Those farmers that are not from the farmer-family stated that they got their knowledge on farming from different trainings they attended. Most of the sample participants were motivated to engage, convert, or continue organic agriculture after attending different trainings provided by their municipalities. It was also noted that 12 out of 17 farmers encourage their children to engage in farming. All of the farmers were motivated and adopt or modify specific technology or innovation on OA once in their farming career as some of the interviewed farmers stopped OA, went back to conventional, or stopped farming.

Table 6.7 Distribution of farmers based on their family background, source of their farming knowledge and experiences, and engaging their children in farming

No. of farmers n=17	From a farm family		From a non-farm family	Total
	w/ farming experiences	w/out farming experiences		
• belongs to farm family or non-farm family	11	2	4	**17**
• that learned their knowledge from family	4			**4**
• attended trainings	7	2	4	**13**
• motivated adopt/modify/ innovations learned	11	2	4	**17**
• that are engaging their children in farming	8	2	2	**12**

Source: Field study in July-September 2019

Results showed that farmers had varied perceptions in transferring knowledge and motivations to their successors. The most common reason that was noted is the safeness of OA to farmers, consumers, and environment as the farmer-parents want to make sure that their children will be safe in doing farming. Some farmer started farming just for the consumption of their own family and chose OA to ensure that they are feeding them safe food. In time, most of them realized the importance of OA not just for the farmers and consumers but also for the environment. Some also saw the possible opportunity that OA can give them in terms of market and income.

6.4b Factors affecting morale and confidence of farmers

Low morale in farming as it is known to be the underrated, and undervalued occupation especially in the Philippines, was noted as one of the factors why younger generation does not want to engage in farming. In order to boost the confidence of farmers and change how young generation perceive farming as a career, farmers' importance must be acknowledged in the society. In the research area, it was observed that farmer tends to be motivated by other farmers,

they are also being confident if farmers, students, teachers, hobbyist, and other actors in the society asked for their help in terms of advice and other farming related activities. They feel that their opinion matters, which also motivates them to continue farming and do experimentations on their farm. Some of them do OA for their consumers' sake. Upon being acknowledged in the society, most of the farmers' moral were uplifted. They displayed positive attitude and outlook towards agriculture that were reflected through their encouraging behavior to engage their children in farming.

These results responded to the United Nation's Sustainable Development Goals 2, 3, and 12. Goal number 2 or zero hunger will be reached if yields will be increased and stabilized; goal number 3 or good health and well-being and goal number 12 or responsible production and consumption will be attained if current and future farmers will avoid the use of synthetic inputs and consumers will support them. If current and future organic farmers morals will continue to be boosted these sustainable goals will also be achieved.

6.4c Family members' perception in agriculture

Family's perception plays vital role in boosting the confidence of farmers. Their children were also proud of their farmer-parents. As per the in-depth interview, transcripts from the family members were assessed and help in the understanding of the effects of engaging in OA to the farmer's family. Based on different transcripts, farmers gained positive change in terms of having a better family relationship and gaining self-worth as the farmer can decide on his own and share his experiences and knowledge to others especially younger generations (Transcript 1 in Table 6.8). Other answer that was noted focused on the child's personal feelings and preferences as can be seen in Transcript 2 in Table 6.8. As a 4-year-old son, he requires attention and affection of his parents especially his father that he rarely sees and remember, when his father was still working as a security guard.

Table 6.8 Transcripts from the farmers' family members regarding the effect of farming to their family

Farmers' family members	Transcripts
Trans. 1- Wife of a farmer	"Before, when he was working as a security guard, he usually arrived very late when children were already sleeping. He was also leaving early when his children were still sleeping. He does not even have time to talk and say hi to his children. However, now, it is better. He is his own boss, he manages his own time, and he has time for us. Also, he is free to decide on matters regarding his farm. He is always with us and can still provide for the needs of the family. I also feel proud that students and other future farmers are visiting our farms to learn and to experience farming."
Trans. 2- Son of a farmer	"I like it now. I can always see my Papa. He can play with me now. I can also help him in his work (by weeding and watering plants)"
Trans. 3- Son of a farmer	"I am proud of my mother. I also often do school gardening activities similar to what she's doing on our farm. I can confidently tell my classmates that organic agriculture can be fun and easy if I do what my mom does."
Trans. 4- Daughter of a farmer	"I am happy that my mother is doing better now. She also has more time for us and can help us in school activities."
Trans. 5- Son of a farmer	"Mama is doing better for her customers; she loves farming; even if her body tells her to stop, she will not."
Trans. 6- Grandson of a farmer	"I want to help my Lola (grandmother) in doing activities on the farm, it is fun, but I saw her getting sick because it is hard, so I keep telling my Papa that we should help Lola".

Source: Field study in July-September 2018

Table 6.8 also shows the interview conducted from a 12-year-old son of a farmer. The grade 6 student is a proud son. During interview, it was observed that the son was shy at first and when ask about the effect of OA to his mother, he positively, and bravely answered that he is a proud son and keeps applying what he learns from her mother to his school's garden (Transcript 3). In addition, a daughter, 10 years old, grade 4 student eagerly answered the effect of OA to her mother (Transcript 4), stating that she is happy for her mom. For these children, they value more the time allotted by their parents with them greatly matters as both parents are working. In

addition to the family time that leads to better family relationship, proud children also boost the morale and confidence of their farmer parents.

A transcript from a son, 32 years old and a grandson, age 5 were also distinguished. The son focused on how he sees his mother as a hardworking farmer to meet her goal to provide safe food for her consumer (transcript 5). The grandson's answer, on the other hand, was unique as he saw the hardship of farming (transcript 6), but his grandmother still enjoys it.

It can be concluded that based on the transcripts from the farmer's family members there are significant effects brought by farming aside from providing the needs for their family, farmers particularly improved their family relationships. Moreover, farmers' confidence and morale, were boosted and these improvements were all connected to the positive outlook and support of their family members.

6.4d Life History of Farmers Utilizing Trajectory Equifinality Method

To fully understand and interpret the attitude and behavior of farmers that greatly affect their decisions in farm activities, including farm succession, each of their life history was noted and analyzed with the Trajectory Equifinality Model (TEM) as shown in Fig. 1. TEM is a methodology for describing life within irreversible time which is composed of Bifurcation Point (BFP), Equifinality point (EFP) and Trajectory or the life path (Sato, et al.,2013).

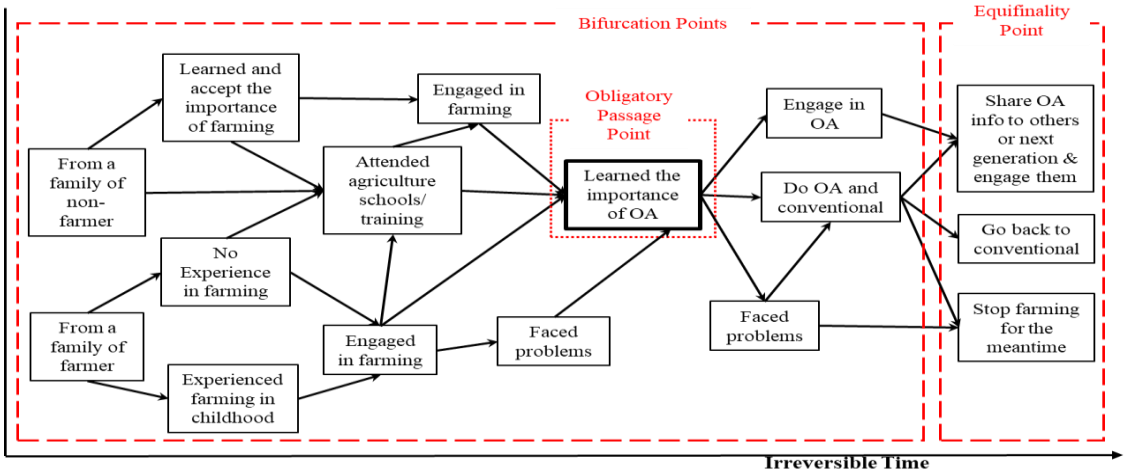


Figure 6.6 Life History of the farmers using the Trajectory Equifinality Method (TEM) of selected organic farmers in Laguna, Philippines

For this sub-chapter, the bifurcation points are the points in farmers' lives that can leads to different path. The equifinality points on the other hand, are the end point or the end-goal of the farmers' farm career such as sharing OA to the next generation and engaging them, going back to conventional, or stopping farming. In addition, the decision points are the turning points on the farmers' lives (learned the importance of OA and faced problems) which affects their decision in meeting their equifinality points. The obligatory passage point (learned OA) is a point which every farmer experienced.

The 17 farmers were grouped based on five categories based on their starting and equifinality points. The first category has three (3) farmers who were from a family of farmers, two of them with no experience in farming and graduated college with a degree of BS Computer Engineering and a Bachelor of Arts in English, both worked in private companies and retire early to engage in farming. The three (3) farmers attended agricultural training at different point of their lives with different reasons and motivations, learned the importance of OA, engaged in OA, and share OA information to the next generation and persuading and encouraging younger generations in OA. They have different life paths and choices that lead to different bifurcation points but started and ended with the same starting and equifinality point.

On the other hand, the second category comprises seven (7) farmers from the family of farmers, with experiences in tending crops and livestock, assisting their parent family on their farm since childhood. Faced different problems and challenges during their farming life that lead to different life paths, but at certain point of their lives, each of them learned the importance of OA and decided to engage in OA and share it with the next generation.

One farmer belonging in this category chose to change his career from being an employee to be his own boss as he also wants to spend more quality time with his children, as per the interview with his wife, she stated that "he was preparing and leaving early for work, our children were all still sleeping, he will be back late at night from work, and our children were already sleeping." During his childhood, even when he attended an agricultural high school, his father neglected his ideas to be implemented on their farm. After attending OA training, he quit his job

and started his own organic farm and executed what he learned from the training and his past experiences. His learnings were shared to his wife and children and later even to students, and other farmers. He also involves his children in farming by allowing them to do simple tasks like watering and weeding. In addition, being unheard and disregarded during his childhood while helping in his father's farm, he is now making sure that his children can try and voice-out their thoughts while assisting him in their farm.

Farmers on the third category are the two farmers who are from a family of farmers, with experiences in farming, they were doing farming, attended some trainings and learned the importance of OA. Unfortunately, even though they know the importance of OA, they just decided to stop farming when they faced problems while doing organic farming. According to the interview, both have problems managing their time as they were hired in a full-time job. For them, OA is very laborious and time consuming, even they are aware of the health benefits of growing and consuming organic produced, they chose to stop doing it and stated that if there will still be chance for them to do it after their retirement, if their body can still do the farm activities, they might go back to farming.

Likewise, the fourth category involves a farmer who is also from a family of farmers. The farmer's spouse is also a farmer. Both experienced farming during childhood and later in life engaged in farming, they also attended training related to agriculture and learned the importance of OA, they did OA and conventional, but after trying and experiencing the increased input in terms of labor, they gave up OA and go back to conventional farming. They stated that they tried their best in doing and managing OA, but regrettably, OA is not for them as it is too labor-intensive and requires too much time on the field.

Four farmers constituted the fifth category. They are the farmers who are from the families of non-farmer, learned the importance of farming and/ or attended agriculture training, engage in farming, learned the importance of OA, engage in OA, and share OA information to family members and other actors in the community including the next generation.

6.4e Conclusion

Farm succession is one way to ensure agricultural sustainability. Thus, the situation of farmers on the real ground must be understood through proper interpretation of their attitude and behavior that greatly affect farm succession. Common factors such as farm's profile, farmers' perceptions in transferring knowledge, and motivations related to farm successors are essential. Different farmers can also be understood through the utilization of TEM. TEM assisted the researchers see each farmer's life history and how each point of life affects their decision to continue and hand over their farms to their successors.

Conclusion

TEM can be used in categorization of farmers based on their life histories to help in proper interpretation of farmers' attitude and behavior. Upon interpretation, it can be concluded that farmers' decisions were affected by different factors and such as perception, situation, attitude, interests, and valued benefits. Most farmers tend to search or look for varied knowledge and technology in search for solution to problems they were facing and sometimes, also to be equipped in helping other people.

Farmers adopt OA mainly for its environmental and well-being benefits. On the other hand, farmers tend to reject OA due to its low income, more labor, time, and effort requirement. In addition, neighboring farmers who were not practicing OA, conversion of land, and their children's unwillingness to continue farming similarly affected farmer's decision. Furthermore, uplifting morale of farmers by being acknowledge in the society positively affect their attitude towards farm succession.

Chapter 7: Summary, Conclusion, and Recommendation

Summary

With the principle of health, ecology, fairness, and care that are at the core of the organic philosophy, OA has changed unsustainable habits around the globe by inspiring producers and consumers alike (Arbenz, et.al, 2016). With these advantages, different countries including the Philippines are adopting the technology.

The Philippine government has been promoting the adoption of organic agriculture to be one of the solutions in the current issues on sustainable agriculture, environmental degradation, and climate change. To intensify the OA adoption, and as a result of a long years of development efforts (mostly by non-government organizations and private groups) pushing for agriculture sector reforms to an ecologically sustainable, environment friendly and safer production systems for the Filipino farmers, the Republic Act No. 10068 (RA 10068) or more commonly known as the Philippine Organic Agriculture Act was signed on April 6, 2010. The Department of Agriculture (DA) of the country targets 5% of the country's agricultural lands to be use in organic farming. According to Philippine Statistics Authority as cited by Pantoja, et al. (2016), the 5% of the 4 million ha crop land in 2014 (most recent) is 200,000 ha but based on Willer and Lernoud (2019) in 2017 the area devoted to OA in the Philippines was only 0.17% or about 17,156 ha.

Even with these efforts, the adoption rate of OA in the Philippines is still low. This can be attributed to different factors which includes all the variable components in technology provider and receiver and the big gaps between them (Pantoja, et al., 2016 and del Rosario 2018). These challenges and gaps can be bridge through proper information sharing activities and appropriate interpretation of the attitude and behavior of farmers.

The study's main objective is to properly interpret farmers in terms of their attitude and behavior towards OA and its effect in information sharing in the Philippines through a Trajectory Equifinality Model of farmers' life histories. Specifically, this study aims to (1) Identify and classify farmers based on their characteristics through extrinsic and intrinsic variables; (2)

Explore and distinguish contents, methods and sources of information sharing to and within farmers; (3) Assess the impact of information sharing to farmers and other actors in the community; and (4) Assess the effect of farmers' attitude and behavior towards OA adoption to the information they are sharing.

Following these objectives, this study attempted to gain the kind of in-depth knowledge and understanding of how to properly interpret farmers' attitude and behavior towards OA adoption and the effect of these in information sharing and adoption of OA technologies.

This study was conducted in the Province of Laguna, Philippines as one of its municipality- the Los Baños is designated and declared through the Proclamation Order No. 349, s. 2000 as a special science and nature city of the Philippines because it caters to different agricultural institutions.

As a qualitative research, primary data source using semi-structured interviews and observations were utilized to gain a good access of people's perceptions, meanings, and definition of situations to understand and record what is happening on the ground. In addition, the study applied Life History Approach (LHA), Trajectory Equifinality Approach (TEA), Grounded Theory Approach (GTA) and data triangulation for validity which required constant and in-depth interviews, observations, and memoing with different actors and information sources in the community accessed over different period (days, months, years). There were 30 farmer-participants, 11 institution staffs (from 5 major institutions), 6 farmer family members as main actors on this study. Each of them was qualified on the criteria set by the research and was invited as a research participant following the Historically Structured Inviting (HSI) of Valsiner and Sato (2006) and Sato et al. (2007). Data gathered were constantly transcribed, coded, compared, categorized, and analyzed until data saturation. In addition, respondent verification was done. Information from books, journals, training modules, websites, and other printed materials were also crossed referenced.

To further support this study different literatures were also reviewed. Definition and importance of OA as a general and in the Philippines were explored. Studies recommending research focus on attitude and behavior affecting farmers' decision in adopting and sharing of technologies were also reviewed. In addition, literature on information sharing and its significance and all the qualitative analyses were used in this study were included.

Based on the literature that were cited, most of the qualitative analysis that were utilized in this study were commonly used in educational, medical, and cultural psychology. Hence, this study found three published articled specifically utilized Trajectory Equifinality Approach (TEA) outside three field stated above, two articles were in the field of business and one in agriculture specifically food ethics. However, these studies were totally different from this study. Furthermore, a systematic review analysis was done following the guidance of Edinburgh University (2020) and the result was there is zero or no published articles in the data bases that were used.

In order to understand and interpret the attitude and behavior of farmers. Factors affecting the adoption and information sharing were explored. These factors were divided into two parts or categories: the *extrinsic variables* (includes characteristics of the farmer, external environment, and innovation) and the *intrinsic variables* (attitude, knowledge, perception, motivation- that will be understood through farmers' life histories).

To further understand these factors, chapter 3 categorized the farmers based on their extrinsic and intrinsic variables. Extrinsic focused on farmers' socio-demographic characteristics' categorization and farmers' intrinsic characteristics' categorization was made based on their life histories.

Based on the extrinsic categorization, the average age of farmer-participants was 51.57 years old with a group of older farmers consisting of 9 men and 6 women who mostly rely on traditional practices and younger farmers (12 men and 3 women) tend to explore more technologies. In terms of farming types, 16 farmers were doing commercial farming, 12 were

doing subsistence and commercial (providing for their own needs first and selling the excess), while 2 farmers stopped farming for the mean time. Most farmers were married with an average number of five (5) household member per family ranging from 3-10 family members). Age, marital status, and number of household member found to be factors in information sharing and adoption of technology as most of the farmers keep sharing what they learned to their spouse and children. In addition, they work harder to provide the needs of their family especially safe food.

In educational attainment, 11 farmers were not able to graduate high school, they incline more on farming and asking elder farmers or family members about the practices in their farm. On the other hand, three (3) college graduates' farmers specifically two (2) women inclined in organic agriculture because of its health benefits.

Most of the farmers learned agriculture from their parents as most of the 21 farmers from a family of farmers assisted their farm activities since childhood. Other farmers gained farming experience and knowledge in farming through observing to others and attendance to training. Contrary to the expected, 40% (12) of the farmer-participants were not able to attend even one training

This can be due to external environment of the farmers. Farmers cultivate an average of 1.2 ha with 0.075 ha as the smallest and 3.5 ha land as the largest, 16 farmers have a flat land, but 4 and 10 of them were tending a partially sloped and very sloped lands, respectively. With these environment, 12 farmers were living in a mountainous area (with no vehicle access), 19 farmers were living in an area with poor or unstable cellular signal, and 9 farmers were living in an area where there is no electricity.

Aside from these extrinsic factors, farmers were classified into 4 categories based on their life histories focusing on intrinsic factors. The first category was composed of 16 farmers from a family of farmers, learned the importance of OA, and share OA info to others or/and next generation and engage them. The second category with 2 farmers from a family of farmers, learned the importance of OA, but stopped farming for the meantime. The third category from a

family of farmers, learned the importance of OA, and went back to conventional farming. The fourth category from a family of non-farmers, learned the importance of OA, and share OA info to others or/and next generation and engage them. This categorization indicated and clarified the background and experiences of farmers and how each factor and point of farmer's life affects farmers' decision making in farm activities and in farm succession in terms of their attitude in information sharing and engaging younger generations in farming. Chapter 3 shows that extrinsic variables also affect intrinsic behavior and both variables affect farmers in making decision in learning, adopting, and sharing of information and innovation.

As part of the extrinsic factors, innovation was focused on chapter 4. Sources, contents, types, and methods of information sharing were explored. Sources such as public (different government institutions), private (farm input companies and private farms), personal (family members, neighboring farmers) and mass media (which were most an output of research of public and private institutions) were all examined. Most farmers stated that they received and understand the importance of OA from Institution 1 (Public source) and family members or neighboring farers (personal sources).

Each source has their own target beneficiaries that were highly influenced by the institutionalization of DA to improved agricultural system in the country. Sources offered diverse contents or technologies for farmers, each of them has their own specialty and focus, hence cooperation between stakeholders is highly necessary. It is also worth noted that types of information sharing should be available, accessible and can complement the needs and interests of farmers.

Farmer-to-farmer movement is still playing a very substantial role in boosting confidence of farmer-trainers not only in the Philippines but also in Japan. The movement encouraged the farmers to invent and modify innovations and conduct their own trainings as they are the main actor and center focus of the farm activities. This result also is timely needed for OA adoption and information sharing as OA is location specific.

In addition, farmer-trainers are more motivated and passionate to spread safe, environmentally friendly agricultural systems using their innovations in organic agriculture. Farmer-trainers also acknowledge the importance of enhancement of "theme-community" that brings people with common interest and passion together.

Moreover, it also showed that not only in the Philippines but also in Japan, Farmer-trainers have diverse topics or focus, different methods, packages, and strategies but they have interconnected reasons and motivations for their varied initiatives in the dissemination and persuasion of other people to adopt the OA technology.

Upon knowing the different factors affecting information sharing and adoption, Chapter 5 assessed the impacts of information sharing to different actors in the community it also showed the importance of interpretation of the farmers attitude and behavior towards OA adoption and how these attitude and behavior affected information sharing and adoption of technology. Major actors on this study include 11 institution staff from 5 major institutions (as the main information sources), 30 farmer-participants (as the main receiver or beneficiaries of information and innovation), and 6 farmers' family members (who are the main factor or reason affecting farmer's decision in adopting certain innovation).

This chapter revealed that needs, importance, sustainability, pressure from others, availability, and easiness to adopt as the factors affecting actors' attitudes toward learning, sharing, and adopting organic agriculture technologies. Moreover, the degree of the economic, well-being, and environmental impacts varied. Institution value income the least as they do not care whether they get additional honorarium through extending the importance of OA. Farmers and farmer families valued economic impact moderately while all actors valued well-being and environmental benefits the most.

The strongest interaction and impact were noted on personal information sources and some institutions. This can be associated to the external environment of the farmers as they tend to get more information from those who were near them in terms of accessibility and availability.

Furthermore, farmer-participants tend to be interested in the technology that will benefit them and their respective families, especially their children who will inherit their farm.

Two farmers from category 1 think agriculture were interesting, promising, challenging, and they were proud to be from a farmer family, so with zero knowledge in agriculture, and positive attitude towards agriculture, farmers attended agricultural training. Others engaged in agriculture with their attitude that farming is satisfying, and enjoyable, some think that farming is back-breaking work and a reminder of hard life, but due to the situation that they need to accept the farmland and continue farming, they do not have a choice but to continue. Facing the fact and having a mindset that family farm should be continued, and that it is a family tradition, their responsibility and obligation, they engaged in agriculture. Even they faced problems they managed to continue OA after they learned and accept its importance.

On the other hand, category 2 farmers were from a family of farmers, engaged and experienced handling and tending different kinds of crops and were exposed to different kinds of technology. Farming for them was hard but it was a source of living and a way of life. But as a full-time employee that demands over time even weekends, they had problems in balancing their time hence even they know the importance of OA as practices is time-consuming, they were forced to stop farming for the mean time.

Category 3 as some of them inherited their farms, were obligated. They were already accustomed of conventional practices, but upon learning the importance of OA, they tried to convert but due to problems such as pressure from their neighboring farmers, conversion of land, and children not eager to do farming in the future, they went back to conventional farming. Furthermore, they also stated that OA has low income, hard, tedious, and time-consuming.

Category 4 were new farmers, they got information about farming from exhibits, seminars, or met a farmer. After learning and benefiting from OA, they think that the information and knowledge on OA should be transferred or shared to others specially to the next generation. Making the agriculture sustainable with a safe management practices OA offers.

On the needs and interest, it was noted that almost half of the farmer-participants were interested to learn more on updated crop production management practices, specifically fertilizer and pesticide. Some wants to learn crop production (grafting, ratooning, marcotting), post-harvest handling, value addition, marketing, and livestock production). The main reasons farmers want to learn additional technologies were to be more equipped in their own production, to satisfy their own curiosity, and to be more equipped in sharing knowledge with others.

For the reasons farmers adopt OA, all of them stated the importance of OA as a safe technology not only for the producers (farmer and their family), and consumers (farmer, famer families, and customers), but also to the environment. Most of the farmers valued the benefits under the well-being specifically the social and psychological well-being they were getting upon adoption of OA. For these farmers they appreciate and treasure more the better relationship with their family, neighbors, and consumers and the gratifying and fulfilling experiences and peace of mind that they were getting. On the other hand, farmers who rejected OA were more focused on being reluctant to the technology as it gave them low income, requires more labor, time, and effort.

In farm succession, result on this chapter showed that farmers had varied perceptions in transferring knowledge and motivations to their successors. Upon being acknowledged in society, most of the farmers' moral were uplifted. They displayed positive attitude and outlook towards agriculture that were reflected through their encouraging behavior to engage their children in farming. Their children were also proud of their farmer-parents.

Conclusion

Interpretation of the attitude and behavior of farmers is a possible solution to bridge the gap between the information provider and receiver that will lead to adoption of technology. As there were only few studies focusing on attitude and behavior of farmers affecting adoption and information sharing. As Trajectory Equifinality Model (TEM) is commonly used in medical,

cultural psychology, and education studies, results showed that this study is the first to utilized TEM to explain the life histories of farmers in the Philippines. Furthermore, this is the first in agribusiness field to use Trajectory Equifinality Approach (TEA) and the first in the interpretation of farmers life path affected by their attitude, behavior, and situation.

This study also showed that both extrinsic and intrinsic characteristics of farmers affected attitude and behavior. Different categorization seemed to be applicable and appropriate in the interpretation of farmers. Even though varied information and innovation sources existed in the study area, each had diverse target beneficiaries, contents, focused, and methods or way of dissemination. However, most farmers were not receiving information from public and private institutions, and they only mainly relied on their family members or neighboring farmers. Factors affected actors' attitude in learning and adopting technology includes farmers' needs, technology's importance, sustainability, availability, easiness to adopt and pressure from others. Degree on economic, well-being, and environmental impacts varied with most valued impact on well-being and environmental. As some farmers were not receiving information, public and private sources personal information sources had the strongest interaction and impact.

To interpret farmers attitude and behavior, TEM seemed to be useful in categorizing farmers based on their life histories. Upon interpretation, it can be concluded that farmers' decisions were affected by their perception, situation, attitude, interests, and valued benefits such as finding solution to problems and helping other people. Farmers mainly adopted OA for its environmental and well-being benefits. On the other hand, farmers tend to reject OA due to their reluctance as OA gave them low income, while requiring more labor, time, and efforts. In addition, neighboring farmers who were not practicing OA, land conversion, and children's unwillingness to continue farming affected their decision. Furthermore, uplifting morale of farmers by being acknowledged in the society positively affected their attitude towards farm succession.

Recommendation

This study recommends that information should be available, accessible, and complementary to the needs and interests of farmers. In order to do so, cooperation between stakeholders (public and private sources) is highly necessary. In addition, technology provider should understand the needs of the farmers to provide a sustainable and easy to adopt innovation through listening to the farmers voices and ideas. There is a need to make the farmers on top or main focus of the information system and not at the bottom. Personal sources including farmer-leader should be well knowledgeable about the technology as they have the strongest interaction and impact. This can be done by making sure that the farmer-leaders are included in all information system such as in the planning, creating, implementation, monitoring, and evaluating of technology dissemination initiatives. Farmers' morals should be uplifted through acknowledgement in the society as an important and respected role or position. Furthermore, policy makers should also be aware on the problems and threats of land conversion to safe and sustainable food production.

For future studies, it is recommended to explore more on the different factors affecting farmers attitude and behavior in adopting and sharing technology through testing and evaluation in different areas (regions or countries) and with bigger sample size or population to also utilize quantitative analysis.

References

Abu Bakar, N. R., & Hj., A. M. (2008). The life history approach: fieldwork experience. *Jurnal e-Bangi, 3*, 1-9.

Accascina, G. (2000). *Food and Agriculture Organization.* Retrieved from The role of information and communication technologies in rural development and food security: http:// www.fao.org/sd/CDdirect/CD re0055h.htm

Agricultural Training Institute (DA-ATI). (2012). Techno Gabay. Retrieved 04 2017, from Department of Agriculture Agricultural Training Institute: http://ati.da.gov.ph/ programs/techno-gabay

Ali, S., Jabeen, U., and Nikhitha, M. (2016). Impact of ICTs on Agricultural Productivity. *European Journal of Business, Economics and Accountancy, Vol. 4*(No. 5), 82-92.

Amoloza, J., and Gonzales, C. (2019, July and September). Project on Organic Agriculture of the Municipal Agriculture Office. (E. Aquino, Interviewer) Los Banos, Laguna: Municipality of Los Banos- Municipal Agriculture Office.

Aquino, E. (2019). Effectiveness of farmer-trainers in the Philippines: A Case on Organic Agriculture. Master's Thesis, Department of Agribusiness Management, Graduate School of Agriculture, Tokyo University of Agriculture, Setagaya, Tokyo.

Aquino, M., Cardenas, V., Saliot, A., & Cruz, L. (2011). Imperatives of Extension, E-information, Communication and Statistics in Agricultural Development. *Transaction Natl. Acad. Sci. Tech. Philippines (NAST PHL). Vol. 33*, pp. 369-390. Taguig: National Academy of Science and Technology,. Retrieved from Imperatives%20of%20Extensi on,%20eInformation%20Communication,%20Marlowe%20Aguino%20et%20al.pdf

Arbenz, M., D. Gould, and C. Stopes. 2016. Organic 3.0 – for truly sustainable farming and consumption (2nd ed.). Bonn, Germany. IFOAM Organics International. 24 p. Retrieved from https://www.ifoam.bio/sites/default/files/202005/Organic3.0_v.2_web

Babbie, E. (2014). *The Practice of Social Research.* Boston: Cenggage Learning.

Bañares, R. B. (2020, March). Interpreting the Attitude and Behavior of Farmers and Evaluation of Farmer-Trainer in the Philippines. (E. C. Aquino, Interviewer)

Belen, R. (2018, March 27). Evaluation of Farmer-Trainer in the Philippines. (E. C. Aquino, Interviewer)

Boadu, M., and Sorour, M. (2015). On Utilizing Grounded Theory in Business Doctoral Research: Guidance on the Research Design, Procedures, and Challenges. International Journal of Doctoral Studies, 143-166.

Bunch, R. 1989. Encouraging farmers' experiments, pp. 55-60. In R. Chambers, A. Pacey, and L. A. Thrupp (eds.). Farmer First: Farmer Innovation and Agricultural Research. Intermediate Tech. Pub. London. 218 p

Burton, M., Rigby, D., and Young, T. (2003). Modelling the adoption of organic horticultural technology in the UK using duration analysis. Australian Journal of Agricultural and Resource Economics, 29-54.

Castillo, A. (2018, March). Evaluation of Farmer-Trainer in the Philippines. (E. C. Aquino, Interviewer)

Chaiklin, H. (2011). Attitudes, Behavior, and Social Practice. Journal of Sociology and Social Welfare.

Chambers, R. (1989). Reversals, institutions, and change. In R. Chambers, A. Pacey, & L. A. Thrupp, Farmer First: Farmer Inovation and Agricultural Research (pp. 181-195). London: Intermediate Technology Publications.

Chamber, R., A. Pacey and L. A. Thrupp. 1989. Farmer First: Farmer Innovation and Agricultural Research. Intermediate Tech. Pub. London. 218 p.

Charmaz, K. (2005). Grounded Theory in the 21st Century: Applications for Advancing Social Justice Studies. In N. Denzin, & Y. (. Lincoln, The Sage handbook of qualitative research (pp. 507-535). Sage Publications Ltd.

Chepkemoi, J. (2018, November 29). *World Atlas* . Retrieved from Island Countries Of The World: https://www.worldatlas.com/articles/which-are-the-island-countries-of-the-world.html

Chisita, T. C. 2012. Knotting and networking agricultural information services through Web 2.0 to create an informed farming community: A case of Zimbabwe. In World Library and Information Congress: 78th IFLA General Conference and Assembly. Social networking for agricultural research, education, and extension service: An international perspective — Agricultural Libraries Special Interest Group Session 205. Retrieved from https://www.ifla.org/past-wlic/2012/205-chisita-en.pdf

Christopolos, I. (2010). Mobilizing the Potential of Rural and Agricultural Extension. Rome: FAO.

Clear Impact. (2016). *What is Impact and How do we Measure it?* Retrieved from Clear Impact reach your peak: https://www.clearimpact.com/how-to-define-impact/

Cooke, A., Smith, D., & Booth, A. (2012). Beyond PICO: the SPIDER tool for qualitative evidence synthesis. *Qualitative Health Research*, 435-443.

Collence, T. C. (2012). Knotting and networking agricultural information services through Web 2.0 to create an informed farming community: A case of Zimbabwe. Social networking for agricultural research, education, and extension service: An international perspective — Agricultural Libraries Special Interest Group session 205.Retrieved from https://conference.ifla.org/ifla78

Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). Singapore: SAGE Publications, Inc.

Costales, J. (2017, August). Evaluation of Farmer-Trainer in the Philippines. (E. C. Aquino, Interviewer)

Crawford, C., Grossman, J., Warren, S., & Cubbage, F. (2015, June). Grower Communication Networks: Information Sources for Organic Farmers. *Journal of Extension, 53*. Retrieved from https://joe.org/joe/2015june/pdf/JOE_v53_3a9.pdf

DA-ATI. (2020, June 21). *School-on-air Programs for Rice Farmers coming to radio starting June*. Retrieved from Philippine Information Agency:https://www.google.com/.amp/s./pia.gov.ph/news/articles/104523.amp

de Ramos, R. (2019, July and September). Mandates, Supports, and Projects on Information Sharing on Organic Agriculture. (E. Aquino, Interviewer) Los Banos, Laguna: Department of Science and Technology- Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (Applied Communication Division)

Defrancesco, E., Gatto, P., Runge, F., & Trestini, S. (2008). Factors Affecting Farmers' Participation in Agri-environmental Measures: A Northern Italian Perspective. Journal of Agricultural Economics, 114-131.

del Rosario, B. (2018). *National organic agriculture program, FY 2017-2023.* Diliman, Quezon City: Department of Agriculture, Bureau of Agriculture and Fisheries Standards.

Department of Agriculture. (n.d.). Republic of the Philippines, Department of Agriculture. Retrieved from Gov.PH: http://www.da.gov.ph/

Dhunpath, R. (2000). Life history methodology: ‘‘narradigm’’ regained. QUALITATIVE STUDIES IN EDUCATION,, 543-551.

DOST-PCAARRD.(n.d.).Republic of the Philippines- DOST-PCAARRD. Retrieved from gov.ph: http://www.pcaarrd.dost.gov.ph/home/portal/ index.php/about-pcaarrd

FAO. (1995). *Understanding farmers' communication networks: an experience in the Philippines.* FAO.

FAO, IFAD and WFP. The State of Food Insecurity in the World. 2013. The multiple dimensions of food security. Rome, FAO. In: http://www.fao.org/docrep/018/i3434e/i3434e.pdf

Flick, U. (2009). An Introduction to Qualitative Research. London: SAGE.

Franzel, S., A. Degrande, E. Kiptot, J. Kirui and J. Kugonza. 2015. Farmer-to-Farmer Extension. Note 7. GFRAS good practice notes for extension and advisory services. Lindau, Switzerland. Retrived from https://www.g-fras.org/es/good-practice-notes/farmer-to-farmer-extension.html 4 p

Gale, P., Devai, I., Reddy, K., & Graet, D. (1993). Denitrification Potential of Soils from Constructed and Natural Wetlands. Ecological Engineering, 119-130.

Genius, M., Pantzios, C., & Tzouvelekas, V. (2006). Information Acquisition and Adoption of Organic Farming Practices. Journal ofAgricultura1 and Resource Economics, 93-113.

Given, L. (2008). The Sage Encyclopedia of Qualitative Research Methods. London. Sage Publication Ltd.

Glaser, B., and Strauss, A. (2006). *The Discovery of Grounded Theory: Strategies for Qualitative Research.* New Brunswick, USA: Aldine Transaction Publishers.

Glaser, B. 2001. The Grounded Theory Perspective: Conceptualization Contrasted with Description. Mill Valley, CA. Sociology Press. 232 p.

Goetz, S., & Debertin, D. (2001). Why Farmers Quit: A Country-Level Analysis. American Journal of Agricultural Economics, 1010-1023.

Goulding, C. (2002). Grounded Theory: A Practical Guide for Management, Business and Market Researchers. Sage Publication Ltd.

Habito, C. (2016, October). Drawing the young to farming. Philippine Daily Inquirer.

Hattam, C. (2006). Adopting Organic Agriculture: An Investigation Using the Theory of Planned Behaviour. International Association of Agricultural Economics Conference (p. 17). Edinburgh: Land Economy Research Group.

Hagemaster, J. N. 1992. Life history: a qualitative method of research. J. Adv. Nursing. 17(9):1122-1128. Retrieved from https://doi.org/10.1111/j.1365-2648.1992.tb02047

Hawkensworth, S., & Perez Garcia, J. (2003). Potentials and constraints of the farmer to farmer programme for environmental protection in Nicaragua. Land Degradation and Development, 175-183.

Hellin, J., & Dixon, J. (2008). Operationalising Participatory research and farmer to farmer extension: the Kamayog in Peru. Development in Practice, 627-632.

Heeks, R. 2018. Information and Communication Technology for Development (ICT4D). Routledge. New York. 428 p.

Hiromatsu, C., & Ozawa, S. (2020). A Qualitative Study if Formation process of Work Values and Beliefs in Experimental-learning in Mid-level employees Requiring Reflective Support. *Japan Journal of Educational Technology, 43*(4), 363-380. Retrieved from https://www.jstage.jst.go.jp/article/jjet/43/4/43_43057/_article/-char/en

Hocde, H. (1997). Crazy but not mad. In L. Van Veldhuizen, A. Waters-Bayer, R. Ramirez, D. Johnson, & J. Thompson, Farmers' Research in Practice: Lessons from the field (pp. 49-66). Southampton Row, London, UK : Intermediate Technology Publications.

IFOAM (2005). Working for Organic Farming in Europe IFOAM EU Group Annual Report. Retrived from https://www.organicseurope.bio/contents/uploads/2021/04ifoameu_comm_annual_report_2005.pdf?dd

IFOAM (2019) The World of Organic Agriculture: Statistics and Emerging Trends. http://www.organic-world.net/yearbook/yearbook-2019.html

Jitsuchon and Methakunavut (2015) Jitsuchon, S., & N, M. (2015). Macroeconomic Impacts of Organic Agriculture in Thailand. Organic Agriculture and 197.

Kawai, A. (2020). Being cared by vegetables: understanding Japanese farmers' seed saving practices from care ethics point of view. *Asia Pacific Society for Agricultural and Food Ethics.* Retrieved from https://www.apsafe2020.online/2020/12/03/13-being-cared-by-vegetables-understanding-japanese-farmers-seed-saving-practices-from-care-ethics-point-of-view/

Kendra, C. (2021, February). *Attitudes and Behavior in Psychology.* (D. Susman, Ed.) Retrieved from verywell mind: https://www.verywellmind.com/attitudes-how-they-form-change-shape-behavior-2795897

Keränen, J., & Oinonen, M. (2019). Grounded Theory Studies in Industrial Marketing: Systematic Review and Implications for Future Research. Retrieved from https://www.impgroup.org/uploads/papers/8226.pdf

Kettinger, W., Li, Y., Davis, J., & Kettinger, L. (2015). The roles of psychological climate, information management capabilities, and IT support on knowledge-sharing: an MAO perspective. European Journal of Information Systems, 59-75

Kimhi A., Bollman R. (1999): Family farm dynamics in Canada and Israel: the case of farm exits. Agricultural Economics, 21: 69–79.

Kiminami, L., Furuzawa, S., & Kiminami, A. (2020). Social entrepreneurship and social business associated with multiple functions of urban agriculture in Japan. *Asia-Pacific Journal of Regional Science*, 521-552. Retrieved from https://link.spinger.com/article/10.1007/s41685-020-00154-8

Kiptot, E., & Franzel, S. (2015). Farmer-to-farmer extension: opportunities for enhancing performance of volunteer farmer trainers in Kenya. Development in Practice, 25(4), 503-517.

Labonne, J., & Chase, R. (2009). *The Impact of Mobile Phones on Farmers' Welfare in the Philippines.* The World Bank. Policy Research Working Paper 4496. 26p. Retrieved from https://doi.org/10.1596/1813-9450-4996

Laepple, D., & Donnellan, T. (2008). *Farmer attitudes towards converting to organic farming.* Retrieved from National Organic Conference 2008: https://orgprints.org/18660/1/D.LappleConfpaper08.pdf

Landicho, L. D., Paelmo, R., Cabahug, R., Visco, R., & Abadillos, M. (2014). Prospects and Challenges in Promoting Organic Agriculture in the Upland Communities in the Philippines: Implications to Food Security and Nutrition. IPCBEE 2014 International Conference on Food Security and Nutrition, 67, 60-65. doi: 10.7763/IPCBEE

Lapitan, J. (2019, August). Information about Organic Agriculture Training and Seminars. (E. Aquino, Interviewer) Diliman, Quezon City: Department of Agriculture-Bureau of Agricultural Research (Applied Communication Division).

Largoza, M. (2020, March). Interpreting the Attitude and Behavior of Farmers and Evaluation of Farmer-Trainer in the Philippines. (E. Aquino, Interviewer)

Leite, Y., Morales, W., & V, S. (2016). International Entrepreneurship in Agribusiness. Revista Galega de Economia, 151-162.

Lenoir, M. (2009, December). Farmers teaching farmers. ICT Update(52), 4-6.

Locke, K. 2002. The grounded theory approach to qualitative research, pp. 17-43. In F. Drasgow and N. Schmitt (eds.). Measuring and analyzing behavior in organizations: Advances in measurement and data analysis. San Francisco, CA. Jossey-Bass. 591 p.

López, C.P., and Requena, J. C. (2005). Factors related to the adoption of organic farming in Spanish olive orchards. Spanish Journal of Agricultural Research, 5-16.

Lotfi, Z., M. Mukhtar, S. Sahran, and A. T. Zadeh. 2013. Information sharing in supply chain management. Procedia Tech. 11:298-304.

Li, S., & Lin, B. (2006). Accessing information sharing and information quality in supply chain management. Decision Support Systems, 42, 1641–1656. https://doi.org/10.1016/j.dss.2006.02.011

Mason, J. (2002). Qualitative Researching (2nd ed.). London: Sage Publication Ltd.

Meijer, S., Catacutan, D., Ajayi, O., Sileshi, G., & Nieuwenhuis, M. (2015). The role of knowledge, attitudes and perceptions in the uptake of agricultural and agroforestry innovations among smallholder farmers in subSaharan Africa. *International Journal of Agricultural Sustainability*, 40-54.

Minami, R. (1986). The Economic Development of Japan: A Quantitative Study. Hampshire and London: The Macmillan Press LTD.

Ministry of Agriculture, Forestry and Fisheries Japan. (2016). FY2015 Annual Report on Food, Agriculture and Rural Areas in Japan. Retrieved from MAFF Japan: http://www.maff.go.jp/e/data/publish/attach/pdf/index-35.pdf

Mottaleb, K. (2018). Perception and adoption of a new agricultural technology: Evidence from a developing Country Technology in Society, 126-135.

Municipality of Los Banos. (2015, April 23). Republic of the Philippines- Municipality of Los Banos. Retrieved from Municipality of Los Banos- Facts and Figures: http://www.losbanos.gov.ph/facts-and-figures/page/4

Muramoto, J., Hidaka, K., & Mineta, T. (2010). Japan: Finding Opportunities in the Current Crisis. In S. a. Gliessman, The Conversion to Sustainable Agriculture: Principles, Process, and Practices (pp. 273-301). USA: CRC Press, Taylor and Francis Group, LLC.

Murshed-E-Jahan, K., & Pemsl, D. E. (2011). The Impact of Integrated Aquaculture-Agriculture on Small-scale Farm Sustainability and Farmer's Livelihoods: Experience from Bangaldesh. Agricultural Systems, 392-402.

Nugent (2015) *Organic Agriculture and Post-2015 Development Goals Building on the Comparative Advantages of Poor Farmers* (pp. 3-48). Mandaluyong City, Metro Manila, Philippines: Asian Development Bank.

O' Reilly, J., Woolrich, M., Behrens, T., Smith, S., & Berg, H. (2012). Tools of the Trade: Psychophysiological Interactions and Functional Connectivity. Social Cognitive and Affective Neuroscience, 604-609.

Office of the Vice Chancellor for Research and Extension (OVCRE). (2018). Research Development Extension History. Retrieved from UP Systems| UP Los Baños: https://ovcre.uplb. edu.ph/about/r-e-uplb/history

Ogar, C. E., S. I. Dika and L. A. Atanda. 2018. Challenges and prospects of information service delivery to rural people of Nigeria. Research J. Lib. and Info. Sci. 2(3).14-28.

Okeh, E. (2002). Education agent and information provision in rural communities: The case of selected Nigerian communities. Gateway Journal, 54-60.

Palis, E., Diaz, C., Flor, R., Balimbing, C., Datoon, R., & Pamatmat, B. (2012). What do Filipino farmers need to meet the challenges of rice self-sufficiency? *Philippine Journal of Crop Science*.

Pantoja, B., Badayos, G., & Rola, A. (2016). *Constraints to Adoption of Organic Rice Production in Selected Areas in the Philippines.* University of the Philippines Los Banos. Research Gate.

Pauig, Y. C. (2018, March and August). Information about Magsasaka Siyentista on Organic Agriculture. (E. Aquino, Interviewer) Diliman, Quezon, City: Deapartent of Agriculture- Agricultural Training Institute.

Petrzelka, P., & Korsching, P. (1996). Farmers' Attitude and Behavior toward Sustainable Agriculture. *Journal of Environmental Education*, 38-58.

Piadozo, Eden S., F. A. Lantican, I. M. Pabuayon and N. N. Shimoguchi. 2016. Cost of organic certification in the Philippines: Boon or bane to organic farmers. J. Intl. Soc. for Southeast Asian Agri. Sci. 22(2).107-118.

Pierpaolia, E., Carlia, G., Pignattia, E., & Canavari, M. (2013). Drivers of Precision Agriculture Technologies Adoption: A Literature Review. 6th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA 2013) (pp. 61-69). Bologna, Italy: Elsevier Ltd.

Phil-Organic Network. (2017, April 30). Philippine Organic Agriculture Information Network. Retrieved from Policy Framework: http://www.pcaarrd.dost.gov.ph/home/momentum/philorgagri/index.php?option=com_content&view=article&id=6&Itemid=8

Qamar, K. (2012, September). Global Forum for Rural Advisory Services (GFRAS). (B. E. Swanson, Editor) Retrieved from Global Forum for Rural Advisory Services (GFRAS): http://www.g-fras.org/en/events/gfras-events/annual-meeting-australia-2017/94world-wide-extension-study/asia/south-eastern-asia/316-philippines.html#ict

Rehmana, T., Mc Kemeya, K. Y., Cooke, C., Garfortha, C., Trantera, R., Parka, J., & Dorwarda, P. (2007). Identifying and understanding factors influencing the uptake of new technologies on dairy farms in SW England using the theory of reasoned action. Agricultural Systems, 281-293. Retrieved from https://www.sciencedirect. com/science/article/pii/S0308521X06001375

Rudolfo, G. (2019, July). OA initiative and training details. (E. Aquino, Interviewer)

Sato, T. (2006). Development, Change or Transformation: How can psychology conceive and depict professional identify construction? European Journal of School Psychology, 321-334.

Sato, T. (2016). From TEM to TEA: The Making of a new Approach. In T. Sato, N. Mori, & J. Valsiner, Making of the Future: The Trajectory Equifinality Approach in Cultural Psychology (pp. vii-xii). Charlotte, NC, USA: Information Age Publishing Inc.

Sato, T., Hidaka, T., & Fukuda, M. (2009). Chapter 10 Depicting the Dynamics of Living the Life: The Trajectory Equifinality Model . In J. Valsiner, P. Molenaar, M. Lyra, & N. Chaudhary, Dynamic Process Methodology in the Social and Developmental Sciences (pp. 217-240). London and New York: Springer.

Sato, T., Mori, N., & Valsiner, J. (2016). Making of the Future: The Trajectory Equifinality Approach in Cultural Psychology. Charlotte, NC, USA: Information Age Publishing Inc.

Sato, T., Yasuda, Y., Kanzaki, M., & Valsiner, J. (2013 March). From Describing to Reconstructing Life Trajectories: How the TEA (Trajectory Equifinality Approach) explicates context-dependent human phenomena. Aalborg.

Sato, T., Yasuda, Y., Kido, A., Arakawa, A., Mizoguchi, H., & Valsiner, J. (2007). Sampling reconsidered idiographic science and the analysis of personal life trajectories. In J. Valsiner, & R. A. (Eds.), The Cambridge handbook of sociocultural psychology (pp. 82-106). New York: Cambridge University Press.

Setboonsarng, S. (2015). Organic Agriculture, Poverty Reduction, Climate Change, and the Millennium Development Goals. In S. Setboonsarng, S. Setboonsarng, & A. Markandya (Eds.), *Organic Agriculture and Post-2015 Development Goals Building on the Comparative Advantages of Poor Farmers* (pp. 3-48). Mandaluyong City , Metro Manila, Philippines: Asian Development Bank.

Shimoguchi, N. and L. Mojica. 2016. Adaptation strategies to changing environment by an organic farm in Laguna, Philippines. Int'l. J. Envi. and Rural Dev't. 7(2): 93-97.

Simpson, B., Franzel, S., Degrande, A., Kundhlande, G., & Tsafack, S. (2015). Farmer-to-Farmer Extension: Issues in Planning and Implementation. University of Illinois: Modernizing Extension and Advisory Services (MEAS) technical Note.Ssali

Tanja, W. (2018, October). *Four types of Impacts*. Retrieved from Social Entrepreneurship Support Network of Baltic Sea Region: https://www.socialenterprisebsr.net/2018/10 four-types-off-impact/.

TESDA. (2020). Technical Education and Skills Development Authority. Retrieved from GOVPH: https;//www.tesdad.gov.ph/

The University of Edinburgh. (2020). *Center for Cognitive Ageing and Cognitive Epidemiology*. Retrieved from Systematic Reviews and meta-analyses: A step-by-step guide:https:// www.ccace.ed.ac.uk/research/software-resources/systematic-reviews-and-meta-analyses

The University of York. (2016, June). *Research Impact Statement*. Retrieved from University of York: https://www.york.ac.uk/staff/research/research-impact-definition/.

The World Development Bank. (2007). World Development Report 2008: Agriculture for Development. Washington DC: The World Bank.

Toma, L., Barnes, A., Sutherland, L., Thomson, S., Burnett, F., & Mathews, K. (2018). Impact of information transfer on farmers' uptake of innovative crop technologies: a structural equation model applied to survey data. *J Technol Transf*, 864-881.

Valsiner, J., and T. Sato. 2006. Historically Structured Sampling (HSS): How can psychology´s methodology become tuned in to the reality of the historical nature of cultural psychology?, pp. 215-251. In J. Straub, D. Weidemann, C. Kolbl, and B. Zeilke (eds.). Pursuit of meaning. Advances in cultural and cross-cultural psychology. Transcript Verlag. 518 p.

Voas, D. (2014, February 28). *Towards a Sociology of Attitudes.* Retrieved from Sociological Research Online: http://www.socresonline.org.uk/19/1/12.html

Willer, H., & Lernoud, J. (. (2019). *The World of Organic Ariculture. Statistics and Emerging Trends 2019* (20th ed.). Switzerland: Research Institute of Organic Agriculture FiBL and IFOAM-Organics International, Frick and Bonn.

Willock, J., Deary, I., Jones, G., Gibson, G., Mc Gregor, M., Sutherland, A., . . . Grieve, R. (2008). The Role of Attitudes and Objectives in Farmer Decision Making: Business and Environmentally-Oriented Behaviour in Scotland. Journal of Agricultural Economics. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1477-9552.1999.tb 00814.x

Appendices

Appendix 1. Journal Articles Produced by this Research

1. Eliza C. Aquino, Nina Nocon-Shimoguchi, and Hiroki Inaizumi (2018), *Significant Contribution of Farmer First in Farmer-Trainer for Environmentally-Friendly Agriculture and Rural Development*, International Journal for Environmental and Rural Development (IJERD), Vol. 9 No. 1, pp. 128-134

2. Eliza C. Aquino, Nina Nocon-Shimoguchi, Hiroki Inaizumi (2019), *Comparison of Organic Farmer-Trainers in Japan and the Philippines,* International Journal for Environmental and Rural Development (IJERD), Vol. 10 No. 1, pp. 22-27

3. Eliza C. Aquino, Hiroki Inaizumi, Nina N. Shimoguchi, Satoshi Suzuki (2021), *Effect of Farmers' Attitude and Behavior in Farm Succession in the Philippines*, International Journal for Environmental and Rural Development (IJERD), Vol. 12 No. 2, pp.86-92

4. Eliza Catelo Aquino, Satoshi Suzuki, Hiroki Inaizumi, Nina N. Shimoguchi, (2021) *Impact of Organic Agriculture Information Sharing on Main Actors in Laguna, Philippines*, Journal of the International Society for Southeast Asian Agricultural Sciences (J. ISSAAS), Vol. 27, No. 2, pp. 109-123

Appendix 2. Farmers' Life Histories

Compilation of Life Histories of Farmers in Laguna

Farmer 1 (F1)

F1 was the founder and owner of a famous agro-tourism farm. He is from a farm family which could not afford to send him to college. After finishing high school, his determination to go to college, pushed him to stopped studying for two years and worked as a jeepney driver and sometimes as a barker (someone who calls passenger) to save enough to study in Manila. While taking up his college degree, he needed to work as a security guard in the morning and attend classes in the evening to keep him in school.

F1graduated from the Polytechnic University of the Philippines in 1989 with a degree of BS Computer Engineering. He started as a computer programmer and was promoted as Manager then in 2001 he became an Executive Vice President of a private telecommunications company and retired and engaged to farming in 2005. He invested his retirement fee in farming, before it was just a hobby for him, his neighbor saw him closely planted the bitter gourd and suggested that he should attend the seminar of a private company which manufactures organic fertilizer. A sack of organic fertilizer was given to him as prize in a raffle draw. He applied it to his bitter gourd plant and was amused to the dramatic reaction of the plants to the fertilizer. That gave him an idea to know more about OA and later engaged in OA as he realized that organic farming had a great potential as a business. (Sarian, 2014)

F1 who started with zero background in faming gained 15 years of experiences in tending his own organic farm through experimentation, adoption and modification of innovations he learned through trainings he attended locally and internationally. Unfortunately, he passed away in 2016.

To continue the legacy after the sudden death of F1, his wife F1.1, and their son, F1.2, fully took over the responsibility of conducting trainings and became the chairman and president of their farm, respectively. Mrs. of F1 is a graduate of the Polytechnic University of the Philippines with a degree of Bachelor of Science in Computer Data Processing. The son on the other hand, is a graduate of De La Salle University-Dasmariñas with a BS Agribusiness Management degree. The son (F1.2) was also acknowledged as *Magsasaka Siyentista (MS* or Farmer Scientists) and became the president of the MS officers of Region IV-A in 2016.

For the past years, their children were very active in engaging in their farm business, turns out when asked on how did they engage their children in farming, the farmer mother answered that it was originally their eldest son who persuaded them to venture into farming. When asked, the son replied that he has the tendency to think that there will be invasions of zombies and other creatures (megalomania or paranoia) and the important and main necessity is food. In order to be at ease, he convinced his parents to buy lot and started their own farm.

In reference to the interview with F1.1 (F1's wife), who is currently the owner and chairperson of their farm and MS profile and, trainings offered and conducted, reasons and motivations to do trainings were understood. F1's farm is located at the foothills of Mt. Banahaw in Majayjay, Laguna, around 120 km south of Metro Manila. It is known as the premiere agri-tourism destination of the Philippines. In 2005, F1 farm was established, with only 1,000 m2 land as practice area. Originally, it was planned to be a leisure farm and was planted with vegetables that

the family loves to eat. The organic farm produces were just initially intended for family consumption as the couple-owner were motivated not to feed toxic or synthetic chemicals to their children.

To feed our family fresh, nutritious, toxic, and chemicals-free food. Not to feed our family toxic and chemicals. We started farming as organic basically at first for family consumption.

In 2009, with their six-hectare land, F1's farm was commercialized, and began supplying different branches of known restaurants of the country. Furthermore, in 2012 they partnered with private food company offering "top-of-mind" local organic fresh farm produce. This food company provides product for healthy living including grocery, supplements, farm produce, and personal care.

F1's farm is an integrated organic farm composed of vegetables, fruit trees, livestock, fisheries, and areas for composting, vermicomposting, natural fertilizers and pesticides area, and post-harvest facility. It practices zero-farming and utilized different technologies such as vermiculture, aquaculture, natural farm inputs' production and farm integration.

F1's farm is the first organic farm in Region IV-A, and accredited private extension service provider for Institution 5, Department of Agrarian Reform (DAR) and Department of Tourism (DOT) which impart farm technologies and knowledge to "small scale farmers and provide workshops for those who wish to learn about sustainable organic farming and farm tourism. They also serve as mentor of the out-of-school- youths (OSY) through provision of assistance for OSY to prepare them as future farm managers and agripreneurs utilizing the learning-by-doing in farm processes and activities. F1 encourages OSY to engage in OA as part of the on-the-job training (OJT) programs, as these OSY became responsible not only in tending crops and livestock but also in doing different organic farm inputs such as botanical concoctions and vermicompost.

Providing training is one of the visions and roles of F1's farm following their founder's motto that "Knowledge is a gift that we cherish, keeping it from others is sterility, sharing it with others is Legacy". The farm's founder was the late F1, who was known and awarded as Outstanding Magsasaka Siyentista and Most Outstanding Organic Agriculturist in the Philippines in 2011. There were other awards and acknowledgements received, but before engaging to farming, F1, even from a family of farmer, admitted that he had zero knowledge about growing crops.

The reason why F1 chose farming is that they want to provide food for their family and community. At first, F1's farm harvests were just for family consumption, and they want to make sure to feed their family fresh, nutritious, toxic and chemicals-free food, so the owner and farmer-trainer decided that the farm should be organic. It was very hard for them to do OA when they started, they need to go outside the country to attend trainings and to adopt different technologies. Most of the farmers in the Philippines does not have the capacity, means or the opportunity to study abroad and attend trainings, that's why F1 and his family choose to share OA knowledge through trainings. All the learnings and technologies that they have learned, they keep teaching and sharing it to the participants. The experiences and struggle made the F1 family to be motivated to share what they know through trainings. F1 and family also wish to inspire more people to lead a healthy and sustainable future and expecting their trainees to practice and apply what they learned and to save the next generation by producing safe and nutritious food while protecting and saving the environment.

Farmer 2 (F2)

Based on the interview with F2, the owner, founder, *Magsasaka Siyentista*, and farmer-trainer of F2's Farm, his profile, history and stories behind their success in practicing OA were noted. Observations in their farm were useful in understanding the different practices, innovations, and motivations of the farmer-trainer.

F1 is a son of a farmer, even from a family of farmer, he stated that he had no knowledge about agriculture, his friend used to laugh at him when he tried to replant a fruit tree seedling as the plants were not growing properly as he includes the nursery plastic bag during transplanting. He achieved his Bachelor of Arts in English degree and worked for a private company, then he was hired in a US government project and after 10 years of service, he resigned and venture in farming. In 1980, at first, he was just doing farming as his hobby. He learned techniques in seedling propagation through watching his friend that was working in Bureau of Plant Industry in Los Baños, Laguna. He then asked him to work for him every weekend and through observing the activities of his friend, he learned different techniques in fruit trees and seedling propagation. He also attended trainings from Institution 1 and ask his friends to teach him different technologies related to planting.

In 1987, with 1.2 ha land located around 88.4 km south of Metro Manila and just P700.00 (¥ 1,490), F2's Farm was established originally as a plant nursery farm offering fruit seedling and later on developed to an orchard with different fruit-bearing trees. After typhoon Milenyo in 2006, where the farm was greatly affected, F2 thought that his employees' families will be hungry if he will not act (transcript 3.1). From then, F2's Farm embraced the conversion of the property to an integrated and diversified organic farm.

The farm implements a zero-waste management program utilizing every bit of natural resources to make the farm productive and sustainable. Portions of the vegetable and fruit harvests go to the animal feeds, while the animal wastes are used as part of the fertilizers for the vegetables and trees. Water supply of the farm is being pumped using solar power. Biogas from the hogs are being produced too. Vermiculture is also being practiced including aquaculture and bee farming. High value vegetables such as different varieties of lettuces and other leafy vegetables are also grown in green houses. Fruit bearing trees and grafted fruit trees can also be seen integrated in the farm. Fruit trees seedlings and grafted seedlings are still being produced and sold. Botanical concoction and Bokashi production, farm integration, active composting and container gardening are also being practiced.

F2's Farm became more sustainable and self-sufficient applying every technology and innovation F2 adopted and modified. The initial 1.2-hectare farm expanded to 2.0 ha in 2010 and currently operates in a 15-ha land. Moreover, it serves also one of the learning sites in Laguna of Institution 5. F2's Farm is also known to be one of the active farms and provider of trainings in OA. Institution 5 accredited and private farm and *Magsaaka Siyentista* (MS- Farmer Scientist) partner. In 2012, F2 was acknowledged as MS. Aside from F2, in 2015, the whole F2 Family was chosen and awarded as the Provincial and Regional Outstanding Farm Family at the Gawad Saka and at the National Organic Agriculture Achievers Awards, respectively. F2.5, one of the sons of F1, is currently taking the lead in developing the farm after turning his back from the corporate world in September 2010 to embrace farming.

F2.5 is motivated and continuing the main goal of the family farm that "for every Filipino not to go hungry ever again". As a graduate of BS Agribusiness Management in University of the

Philippines Los Baños (UPLB), and with his nine years experiences as business development manager in F2's Farm, for four years now, he is the one conducting in-house trainings on organic integrated agriculture and the one being appointed to attend and speak to other organic forums, trainings, and activities nationwide.

Fruit propagation and farm integration (e.g. high value crops, fruit trees and grafted fruits) are the unique focus of F2's Farm in OA training. They also allocate time to thoroughly discuss fruit trees seedling production as this technology became F2's Farm trademark since it started. Shift from fruit trees seedling production to OA, can be understood through reviewing and understanding of the farmer-trainers' life experience as he remembered the disaster from a typhoon that greatly affect the farm and his concerned for the families of his farmers. His concern and responsibilities for his employees pushed him to adopt other technologies including integrated OA. While engaging in OA, he found out the advantages and importance of OA such as its safeness to farmers, consumers, and environment; sustainability; and building better relationship through trust to their consumers, neighbors, and trainees.

F2's Farm's philosophy and motivations that pushed them to conduct training and share what they discovered to other farmers include the passion and hope that there will be more people who can benefit and enjoy the advantages of organic agriculture, safe food for the consumer and safe management production for the farmer and environment. In, OA, trust and a good farmer-consumer relationship are also created as quoted from the transcript 3.2 from F2 This could be attributed to Filipino Culture "suki"- as the customer tends to buy in the same "suki" store every time without any question because the customer trust the seller that he/she will give him/her the best quality product in a good price. To add, F2's Farm also stated that there is income in farming as the food is always in demand.

Farmer 3 (F3)

F3's Farm, was established in 2012 with a land area of one and a half hectare (1½ ha) producing leafy vegetables such as lettuce (*Lactuca sativa)* and pechay *(Brassica rapa)* as its main commodities and pineapple *(Ananas comosus),* livestock and other seasonal vegetables as its minor commodities. The farm produce is commonly sold in the municipal trading post. The farm is owned by F3 is an owner-farmer and seller of organic produce.

He is also a member of their LGU's farmer-association. He is from a family of farmers. He used to help his father in the farm when he was still young. Also, he graduated from an Agricultural High School. Learning different production techniques and scientific approaches in agricultural high school, he was excited to apply it in their own farm, unfortunately his father did not allow him and was not eager to listen and try to apply his learnings from school. After the rejection from his father, without a choice, he just keeps assisting his father in the farm by following his instructions for farm production. He then pursued computer programing as a course in college, but due to financial problem, he was forced to stopped. From Bicol Province, he moved to Alabang, Muntinlupa City, Metro Manila to work as a security guard. He met his wife- F3.1 and started their family. On August 14, 2002, they left Manila and decided to live with his sister's family in Mayondon, Los Baños, Laguna.

In 2007, due to some conflicts within the family including the growing children's fights, F3.1 persuaded her husband to find another house for their family to independently live. It was a good timing that their family friend was looking for a caretaker for his land in Timugan, Los Baños,

Laguna. F3 grabbed the opportunity and his family transferred from Mayondon to Timugan. The land is big but quite far from the main road and it has a very poor access in terms of transportation. In order to commute, comfortably, someone must pay a *special trip* or the payment for the whole amount of the trip for four to five passengers in a tricycle which costs PhP 45-50.00 (JPY 98-106) per trip. F3, breadwinner of their family consisting of his wife and seven children and working as a security guard in one of the shopping malls in Los Baños, earning a minimum wage of PhP 8,000.00 (JPY 38,290) per month does not have the capacity to pay a *special trip.* He used to walk from home to the main road and take jeepney (cheapest public transportation) to go to work and walk from work going back home. Walking makes him healthy, but it consumes most of his time for his family as he works for 12 hours plus 2 hours of walking. As per the interview with F3.1 she stated that "he was preparing and leaving early for work, our children were all still sleeping, he will be back late at night from work, our children were already sleeping."

In 2012, F3 persuaded by his friends attended the training regarding organic agriculture that was one of the initiatives of the municipal agriculture office of Los Baños. He quitted his job and from then on, he became one of the active members of the Los Baños Organic Fruits and Vegetable Growers Association their LGU's farmer-association. Being a member, the association provides them an access to free trainings conducted by Institutions 1,2,4, and 5 coordinated by Institution 3; free planting materials and tools; market or place to sell their produce; and it also gives them opportunities to go on a *lakbay aral* or field trips to successful organic farms within the Region. He started his own organic farm and was able to execute what he learned from the training and his past experiences. He also did experiments including doing his own versions of botanical concoctions and checking the effectiveness on his crops and modifying different technologies to maximize the effect on his farm. His learnings were shared to his wife and children and later even to students, neighboring farmers, hobbyists, and other farmers from different areas that are visiting successful organic farms in Laguna. He is also making his children involve in farming by allowing them to do simple tasks like watering and weeding. In addition, being unheard and disregarded during his childhood while helping in his father's farm, he is now making sure that his children can try and voice-out their thoughts while they are assisting him in their farm.

Based on the transcripts from the interview, his reason for choosing farming is that farming is life in a sense that "farming income is really big, as long as you have land". While his reason for doing OA is that *"Synthetic pesticides resulted to have effects on human, so why do I still need to use it, and if the natural pesticide and fertilizers can be found just around here, why do I need the synthetic ones?"* He also added that *"OA is safe for everyone, safe for all. Safe for the consumer's health, safe for us as well, and we can also help our environment by not using synthetic chemicals".* He learned propagation of fruits from a private farm. While he learned, how to make and use fermented juice from a private farm. These learnings including his own mini experimentations are being shared to his wife, children, and other actors in the community.

Farmer 4 (F4)

The F4's Farm, was established in 2013 with a land area of three hectare (3 ha) producing fruits such as banana (*Musa sapientum*), star apple *(Chrysophyllum cainito)*, rambutan *(Nephelium lappaceum*), santol (*Sandoricum koetjape*), lanzones (*Lansium domesticum)*, as its main commodities and papaya *(Carica papaya)*, ginger *(Zingiber officinale)*, taro *(Colocasia*

esculenta), turmeric *(Curcuma longa)* and other seasonal vegetables as its minor commodities. The produced are also sold in the municipal trading post.

It is owned by F4, an owner-farmer and seller of organic produce. She is also a member of their LGU's farmer-association. She is from a family of farmers. She is a farmer since her childhood. During her childhood, all the family members were needed to help in the farm, she stated that *"the only time you are allowed not to help in the farm was during your exam in the school, all of us were forced to go almost every day in the farm, farming is not a man's work, father said whether you are a girl or a boy, if we want to eat, we need to help in the farm".* After finishing her 3rd year high school, she was forced to stop attending the school as her father needed someone to assist in the farm, her brothers were able to continue and graduate even high school as his father's reason was the man needs to be educated as he will be the foundation of his own family, he will work and provide for his family and the girls will just marry and depend on her husband.

Being left with no choice in the farm but to help and do what their father instructed the female children in the family, all the farm works became more tedious, hard, and laborious for them. She stated: *"I observed my father using compost, he cleared the land, dried and collected all leaves, dug a hole in the ground put the collected leaves in it, layered with soil, check the compost that looks like almost soil and he will plant the vegetables and he keeps doing it every day. That was really tedious and laborious. That was really hard, so when it is now my turn to be the boss of my own farm, I switched to chemicals, it is easy to use, time efficient, and very effective."*

In 2012, F4, together with her sibling and other friends received an invitation to attended and participate the training regarding organic agriculture from the municipal agriculture office of Los Baños. She learned the hazard of using chemicals not just to her consumers but also to her and her family, she then realized why her father keeps doing composting even it was hard, time consuming, and laborious. After the realization, she became one of the active members of the Los Baños Organic Fruits and Vegetable Growers Association (their LGU's farmers association) and in 2013, her farm was fully converted to organic agriculture. Upon knowing the importance of organic agriculture, she became eager to share the knowledge and experiences from training, field trips, and activities in her own farm to her family and her children's school. She specified: *"In organic, yes, it is very hard, laborious, time consuming, and tedious, but now, I realized that in the long run, it will be more beneficial as it is safe not only for me and my children but also for the consumers and the environment. I am at ease that my children, unlike me when I was their age, now knows the important of organic. They are even bragging how to do it in their school as they say that they saw me doing it and it's easy to do."* F4's case of applying what she learned and sharing it to her family and teachers and co-mothers in her children's elementary school, shows the information sharing between farmer and other actors in the community.

Her reason for choosing farming is that farming is life in a sense that it gives her happiness, and it is really their source of income. The reason behind adopting OA is that it is safer because they do not use any chemicals, safer to farmers and consumers, and even to the environment. At a private farm, she learned through demonstration how to do grafting and two branching plants produced via budding. While in a private farm, she learned how to make and apply Botanical Concoctions and Fermented Plant Juice Extracts.

Farmer 5 (F5)

The F5's Farm was established in 2013 with a land area of 1.5 ha planted with fruits, taro, bottled gourd, as its main commodities and vegetables in season as its minor commodities. The farm produce are sold in her small store near the alternate route (going to UPLB).

It is owned by F5, an owner-farmer and seller of organic produce. She is from a family of farmer, finished her elementary education. She is a farmer ever since she was in elementary and has 20 years farming experiences tending her own land. When she was a kid, televisions and other gadgets were not yet famous and her family cannot afford to buy, as a past time and hobby, she used to play along with her siblings and cousins at their farm. She enjoyed being in the farm and kept trying to help even on simple farm activities. She said while reminiscing the past: *"I really enjoyed helping in the farm when I was a kid, for me it seems like I was just playing. I also keep observing my father and old people while they were doing farm activities. I clearly remember, I saw my father compiling farm waste and drying it, then he mixed the dried farm waste with soil and he poured the mixture to the soil after land preparation, the remaining mixture will be applied to the base of fruit trees. Ah! One more, I also learned from him the technique of smoking the branches and leaves of mangoes to help in fruiting and fruit ripening. That's how I started my own farm, I learned and applied different techniques that are available."*

In 2012, she received an invitation to attend and participate to the trainings provided by the municipality. She tried to attend during the first two meetings, but due to time constrain, as she is doing farming in the morning and evening and looking after her store for the whole day, she was not able to manage to continue. But that did not stop her to learn new things, she used to watch agriculture related programs on televisions and asked her neighbors (who attended training) of what they learned and try to apply on her own farm. Her reason when asked why she still needs to update her knowledge is that "*I need to update my knowledge in order to improve my farming skills. We also need to improve our practices in order to improve the quality of our produce."* While on her farm, she sometimes accompanied by her children (if they do not have work) or and her grandchildren who also helped her in simple farm activities.

Her reason for choosing farming is that farming is her life in a sense that she loves doing it like she loves selling her produce. Her reason for adopting OA is that she really believes in the importance for the people to taste safe produced without chemicals. Sometimes customers tend to go back saying it is tastier, and they are sure that it has no chemicals, it is all from natural practices. She learned how to make and use compost, vermicompost, and including choir dust, landscape waste (grass), and eggshells as soil amendments.

Farmer 6 (F6)

Farmer 6, age 57 years old is a native resident of Los Baños, in his childhood he was involved in farming. His father was a driver of a jeepney (the most and main public transportation in the Philippines). When he was around 8-9 years old, every Saturday and/or Sunday he usually joins elder people in planting and harvesting in exchange for some produce. Sometimes, he joins because all his friends need to do farm works first before they can play. At first, he just thought that planting and doing activities in the farm with the elders was a good thing. His parents and siblings were not aware that he was helping in the farm, until he went back home with some vegetables and firewood's (for cooking). His mother was very happy that he has the initiative to learn new things from the elders. When his parents got separated, his mother did laundry works

to feed their family. His older brother then used to accompany him at the farm, which made his mother to feel reassured and relieved that both sons were with the elders and learning farm activities. In addition, he as young boy with his older brother were also able to help their family with the harvested crops and firewood they brought from the farm.

"During that time, I was doing every activity in the farm- plowing to harvesting. Seeding, transplanting, weeding, everything. Because I am still young, I never felt it was hard, as it was like a game to me. Like I was just playing. Mother was very happy as I am learning everything at the farm."

He reminisced the time that he and his friends were helping in the farm like they were just playing. *"It was a fun memory, you will not think we were being forced, elders were not strict, maybe it was a win-win situation for them, we were able to help them while playing and they also can monitor us. They do not need to worry about looking for us because we just stay and play in the farm. Also, after meeting the quota, fruits and some vegetables were eat-all-you-can-harvest."*

Adults can look out or watch over to the kids and can gain additional work force while the kids are busy enjoying and learning different activities in the farm.

When he was 13 years old, during his school break, he decided to plant different vegetables in a vacant lot near their house. He started doing what he learned from the farm to his small garden. When he was in 2nd year high school, their school offered different focus to major for their Technology Livelihood Education (TLE). It includes home economics (cooking, baking, sewing, etc); agriculture (growing of crops and livestock); fishery (marine and aquaculture); and industrial arts (carpentry, welding, electrical, etc). He majored in agriculture. He attended agriculture courses under their TLE subjects every Monday to Friday at 1:00 -4:00 pm from his 3rd and 4th year in high school. Three hours per day were allotted for TLE because of the lecture and practical or hands-on activities.

"When I was in high school, I did part time jobs in an agricultural cooperative as a messenger and janitor. During holidays, I tend my vegetable garden in a vacant lot near our house."

He did not stop doing agriculture as after his high school graduation, he kept planting different vegetables and fruit crops such as eggplant, okra, pineapple, papaya, and moringa mainly for their family's consumption. The excess harvested vegetables were given or sold to neighbors.

After getting married, in 1983, he managed and took care of his wife's farm in another municipality. It was easy for him as he was doing farming almost his whole life. In 1990, he established a small farm near his house in Los Baños, he also got a permanent job in UPLB as administrative aid in the Institute of Plant Breeding. Being exposed to different technologies and innovations UPLB offers, he learned about different propagation and breeding techniques, he also learned technologies on organic agriculture (OA).

At first, he just keeps implementing the propagation techniques in his small farm while planting different fruit trees and vegetables. *"During that time, spraying chemicals was proven effective to give you blemish-free and high yield harvest. People want their food blemish-free, no sign of pest infestation, no holes, no eaten leaf. So, I used chemicals, after sometimes, neighbors were complaining. They told me that they can smell the chemicals and I am poisoning them. I think of solution, I remembered the importance of OA."*

After his neighbors' complaints, he switched to OA, he stopped using chemicals and incorporate different propagation technique with OA. He was also able to sell his produced to his neighbors, blemish-free as he also incorporated "bagging" of the integrated pest management (IPM) system in his farm. He then, realized and accept the importance of OA.

"I want to share the learnings and experiences I have in terms of propagation and vegetable and fruit farming. Growing your own food will help you feed your family. I invited my unemployed cousin to plant vegetables with me or even in containers. I am always excited to perform demonstration of fruit grafting every training that my office conducts. Some of the participants were also asking how I manage my own garden."

As an admin aid, he was able to share his knowledge and experiences to other people in different areas of the Philippines. He also encouraged his unemployed cousin by teaching him how to plant his own food in order for his cousin not to rely to others in terms of his and his family's food. His children on the other hand, were too busy on their own work. He wanted his children to plant their own food too, but they are not interested of doing farming.

"My children are not into agriculture; their passion and interest are more on electronics. I tried to engage them, but they do not have the passion and motivation. Also, my plants are being at sake when I am forcing them. They have heavy hands. They want to work abroad so I just respect their decisions."

His mother supported his decision to engage in agriculture when he was young as his mother knows that he is happy in the farm. In return, he respects and support his children's decision about the path they are choosing for their own lives. For Farmer 6, he will still do agriculture until he can.

"In seven years, maybe I will still plant vegetables and fruits. I will do it until I can. As of now, my eyes are getting bad, and I always get body pains too. I am being restricted to do different activities due to my physical condition. Maybe after my retirement in seven years, I will focus on fruit grafting and sell grafted fruit seedlings."

Being happy while thinking and taking farming activities as games, Farmer 6 chose to experience farming during his childhood days. Knowing that he can provide food for his family, he planted vegetables and fruits in vacant lot near their house. At a young age, he was able to learn and appreciate the importance of farming. Technologies he adopted also shows that it was affected by other people, especially his neighbors. For the sake of his neighbors, he adopted OA. He appreciated and accepted the importance of OA when he started doing it. As he cannot force his children to engage in agriculture, he is still trying his best to disseminate all the knowledge and experiences he has to other people.

Farmer 7 (F7)

She was assigned to be the Barangay Councilor for Education and Agriculture. As an official of their Barangay, she is very active in different activities that will help their community specifically in education and agriculture aspects. Together with other residents, she attended trainings provided by the Municipality and through this, she learned the importance of OA. Currently, she is one of the most active OA practitioners in their community. She keeps persuading other residents to engage in OA by sharing with them all her learnings and experiences.
"Everyone should know the importance of OA, it is safe for health, no chemicals, and safe for the

family especially for my kids, I can also share what I learned to others including the benefits and advantages I have because of this."

"Before, we only believe in different superstition. You know that when you were with elders, they will only tell you not to do this and that because it will lead to something bad or do this to harvest something good without explaining the reason behind. Like the superstition when you will plant a banana. Of course, my ancestors are Aeta, elders said that when you will plant a banana suckers it should be around 10:00-11:00 am and the one planting should feel very full and he/she should not look up so he/she can harvest a chubby, healthy, and beautiful bananas. We only relied on that, but it is not true. Now that I attended different training and seminars, I learned the whys and how's and I need it to share to others."

Because of her experience before about superstition, right after every training or activities, she excitedly shares all the learnings and new experiences not only to her husband but also to other members of the community farm that were not able to join the training (because of the limited number of participants) sometimes with the aid of pamphlets. She is also engaging her children into OA through giving them simple task relating to gardening such as weeding, watering, and harvesting.

"I am letting my children to see every activity in the farm, sometimes they ask questions on how to do certain activity and how to use some technology. From there, I will tell them that they can try to do it, like the vermicomposting. We have it here and when they see, especially my 3 children (as the oldest one was working in a factory before COVID-19) they are very curious how the vermicast (worm's poop) can be harvested and applied to plants as fertilizer. Then, I usually tell them that activities in the farm is not just only about vermicomposting, we also need to water the plants, remove the weeds so we can enjoy the harvest. After all they need to know and understand that the food, we are eating is from farming and they can attend school basically because of the income from farming too."

She is not forcing her children to do farm activities, but she is still making sure that her children will be able to understand the importance of farming and OA. She is also engaging her children by letting them to be with her in the farm, watch her in doing and applying different OA technologies, answering questions, and allowing them do activities that stir-up their curiosity. From these, she was able to involve her children in different OA activities without hearing complaints of tiredness and tediousness from her children.

Since the start of lockdown in the municipality in March 2020 due to COVID-19, Farmer 7 and other farmers were not able to go to the municipal trading post to sell their produce. They did not stop farming and she grabbed the opportunity to spend more time and engage her children including the oldest one in farming.

"Farming is important, during this pandemic, we have something to eat. We do not need to go down to buy food, unlike others. Farming and OA really gives lot of advantages. Also, after engaging in OA, my husband and I were able to buy a small land of our own through a monthly payment."

Knowing all the importance and advantages of OA, she sees herself to do farming especially OA until she became old and until she can. She wishes to be more successful in farming, still she knows the hard work of tending a farm that is why she also keep telling her children to finish their studies. She is not against of the thought that her children will do farming or OA in

the future, but she is worried that if it is not their passion, farming will be just a hard work for them.

Farmer 8 (F8)

Farmer 8, 38 years old, does not have any farming experience until she got married, 14 years ago (2005). She is a full-time housewife from a non-farmer family in Bicol (another province). She was persuaded by Farmer 7 to attend the trainings conducted by the municipality. She joined Los Baños Organic Fruits and Vegetable Growers and LBOFVG Vendor's Association, 2 years ago and is considered as one of the newest recruits.

As a new recruit of the organization, she was conscious about being absent during trainings and meetings conducted by the municipality. As a result, she learned more the importance of OA and fully engaged in OA. She also added and pointed out her main reasons in engaging in OA, as it is *"safe and gives me additional income, I can now help my family even if I am staying at home. This changed my life as the feeling of fulfillment that now I have another role for my family, that I am not just someone at home, but I can also bring income for the family"*. The happiness in her tone mirrored her accomplishment and feelings of fulfillment. She also added that *"I feel really happy- as now I can understand planting and I can contribute to my family. After learning new things, I keep reading my notes again and again and reviewing what I have learned so I can apply it properly and will be able to increase my production"*. She is also sharing her learnings and experiences to her sister, husband, and children.

Farmer 9 (F9)

Farmer 9 who is just 30 years old is also a non-native resident of Los Baños, she moved in the city from Bicol province in 2008. In 2015, she attended trainings in OA provided by the municipality with the thought in her mind that she will be able to help her family.

After learning the importance of OA, she started doing OA with her personal reasons of "*I can get additional income and safe food and production*". She also stated her interest in attending different trainings *"I want to learn more about organic because I am also sharing it to my husband and others".*

For F9, her value increased when she was also able to provide for her family. She thinks that through OA, she was able to be an important family member in their family by not just taking good care of the kids and doing household chores, but also by adding income to the family.

Farmer 10 (F10)

Farmer 10, 46 years old is a native resident of Los Baños. He is from a farm family and grew up while helping in the farm. He took over part of the family's farm and continue to practice OA.

"I am practicing OA ever since, as we do not have money to buy commercial fertilizer and pesticide, after attending to different trainings I learned that doing OA is very important, now, my reason is not because of money but because it is also better for the people".

He stated that now he can confidently say that he is engaging in OA as he now knows the scientific reasons and application of what he is doing. With a confident tone he stated that *"I am using OA practices and upon receiving the trainings, I also share and discuss with others and apply it to my farm".*

Before, even F10 is experienced in doing OA, he is not confident until he learned the technical knowledge or theory behind of what he is practicing. It can be stated that learning the importance of innovation form trusted source makes him do or apply the technology more and became confident about it.

Farmer 11 (F11)

Farmer 11, age 57 years old is a native resident of Los Baños, with 30 plus years of farming experience in work and by learning and doing in his own farm. He is from a family of farmer, who took computer programing in college for two years. Because he was not able to finish his degree, in 1992, he continued to engage in farming. He used to plant aster and azucena (both are ornamental plants) for commercial purposes and vegetables for family consumption.

In 2013, he worked as a farm laborer in a project in UPLB conducting research and trainings on a technology using organic agriculture, he learned more about the importance of OA and start applying it to his farm. Currently, his farm is producing golden rod (an ornamental plant), fruit trees (such as sampalok, durian, guyabano, guava, mango, chico, banana) and vegetables like patola and legumes mainly for family consumption. His farm is an integrated farm which includes livestock as per an interview he stated that "I also have 7 turkeys, around 20 ducks, and 6 goats. It is important to have these livestock as before I received compost from the Municipality (compost from biodegradable and kitchen waste), but of course I cannot just rely on them every time, these livestock now are my source of fertilizer." He also stated that OA is good for his plants.

He is now working as an admin aid in UPLB in another research project. Aside from the technologies he's learning in his work, he also stated that he is getting information through watching agricultural-related TV shows. He also added his solution with some constraints that prevent him from getting information. "Just go personally to the office in Quezon City (QC) to get reading materials, they have everything there. They are also announcing it through their TV program that if a farmer needs reading materials for specific technology, they can get it for free from their main office in QC."

In terms of information sharing, his knowledge and experiences are being shared to some students and other people that are asking assistance from their project. His son was also engaged in agriculture as he is also employed in a project in the university and helping him in their own farm.

Farmer 12 (F12)

Farmer 12, 60 years old, is a native resident of Los Baños, from a farmer family who used to grow plantation crops such as cacao and abaca and different fruit trees such as marang, lanzones, duhat, star apple, durian and rambutan. They also have 20 chickens before. During his childhood, he used to join elders in farm work activities and even in hired-labor farming (where one farm

will need additional labor especially during planting and harvesting). *"I experienced everything in the farm, from land preparation, planting, weeding, fertilizing, until harvesting. I even remember after our harvesting, another farm asked my father's help because they need additional labor, I don't have a choice but to join."*

After graduation from elementary, he was not able to continue his studies as his father needed his help in the farm. In 1978, he worked in Agro-Forestry in UPLB. He learned how to incorporate agriculture and forestry. After the project in Agro-Forestry he was able to get some projects under the College of Agriculture as an admin aid. Assisting in different projects allowed him to learn different technologies including OA which he tried to apply in his small plot. But due to industrialization, lands turned into residential and commercial lots. Problem in terms of space and available land forced him to stop tending his own farm.

He stopped farming his own land, but he is still accepting farm works activities such as weeding, planting, and harvesting once in a while.

Farmer 13 (F13)

Farmer 13 is 49 years old, native resident of Los Baños, his father was engaged in a landscape industry when he is still young. He was 7 years old when he first engaged in agriculture while helping his father grow vegetables for their family consumption and ornamental plants for landscaping. They also have 15 pigs during that time. He took 2 years vocational course to be a technician for refrigerator and air conditioner. In 2010, he established his own farm producing seasonal vegetables for family consumption and ornamental plants for selling. He also got a job in UPLB as administrative aid for some researches. From then, he learned different technologies and learned the importance of OA.

He used to spray remaining chemicals for ornamental plants to his vegetable crops, but upon understanding the importance of OA, he stopped using chemicals, *"vegetables that I am producing is mainly for my family, so I stopped using the remaining chemicals (from my ornamentals which I sell) to my vegetable plants".*

He became busy with his work and their land turns to residential lot, with this situation, he was forced to stop planting. He still accepts contract for farm activities as his sideline or secondary job. Due to problem with land, his interest also changed, "*I am now interested to know more about soil-less media, grafting-as I am doing it when I am free (it is like my hobby), more on how to maintain plants; and hydroponics- as I have available motor to use and I do not have enough space and soil."*

Farmer 14 (F14)

"OA is safe, but I am not doing now for my commercial crops as it was really tedious; harvest became low. But for our own food, we stopped putting synthetic chemicals."

Farmer 14 is 65 years old resident of Bay Laguna, she moved in the city from Samar province (in Visayas) in 1986. She is from a family of farmers and got married to a farmer. With experiences of farming from her childhood, it was not new to her when she and her husband manages their own farm. Her husband is a member of one of the cooperatives in their municipality, where they learned the importance of OA through seminars.

After attending seminars, they learned that OA is important, "*it is important, safe for everyone, so we tried it once, we applied what we learned from the seminar, but it failed and it was really tedious; very tedious, harvest became low, so we go back to conventional"*.

Their age seems to be one of the factors why they opted to stop OA, as both of them are already old, tedious work seems to be a burden for them. In addition, they cannot also afford to lose more income as she is undergoing dialysis twice a week.

Farmer 15 (F15)

"OA is safe and profitable. I started farming as organic. It was not influenced by the govt."

Farmer 15, 45 years old, residing in Kalayaan, Laguna is a university graduate and from a family of non-farmer. Originally, she is from Manila and in 2016 decided to move in Laguna. To farm is her main reason in moving from urban to rural area. She does not have any experience in farming. In her free time, she was attending symposium, from there, she learned the importance of farming. She wants to learn more, so she attended seminars about agriculture and learned the importance of OA. *"In OA, there is no waste, everything will have its use. I, together with my colleague's plan to have a shared farm, an organic agri-tourism farm. It is on its way, we have this Maharlika Organic Agricultural Production Inc., Corp."*

Through the agri-tourism farm they want to share the importance and how to's of OA to other people and younger generation.

Farmer 16 (F16)

"Father was doing OA as the flow of nutrients is just in a cycle, everything can just be found within the farm." But for the shift during her time- farmer's safety and environmentally friendly. For her shift- it was influenced by the Municipal Agriculture Office. "*My sister is one of the active participants in Los Baños organic group."*

Farmer 16 and 17 are siblings, they are native residents of Los Baños. The sister is a member of Los Baños Organic Fruits and Vegetables Association. They are from a farm family and grew up while helping in the farm. During their childhood days, labor in the farm is much in need so all of them were forced to help in the farm. Male family members were encouraged to continue studies and were supported than female members.

Siblings continue to engage in farming. The sister, through the organization, learned different crop production techniques that focuses on OA. Trainings were supported by the municipality. From different trainings and activities (tour, seminar) she also learned the importance of OA. All her learnings are being shared to her brother. Both are doing OA and trying to engage their children in OA.

Farmer 17 (F17)

As a sibling of F16, his father was doing OA for the reason of nutrient cycling. But, for the shift during his time his reason is *"OA is safe, especially for farmer's safety and it is environmentally friendly. My siblings are doing OA and attending trainings, they shared*

information like its importance and how can we get income from it. I tried and now I am also doing it".

Through the influence of his siblings, F17 was also persuaded to engage and do OA.

Farmer 18 (F18)

Farmer 18 is a 53-year-old farmer living in Los Baños, Laguna since 1989. He is from a family of farmers in Cagayan Valley (Region 2 and it is about 480km away from Los Baños). When he was a kid, he used to help in their farm by doing simple works such as weeding, watering, and harvesting. He was 10-11 years old when he first did land preparation to their farm. He stated that *"My father also used to work as a part-time construction worker, mostly on weekends. That time, someone needs to plow the land, but my father was working on the construction, so I did it. I know how to do land preparation as I keep watching my father doing it for years. I was helping in the farm every Saturday at 3 or 4 am."* He helped in their farm until he graduated high school.

After graduating high school, he continued his studies until second year college, but due to financial reason, he stopped attending college. *"When I stopped college, my mom thought that I will join NPA (New People's Army-the military wing of the communist party of the Philippines). NPA was at its height and was known to recruit college students. Instead of going back home after stopping college, my cousin told me to join the Philippine Army. I was enlisted as a reservist with a 6 month training."* After his 6-months training, he went to the national headquarters of the Philippine Army in Fort Bonifacio, Manila to continue his army career but, his mother is against his decision and followed him in Manila.

Due to his mother persistent objection, he gave up his army career. He then tried to find work in Manila, he worked as a construction worker and a security guard. Working in a security agency for years, in 1986 he was assigned in the security force for the National Food Authority (NFA) in Batangas (Region IV). In the same year, he was assigned to guard the library and museum of the Philippine Art Center in Laguna, where no one wants to be assigned due to scary stories about ghost and mythical creatures. *"Everyone was so scared, I am used to it, so there was no problem for me to be assigned there. I did my job properly, one night I saw someone roaming around and asked him what he needs at that night. It turns out that he was the head of the security, and he was eying on me and was impressed by my work. I was then promoted as an OIC and from then, I saw that some of the security guards does not have proper training, so every Sunday I am training them to improve."* Not everyone was happy about his promotion. The upper men who think that one of them should be in the position as they are older and served longer than him, made some ruckus.

In September of 1989, he got married, but because of some issues with his upper men in his work he was not able to get a new contract. He then worked as a bodyguard in Manila for a couple (Filipino and Foreigner) who were doing business that he was not sure of what about. After sometimes, he was involved in the couples' business as they gave him an instruction about the container bans that he need to secure. Someone reported the bans to the national bureau of investigation (NBI) and when he checked the container bans, he saw that his employers were doing illegal business in buying and selling car parts. His employers were caught, and he decided to just go back to Laguna. *"It was a good timing when I went back to Los Baños, Laguna as my brother-in-law had a problem while driving my tricycle. His passenger jumped off from the*

tricycle because he was drunk. I had a good reason to get back my tricycle and from then, I earned for our living expenses."

But due to the increasing demand of his growing family, he decided that he needs to work and earn more. *"In 1993, even I was just doing a backyard gardening, I joined the Samahan ng mga magsasaka sa paanan ng Mt. Makiling (Organization of farmers on the foot of Mt. Makiling) and in 1995, my mother-in-law sold the right of her land to me, and I grabbed that opportunity and started planting fruit trees and vegetables for my family, and some for selling".* He stated that when he was starting agriculture in Los Baños, all the farmer neighbors were using chemicals to spray for their fruits and vegetables. *"I consider myself as an environmentalist, I am against the use of chemicals".*

In 2004, he became the president of their organization and started to encourage the members to stop using chemicals. *"I want to change not only their farming ways, but also on how they live. Most of the mothers here spend the whole day chatting and talking about others' lives. I tried to teach them what I know from my experiences and my own farming systems that I am doing in my farm".* To be more equipped, he attended several training and seminars provided by the Municipal Agriculture Office. He also joined the Los Baños Organic Fruits and Vegetable Growers (LBOFVG) and became the organization's president in 2013-2019.

As a member of the LBOFVG he was able to learn more about the practices on organic agriculture, through training, seminars, field trips, demonstrations, and exhibitions. Learning the practices related to OA, he ranked his interests based on what he thinks the farmer needs the most. *"For me, the farmer needs an everlasting and a permanent composting facility, I am very interested about vermiculture and composting. I hope to have a permanent vermiculture facility. Also, farmers should know how to produce his own inputs such as organic pesticide and fertilizers. They should also know how to use garbage in farming, those plastic containers and rubber wheels can make a good planting container, especially to those mothers that are just chatting the whole day".* Upon learning the importance of OA, he is applying and modifying the technologies he learned and share all to his neighborhood.

In 2019, the municipal mayor, assigned him to be the supervisor of the garbage collection and management of the whole municipality. In the garbage facility, there was a concrete vermiculture area that is now functioning. Because of his busy schedule in the facility, he was not able to manage his own farm. But he is still an active farmer by making sure that all the kitchen waste collected are being fed to the African night crawler worms and the vermicast produced and harvested are being distributed to school gardens. Based on the observations, the garbage facility now looks better than ever, and he also utilizes all the recyclable materials such as water gallons, rubber wheels, and other plastic and bottle containers as a planting container. Together with his team, he is still producing organic inputs in the facility to show and share to farmers in the community.

After his retirement, his goal is to focus more on his own farm and apply all the OA technology he is doing and modifying now. He stated that he tried to engage his children in farming but none of them are eager to do it. "They are only interested in harvesting and eating, they even call their friends to harvest and eat, but when it comes to plowing the land, it is very hard to ask them to do it. But I am still happy that they are enjoying the harvest, that is my main goal in farming to make sure that even if I am gone, they will still have fresh fruits available. I am not expecting them to take over as they know how it's hard to do farming, but at least I am hoping that they will soon realize the importance of fresh and chemical-free harvest for them."

From the interviews and observations with farmer 18, it shows that his concern to people around him is innate and too much. It can be understood from the decision to stop attending army training because he do not want his mother to worry too much about him. Also, when he was working as an OIC in the security sector, he trained other security personnel during his day-off. Furthermore, he attended training and seminars and became an active member and a president of organizations to be more equipped in sharing the knowledge, experiences, technologies, and modified innovations to his farmer neighbors. The goal and reason why he chose OA is for his family, environment, and neighbors.

Farmer 19 (F19)

"OA is mainly for my family's health and consumption. Safety reason"

Farmer 19 is a 70-year-old farmer living in Bay, Laguna since 1968. He is from a family of fishermen in Samar (Region 8, located in eastern Visayas, and it is about 757.5 km away from Bay, Laguna). He used to join his father and uncle in fishing when he was a kid. After high school, his paternal uncle offered him financial support to go to college. When he was 18 years old, his paternal grandmother accompanied him to Laguna to meet his uncle. He then started to attend college using the *"pakinabangan"* system- a system where both actors involved are getting benefits from each other. As his uncle payed for his tuition fees and other school expenses, he was working in the poultry and livestock farm of his uncle. After 2 years in college, he decided to stop studying. That time, his uncle was also supporting his other cousins and his tuition and school expenses were getting expensive. *"I was shy, my uncle already supported me for two years and my school fees were becoming more expensive. Furthermore, it was not just me who he was supporting, he was also supporting my other cousins. I decided to find a full-time job while attending typing lessons in Los Baños."*

After a couple of years, he went back to Samar and got married. He and his wife were having a hard life in Samar, so they decided to go back to Bay, Laguna. Years passed by living in Laguna and his own family starts to grow too. With eight children to feed and send to school, he decided to work in Manila. "I need to provide for my growing family, in 1980 I work in the Municipal Office of Parañaque as a driver mechanic." As a driver mechanic he was assigned to drive and to do mechanical and other related maintenance works for the municipal vehicles. *"The work required me to be always on the go, drive here, there, and everywhere. I drive not only four-wheeled vehicles but sometimes even a firetruck. In addition, I also need to make sure that all the vehicles are in good conditions, so I worked hard but because of the nature of my work, I got a pasma"*. Pasma is related to the spanish word "espasmo" which means spasm. According to Mirasol (2015), pasma comes from the Theory of Humours (hot and cold) in which every object is labeled as hot or cold. There must be a balance and synergy between hot and cold for our body to be healthy and well. The imbalance will lead to a disease like pasma.

"One day, while I was driving a fire truck, after we extinguished the fire and everyone was preparing to go back to the office, I cannot move my knees because of too much pasma. Everyone was worried, the mayor sent me to the hospital. When I was trying to move an inch, it hurt so much." He was confined for several days, and he requested to be sent back to Laguna. He was then admitted in a hospital in Los Baños. The Dr. gave him medicine and he recovered fast. *"After my recovery, I went back to work in Paranaque, but in less than a month, my knees hurt so much, I was sent back again in Laguna, medicine was not working, I cannot move, I was bedridden for*

months. My wife took great care of me and the children all by herself." She was able to feed us by selling fish and vegetables that she planted and harvested". This incident changed his life, after his full recovery, he decided to stay in Laguna and engaged in farming. In addition, he stated that the air in Laguna is fresh while in Manila it is very polluted. *"Deciding to settle in Laguna and do farming is a big decision for me and my family, especially that I do not have knowledge or know-hows on planting. But for my health and the potential I saw in farming, it was worth risk taking. Also, I will be able to live with my family and will be able to breath fresh air."*

Even though, he does not know anything about farming, he started to plant vegetables and other crops. He faced a lot of problems and failures especially when he was starting. *"It was hard to start without knowing anything about farming, I asked some old family members and neighbors about their farming experiences, I attended different training and seminars conducted by the municipality of Bay, but everything always vary. That's when I decided to try what I learned first in a small plot before doing or applying it for the whole crops."*

Asking those who have experienced and grabbing the chance to gain farming knowledge by attending training and seminars are some ways of knowledge and information sharing that somewhat worked for farmer 19. With this set-up, he also learned to try it in a small plot and do his own trials or test before applying specific technique or technology in the whole farm. He succeeded in farming as he was able to provide for his family. In time, even his uncle's farming land was lent to him when the family migrated to America. From 0.5 ha starting land, he expanded his farm to 5.0 ha in 2008.

"There is no hunger in agriculture, especially if you are hardworking. In agriculture, I was able to feed and raised my family, my 8 children all graduated from college, it was all because of farming. In the future, I also want to buy the whole land that I am farming. I will do farming until I die."

Farming does not only provide him financial stability but also a good relationship with his neighbors and other farmers. Some farmer neighbors persuaded him to join their group so they can help each other tend the shared land. It was advantageous for him because that time he was new in farming. He can do farming while learning from the neighbor farmers who were considered experienced in farming. But not all neighbors are kind and giving. *"Some of my neighbors are always doing a free-ride, they are shameless as right after harvesting, they will choose the best crop and bring it home, I keep repeating my offer to them to join me in farming, or that we can have a community farm, but they are only good in demanding the next crop to be planted. Other farmer friends got easily annoyed and keep telling me not to be that kind to neighbors. This is always one of the topics in our farmer's group discussion. Farmers in my area are gathering at least once a week for an exchange of ideas and experiences through a drink."* Spouse of Farmer 19 stated that there was a time that Farmer 19 did not accompany her to a special event or gathering as he cannot be absent to the farmers' weekly "drinking session".

Through the attendance to training and seminars he also learned the importance of organic agriculture. He applied what he learned about OA, unfortunately the first time they implemented it, their income dropped more than half and was forced to go back to conventional for their commercial production. But because he learned the importance of OA he continues and allotted a small land to do OA for the sake of his family's food consumption. In addition, he is planning to convert the farm in OA gradually and to share the importance of OA to others and younger generation,

From the training and seminars, he rated the OA fertilizer and pesticide making and application as the most interesting and needed technology as he faced several problems about pests and diseases. *"Before we attended training about OA, I have learned it from the elderly, it was what they were doing before the natural way of farming, using only the available materials within the farm as an input. No chemicals."* Aside from the problems about pest and diseases, he also faced a lot of challenges in terms of typhoon. Through time and support of his neighbor farmers he was able to overcome the challenges by always checking the weather forecast and adjusting their planting or harvesting schedule.

For the ways on how he is getting information and knowledge, he rated the farmer neighbors' gathering as the most effective way of information sharing, followed by exhibitions, training/seminars, and then field visit.

Farmer 19 knew and acknowledged his shortcomings in terms of farming, faced several problems and challenges, but it did not stop him from pursuing farming. He tried what he thinks will be better in his farm. He was very motivated for the sake of his family and his health -to continue to support his family. Based on his transcripts during the interview, it can be concluded that learning from the elders and other farmers who are more knowledgeable and experienced farming firsthand is an effective information and knowledge sharing for him. Moreover, aside from financial success, he also gained a good relationship with his neighbors and neighbor farmers.

Farmer 20 (F20)

F20 is a 41-year-old farmer native and living in Los Baños, Laguna. He is married and has three children. He is a high school graduate and currently work as an administrative aid in an agricultural government funded project-based at the University of the Philippines Los Baños (UPLB). As an administrative aid of the project, his main work includes maintenance of a demonstration garden in the university, assist in different trainings through demonstration and implementation of different gardens and exhibitions nationwide.

His father and paternal grandfather were doing agriculture for their family consumption and focused on planting right after their retirement. His father was a rice and vegetable farmer before getting a full-time job when he was still young, and he used to help in the field. His paternal grandfather used to work at the college of forestry, UPLB and his father was a driver-mechanic at the tourism office of Mt. Mariang Makiling. Even having their subsistence farm and experience in farming when he was young, he started engaging in agriculture when he got married at the age of 16 years old. His father-in-law owns an ornamental farm and were doing landscaping.

"I got married when I was 16, maybe too young, so I wanted to show them that I can support my own family. I wanted to prove myself. I worked in the ornamental garden of my father-in-law. I was able to learn more about gardening."

Before marrying, he was living with his family on the foot of Mt. Makiling and from there he learned some basic organic practices. Their family was planting and producing different vegetables such as moringa, papaya, okra, string beans and Baguio beans. In addition, they were raising goats and around 150 pieces of 45-days chicken for selling and their own consumption.

"In the mountainous area dried and decomposed leaves are used as fertilizer. Grandfather and father did that and taught me how to utilize compost as source of fertilizer. I can use these

knowledges in my work and own vegetable garden now. To add, I also learned how to cultivate mushroom."

After marrying his wife, they moved in a different barangay within the municipality, and he started working in his father-in-law's landscape garden for more than 10 years. In 2014, he got a job at UPLB and was able to incorporate all the learnings from his father, grandfather, and father-in-law. In his own garden he is growing camote, kangkong, eggplant, papaya, chili, blue turnip, and other leafy vegetables without chemicals. Produced are being consumed by his family and his neighbors.

"Basically, harvests are for my family's consumption and maybe I can sell the excess, but my neighbors are asking me for some harvests. As harvests are for my family's consumption, I am not putting chemicals and I am just using kitchen waste as a compost fertilizer. I usually do water and land cultivation and composting as my farm practices."

As an administrative aid in UPLB he was also able to learn different technologies related to OA. He was able to attend three trainings as a participant and now assisting in trainings to different areas nationwide to implement garden following the science of OA.

He is very interested in crop production part of OA where he learned how to sow seeds to seedlings without being infested by different pests. In addition, he also ranked the vermicomposting technology and vermin tea making as first in his interest as part of the crop production. Crop propagation (specifically marcotting and grafting) ranked second for his interest in the information he is receiving. And the third in rank is learning the design and proper spacing of vegetables. He is getting information from his work and training he is attending. In addition, he is utilizing the internet to search additional information or technologies he is interested of.

"It is rare for me to received printed materials, so I usually search what I am interested of in the internet. Using youtube to search what I want is very effective for me as I can just input the topic I want to know, and I can easily try it by copying it step-by-step. Like for example, I just search what I need to know about grafting or on rooting, on how I can do grafting, and make my plants to root. Sometimes, I just utilized the knowledge I was accustomed to."

"I am trying the information or technology I am receiving until I can become successful to it. I want to learn more technology. I want to learn about grafting tomato and eggplant. That amazed me so much that it was possible, also with that I can entice my children and neighbors and visitors to engage in agriculture."

Being updated to different agricultural technology gave positive benefits to F20. He stated that it is helping him to gain additional knowledge by learning a lot and he is happy for that.

"I am gaining new knowledge; I am learning a lot and I am happy to what I am doing. The information I am getting matches my needs and interest, during harvesting it is a big help as I can also sell some.

The information and technology he is receiving matches to his needs and interest in terms of agriculture as his harvest increased with the use of the technologies he learned.

"My desire and like is to plant. I am also engaging my children especially my son by doing weeding, land preparation, seeding, or just by sweeping in the garden

Farmer 21 (F21)

Farmer 21 is a 55-year-old native resident of his municipality. Married and has 3 children. He is a high school graduate and has 40 years of farming experience. He learned his farming knowledge from his father and currently he belongs to the farmers' association of their municipalities. He owns and farms a 1.5 ha land in with Initially, rice and vegetables were the main crops, and he has a carabao to help him in land preparation. His reason in doing agriculture is for their family's source of income.

In 2020, the farm size is still 1.5 ha producing mainly vegetables such as squash, pechay, and upo (gourd/luffa). The farm has carabao, cow, goats, and pigs. Carabao is still mainly used for land preparation. F21 is doing integrated farming.

"I inherited my farm from my parents that is the main reason why I chose agriculture. I started farming through my parents' guidance. I did not attend any agricultural school, but my parents taught me how to farm."

"I attended five trainings so that I can learn more. I experienced problems in farming especially diseases of plants. I asked questions to those who knows or an expert for solutions."

"We are 5 sons in our family, we were helping our father in the farm when we were kids, we do farm activities such as land preparation with the help of carabao and planting water melon, rice, bottle gourd, etc., five of us were helping each other to assist in the farm works."

"I learned OA in my organization. I tried it before, even I know the importance of OA, I cannot do it as it is too laborious and tedious."

"I will do farming until I am alive. In time these lands will be converted to subdivisions. My sons are all lazy and I cannot depend on them helping in the farm. My wife and I just want them to finish their studies and have a good job in the future. The job that they will be staying in an airconditioned room. Not to experienced back-breaking work."

Farmer 22 (F22)

Farmer 22 is a 44-year-old farmer, native in Cabuyao, Laguna. He is from a family of farmer and has 20 years of experience in tending his own farm. He learned farming from his farmer parents. Before, they were farming 4 ha of land but due to conversion of farming lands to commercial lots, they sold 3 ha and now only cultivating the remaining 1 ha of land. They usually plant bottle gourd and other vegetables and rice for commercial production. There is no livestock in the farm. They are selling their produce per kilo and through a trader. He gets information about farming from his parents and farmer-neighbors.

Ranking the effectiveness and source of information, F22 answered *"First is from my parents. Before, it was always. I used to ask and get information about farming to my parents, because I learned farming from them. Then, to my god father (wedding) as he is the one who engaged me to farming again. And the third one is my farmer-neighbors with whom I can frequently ask as I am always with them, and they are more knowledgeable (in farming)."*

"After receiving the information, I usually try it and I still want to know more about new technologies to make my farm more developed. One of the benefits of being updated to new technologies is that my harvest will increase."

"Sometimes, I cannot adopt other information or innovation because it is hard to do. And sometimes, I cannot understand as I am not a member of farmers' groups that are attending seminars".

"I engaged in agriculture because I was not able to finish my studies, I cannot find job and my god father (wedding) introduced me again in farming."

"I learned about OA from my farmer-neighbors and even knowing the importance of it, I cannot continue to adopt the technology as it is hard for me to do."

"I can see myself in farming until I still have my land to farm, and I hope that our life will be better, and I will be able to send my child to school until he finished his studies."

F22 has low morale and low self-esteemed (*mababa ang tingin sa sarili*) as he was not able to finish his studies (grade 3) he asked older farmer-neighbors or his parents for advice in terms of farming. This is also the strong motivation for him to send his child to school and to support his child until the child finish his studies. As he does not want his son to be like him- physically working hard in the farm.

Farmer 23 (F23)

F23 is a 58-year-old farmer, a native resident of Cabuyao City. He learned farming from his father and through attending seminars and training. He belongs to their barangay's Agriculture and Fisheries council, and he is tilling 1.5 ha land which mainly produces watermelon, squash, and other vegetables. Initially, his farm owns duck /itik and pigs. He is selling their produce through traders. And currently practicing conventional agriculture.

His interests when ranked shows that information on pesticide and fertilizer management from experts- DA MAO helps him to manage the usual problems (which is pest in his farm. Followed by modern agricultural equipment and machineries from DA MAO too that he hopes to lessen his work and helped him develop his farm. The third one is the crop production which he learned from his parents as he stated that a farmer should know how to plant and manage crop properly and not just planting.

Consultations with agricultural technicians ranked the most effective information sharing (face-to-face) for F23. This is because agricultural technicians can easily answer his concerns about specific problems in his farm. This is followed by training/seminar as the information sources are the experts and they know everything about they are sharing. The third is the information from family members especially from his parents as they are the first ones to teach him about farming.

Whenever he receives information *"I am studying about it, and I am trying if it is effective. I want to learn new technology that will help me increase my harvest. To have a good profit."*

"In my own opinion, the information I am getting sometimes is not matching my interests and needs because the technology cannot be applied to my farm and my farm is totally different from their experimental area."

"I took over the farm from my parents that is why I continue farming."

"I started my own farm by asking my parents and old people who are knowledgeable and experienced in farming. I attended training about 5 times to have an additional knowledge about modern agriculture."

"OA is safe, but it is laborious, tedious, and profit is low. I learned its importance in seminar."

"I am engaging my children in farming so that in the future they will continue it. I can see myself farming until I have farm to plow, and I hope that my farm will be more prosperous".

Farmer 24 (F24)

F24 is a 38-year-old farmer, native resident of Cabuyao city. He learned farming from his father and in 2010 he took over the 3-ha farm; now having 10 years of farming experiences tending his own farm.

He is also a farmer-vendor and a tricycle driver.

He ranked his learnings as first information from his father about crop production followed by pesticide and fertilizer management from his father too. These on how to plant, how to produce seedlings (pagpapadapog); and how and what to spray for pest and what fertilizer to use. The third one is from da-Mao about organic agriculture practices, where he learned the importance of safe production and the needs to utilize what he has in the farm as input (fertilizer and pesticide)

Usually, he is asking his father about farm information as his father is experienced farmer. Followed by attendance to seminar or training conducted by DA -MAO to learn new knowledge. He sometimes utilized YouTube if he wants to learn something as it can give him a step by step procedure.

After learning information or new practices, he usually tries it. He wants to learn new technology to help develop his farm. He is benefiting from being updated to different agricultural technologies by answering and providing solutions to his problems in the farm.

"The organic agriculture is hard to adopt in big rice and vegetable farms."

"I tried but now I am not doing OA as it is very laborious and give small profit."

"Still, I am engaging my children in farm activities as they will be the ones who will continue farming in the future. But I will do farming as long as I can or as long as the time, we can sell the land."

Farmer 25 (F25)

F25 is a 45-year-old farmer native resident of Cabuyao city. He learned farming from his parents and has 25 years of farming experiences tending his own 1.8 ha farm. He is also a fisherman. A member of an agricultural organization in their municipality. Growing rice and different vegetables for family consumption and for selling. He was able to buy additional 2ha land in Calamba City in 2017. He tried doing OA but discontinued because it was very laborious for him.

He first gets information about agriculture from DA-MAO, farmer neighbors and his father mainly focusing on proper crop production techniques and effective practices followed by

pesticide and fertilizer management from DA-MAO and his farmer neighbors as pests are the main problems in his farm.

He usually asks his father about farm information as his father is an experienced farmer and he already experienced everything in the farm. Followed by asking his neighbor farmers as they almost have the same problems, and they know what to do and they are always available for him. And the third is by sometimes attending to seminar or training conducted by DA -MAO as they are not always available.

After learning information or new practices he usually tries it if it is effective, he will use it, if not, he will stop doing it. He wants to learn technology that will help him to increase his profit.

"Sometimes the information I am getting is not doable in my farm."

"I am doing farming as I grew up in a farm. I learned the importance of OA and tried but it is too hard to do and laborious."

"I am still engaging my children in farming so they know and will understand the importance of farming, which farming is the reason why we can still eat, and we have the life we have right now. And in the future, if they will not be able to get a good job, at least they will know how to plant, and they can survive."

Farmer 26 (F 26)

F26 is a 72-year-old farmer, native resident of Cabuyao City, with a high school level of education, and has 50 years of farming experience. He first learned about farming from his parents and learned more about it through attending seminars. He belongs to an agricultural organization of the province (Samahan ng Magsasaka sa Laguna-SAMALAG). With his 1.2 ha land, farmer 26 is practicing organic agriculture since early '90s even before Laguna adopted RA 10068 also known as Organic Agriculture Act of 2010. His main reason for doing OA is for the health of farmers, consumers, and the environment. The farm originally produced rice and vegetables for family consumption and selling. They had cow and carabao. Recently, the farm produced squash, gourd, watermelon, pechay, and rice.

He learned more on crop production from his parents and the Agricultural Training Institute (ATI) as for farmer 26, crop production is important. Pesticide and fertilizer management from ATI ranked 2nd as OA inputs are important to know if a farmer is practicing organic agriculture. The third information is about the importance of nutrient cycle (zero-waste) and fertilizer management as Laguna adopted organic agriculture and it is mainly for health reasons.

Information getting from his family members ranked first as he learned farming from them. Attendance to seminars and training ranked 2nd for its effectiveness as he is getting additional knowledge from it. The third one is from his farmer neighbors who are also members of their organization as he can get diverse knowledge from the opinions of his farmer-neighbors.

Upon receiving information, F26 always reread and study it. He wants to learn more about processing because every time they are harvesting vegetables too much, it usually spoiled.

He is getting additional and new knowledge when he is updated to technologies in agriculture.

F26 opinion about the information sharing if it answers their needs and interest *"No, the support from the government to farmers is not enough".*

"I chose agriculture because this is the job that suits my capabilities and I also got it from my parents. I was able to attend training and seminars for 4 times as it gives me additional knowledge."

"I am doing OA for the health benefits to farmers, consumers, and the environment; also, to bring back the "natural richness" or nutrients of the soil."

"I am engaging my family and children in doing OA so that there will be young farmers. I can see myself farming until I am living, and my plan is that the farmland will still be available as I disagree of the conversion of lands from farmlands especially now that we already have water source."

Farmer 27 (F27)

F27 is a 64-year-old farmer, native resident of his municipality. He finished elementary education and had 40 years farming experience. He learned farming from his family and initially planting rice for commercial production. They had cows. He started doing OA when he got his own family, and the main reason is due to poverty. Aside from rice, they are now producing different vegetables such as pechay, squash, and bottle gourd. He usually sells his produce through traders.

"All the information and knowledge about farming are from my parents and other older farmers as they are all well experienced in farming and they all know what they are doing and, they already undergo with the same situation. In addition, I am already comfortable and at ease of the old practices."

F 27 tends to get information to the people he truly trusts the most. In addition, because he trusts them too much, he applies all his learnings from trusted elders on his own farm and he is already comfortable and contented of what he is doing on his farm.

"After receiving information or knowledge I usually apply it as soon as possible as part of my crop management practices. I do not think that I need to learn new technologies as I am already used to what I am doing or the old practices that I am doing in taking care of my plants."

As he values the learnings from his parents, he also wanted his children to participate in some farm activities. However, his children are not interested and the situation of converting farmlands to commercial land are increasing. But he as a farmer himself, will continue farming until he can.

"I chose and started agriculture as my family influenced me to. I am doing organic agriculture as it is effective, and I learned it from my parents. I wanted to engage my children in farming, but they do not want to, in addition, our area might be also converted into a subdivision. But still, I can see myself farming until I became old, and I will continue it until I can."

Farmer 28 (F28)

F28 is a 63-year-old farmer who is also a native resident of his municipality. He finished elementary education and had 40 years farming experience. He learned farming from his family and initially only producing rice for commercial purpose. They had cows.

He started practicing organic agriculture in 2010 and now producing rice and vegetables by doing traditional method of farming including composting. He is selling his produced through traders.

He learned crop production and composting from his parents. Being the first one to get his information, he ranked his family members especially his parents as the first and most effective source of information in agriculture followed by his neighbor farmers which are also his relatives.

After receiving information, he thinks hard if it should be applied to his farm. He is already satisfied with what he is doing and wished nothing to learned more.

"I am doing organic agriculture as it was the first technology I learned from my parents. I can see myself farming until I get old, and I will continue farming until I can."

Farmer 29 (F29)

Is a 55-year-old farmer, native resident of his municipality. An elementary graduate and has 25 years of farming experience. He learned farming form his father. Their 1.2 ha farm initially produced rice with the help of their carabao. He is doing organic in 25 years mainly to earn profit. His family influenced him in doing organic agriculture as it is the source of living of each family member.

Nowadays, their farm is producing rice and vegetables including pechay, squash, and sitao. They are also raising chickens and ducks. They are selling their produce in the market per sack for rice and per kilo for their vegetables.

He learned all the practices in crop production and pesticide and fertilizer management including composting from his parents. For this reason, he ranked family members especially his parents and older farmer relatives as the first, most, and only effective information source.

After learning or receiving information, he usually applies it in his crop management. He is contented of what he already learned and wants nothing else.

"I learned everything about crop production only through my experiences."

"I chose agriculture because it is the main source of living for my family, my parents also taught us how to do farming and from my experiences I was able to do it too."

"I am doing organic agriculture as it is the first practice that I learned, and I learned all about it from my father."

"I am engaging my children in doing organic agriculture so they will also learn how to do it. I can see myself doing agriculture until I became old and I will still continue practicing it because I am used to it and this is the work that I am doing ever since and the source of our living."

Farmer 30 (F30)

F30 is a 41-year-old farmer, from a non-farmer family in Bicol Region. In 2001, together with his family he migrated in Los Baños, Laguna and started farming. Even from a non-farmer family,

F30 has the passion for agriculture. He started tending and growing papaya and banana mainly for selling from 2001- 2014. He then ventures to organic agriculture in 2015 and now producing camote, taro, okra, rambutan, chili pepper, okra, Chinese pechay, coriander.

"I do not have background on agriculture, but I really like planting. In 2001, when I moved to Los Baños, my landowner helped me to attend a16-weeks training. Both of us (pertaining to his landowner) are very fond of plants and he offered me a vocational course in agriculture. From then, I learned crop production and started my small farm."

"Before planting was just my hobby, but once you put so much effort on it, it can be your livelihood."

In 2015, he fully converted to OA and included vegetables in his crops to sell. With the assistance of the municipal agriculture office, he was able to fully practiced OA. Information on agriculture was first learned from the training he attended, but OA, was mainly from the training and seminars conducted by different institutions through the Department of Agriculture-Municipal Agriculture Office (DA-MAO).

"Ranking the technologies, the first one is the fertilizer and pest and disease management from DA, as these are very hard to prepare, and it takes a month to be effective. That is why I usually focus on these. Second, is related to the first one but focused on vermicast and the knowledge about the enemy and friends of plants, because even kids can do these and apply. The third one is crop production mainly on intercropping. I got and learned all from DA."

Institutions that are being coordinated and in partnership with DA-MAO includes: UPLB, PCAARRD, and BPI. These institutions are also providing printed materials. But as per the interview from F30, they do not usually get any printed materials from them and only from DA-MAO.

"We only got brochure from DA-MAO, and for me it is not effective as we already know what is printed on it. They usually asked us what we learned, and from then, I think, they pattern the brochure. I was hoping that they will add more, or even they should highlight the important ones so we will have an interest to read it. But of course, we are still getting the brochure for the other members who were not able to attend the training or seminar."

As a farmer from a non-farmer family, F30 is dependent on the information he can get from the institution and other sources he thinks that might help him. Ranking the effectiveness of the information he is getting he chose training/seminars from the Municipal Agriculture Office (MAO) as the most effective, followed by field visits, then the information from farmer-neighbors.

"Before, though it was occasionally, I used to listen to "Kabukiran" an agricultural radio show. For me, training/ seminars (though, only attended quarterly per year) from DA-MAO is the most effective information sharing. This is because we can focus, and we can really learn specific technology. Next is the field visits that were also coordinated through DA-MAO as we can really see other farmers that are successful. It motivates us. The third is our community farmers or farmer-neighbors, of course here in our community we are learning from each other, we can share our knowledge to other farmers."

Upon learning innovation, F30 usually do a small experiment on his farm by testing the effectiveness of innovation. *"I usually test or try to apply what I learned in a small area, it is like an experiment if it is effective or not on my plot."*

For F30, testing what he learned and continuous learning is very important not only for his farm but more importantly for other people specifically for the next generation and for the people who trust him.

"I still want to learn a lot of things, new technologies from other countries too. So, we know, we are sure, and it will be easy for us to share to the next generation. Being updated to new technologies in agriculture gave me the confidence that I will not cause harm to others. Also, I gain other farmers' trust."

F30 knows what the problem in farming is, *"Knowledge is already there, inputs such as seeds and fertilizers are available and accessible but there is no sustainability, that is the first hindrance in adopting and continuing the (OA) technology."*

"OA is a hobby for me, I like it. That's how I started engaging myself in agriculture. I attended maybe 20+ training and seminars, faced lots of problems such as pest and diseases, weather disturbances, and others, but I still do agriculture. I am doing OA because it is safe. I am engaging my children because they can also benefit from this."

"My children at first were not interested on agriculture, but through time when they were exposed to it when I am planting and doing farm activities, they got curious and interested. They start asking questions on how to do each activity and started helping me too. Willingness and interest are needed. You should not force them to learn and do something because they will not learn it. They might do it but being force that is why leading to quitting and lack of sustainability."

Farmer 30 understand that sustainability or continuing adoption of technology will be hard to reach if the farmers are not interest and willing to do it. He also recognizes the fact that some farmers are being forced to adopt technology but due to lack of interest and willingness they will also reject the technology.

Appendix 3. Guide Questionnaires

TOKYO UNIVERSITY OF AGRICULTURE

Graduate School of Agriculture, Department of Agribusiness Management
1-1-1 Sakuragaoka, Setagaya, Tokyo 156-8502 Japan
http://www.nodai.ac.jp

Greetings!

I am Eliza C. Aquino, a PhD student under the Department of Agribusiness Management, Tokyo University of Agriculture (Tokyo NODAI), Tokyo, Japan. I am currently doing my research entitled *"Interpreting the Attitude and Behavior of Farmers and its Effect in Information Sharing".* The study hopes to properly interpret farmers as the core actor or practitioner in agriculture. The result will give us information on the ground to provide appropriate technologies, support, policies, and programs for the farmers. In addition, will also leads to persuasion of younger generations to engage in farming. Thus, this study will be one of the possible solutions to achieve agricultural sustainability.

In order to do this research, I am humbly asking your cooperation in this survey. I am thankful for your kindness to answer the following questions. I can ensure you that the information provided will not be used anywhere else. If you are interested in the result of this research, please do not hesitate to contact me by email:*elizacateloaquino@gmail.com or 46719001@nodai.ac.jp*

Thank you very much and God Bless!

Eliza C. Aquino

_____

Sample Number: _____
Brgy, Municipality: _____

Directions: Please answer the following questions honestly and completely.

I. Farmer's Profile

Name (Optional): _____Age: ____

Gender: ____ Marital Status: _____

Number of households (including yourself): _____

Educational Attainment:_____

Main Job and Monthly Income: _____

Secondary Job and Monthly Income: _____

Farming Experience: _____

Organization/Affiliation: _____

Mother tongue: _____

Language(s) written and spoken: _____

II. Family and Farming History

Years residing in the municipality? _____

When and from where did the family come to the municipality? _____

With what farm size did the family start farming? _____

When did the family expand the farm? _____

Type of farm: _____

Initial Crops tend in the farm: _____

Initial Livestock in the farm: _____

When did they start organic farming? Why? _____

Indicate major reasons for shift_____

Specify whether influenced by government, NGO or others (specify)

III. Farm's Profile

Name of the Farm: _____

Location: _____

Land area (in ha):_____ Established since: _____

Number & Type of Housing/ Buildings in the farm: _____

Number & Type of Vehicle owned: _____

Vegetables/Crops tend in the farm: _____

Livestock in the farm: _____

Marketing of Produce (livelihood sources) _____

Farm Management (farm practices) _____

Social Capital (cooperatives, linkages) _____

Technical/ Technological/ Practical Innovations developed/ modified/ adopted:

_____

IV. Information Sharing

What are the contents of the information you are getting?

Content	Source	Rank your interest	Reason for choosing
Crop Production			
Livestock Raising			
Marketing			
Pesticide/Fertilizer App			
Post-Harvest Handling			
Aquaculture			
OA technologies (specify)			
Others (specify)			

What are the main ways for you to get information about agriculture?

a. Printed Materials

Printed Materials	Source	Frequency of using	Rank the effectiveness	Reason for choosing
Newspaper				
Books				
Leaflets				
Magazines				
Posters				
Training Notes				
Brochures				
Billboard				
Others (please specify)				

b. Electronic Source

Electronic Source	Source	Frequency of using	Rank the effectiveness	Reason for choosing
Radio Broadcast				
TV				
Cellphone				
Social Media (FB, YouTube, etc.)				
Official Webpage				
Others (please specify)				

c. Face-to-Face

Face-to-Face	Source	Frequency of using	Rank the effectiveness	Reason for choosing
Training/ Seminar				
Specialist visiting				
Family Members				
School training				
Field Visits				
Exhibitions				
Community gathering				
Demonstration				
Farmers, Neighbor				
Farm shops				
Others (please specify)				

After receiving the information, what do you usually do? _____

_____

Do you wish to learn a specific technology? If yes, what would it be? _____

_____

_____

Why?_____

_____

What benefits do you get from being updated about agricultural technologies through information sharing? _____

_____

_____

Do you think the information disseminated really answers your needs and interest? Why? _____

_____

Are there constraints or hindrances why you cannot get enough information regarding agriculture? _____What are these constraints? _____

_____

How do you think these constraints will be answered? _____

_____

THANK YOU VERY MUCH!

Guide Questions: Life History

Why did you choose farming? How did you start farming?

Do you have experiences on farming? Did you attend agricultural schools?

For how many years? Why? Did you ever attend trainings regarding agriculture? How many times? Why? Have you ever faced any problems or challenges in your farm career? What are those and how did you resolve it? Are you practicing Organic Agriculture? Why? Where did you learn about OA? Are you involving or engaging your family members in farm activities? Why? Until when do you see yourself in farming? What are your plans? Add: Do you own the land or renting it? From where you usually get the information or technologies you are using in your farm?

Appendix 4. List of topics or technologies from different sources

List of Technologies/Information	Sources of Information and Technology									
	Public					Private		Personal		
	Institution 1	Institution 2	Institution 3	Institution 4	Institution 5	Company	Farms	Family	Neighbors	Association
Definition, scope, benefits	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Productive Vegetable Production in Organic Way	o	o	o	o	o	o	o	o	o	o
A Productive Farming	o	o	o	o	o	o	o	o	o	o
Definition of OA based on IFOAM	o	o	o	o	o	o	o	o	o	o
Organic vs. Conventional	o	o	o	o	o	o	o	o	o	o
Reasons of doing OA	o	o	o	o	o	o	o	o	o	o
OA/ Farm History, OA Development and Trends	**O**	**O**	**O**	**O**	**O**	**X**	**O**	**O**	**O**	**O**
Organic History	o	o	o	o	o	x	o	o	o	o
Old and New Production System	o	o	o	o	o	o	o	o	o	o
Distribution of all OA in 2014 (FiBL, 2016)	o	o	o	o	o	x	o	x	x	x
Philippine National Standard on OA 2016	o	o	o	o	o	x	o	x	x	o
History and Success of their Organic farm	x	x	x	x	x	o	o	o	o	o
Organic Veg. Production (Zero-Waste Farming)	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Planting	O	O	O	O	O	O	O	O	O	O
Seed Selection	o	o	o	o	o	o	o	o	o	o
Seed bed Preparation	o	o	o	o	o	o	o	o	o	o
Sowing	o	o	o	o	o	o	o	o	o	o
Transplanting	o	o	o	o	o	o	o	o	o	o
Fencing	o	o	o	o	o	o	o	o	o	o
Land Preparation	o	o	o	o	o	o	o	o	o	o

Transplanting	o	o	o	o	o	o	o	o	o	o
Maintenance	O	O	O	O	O	O	O	O	O	O
Diseases of Vegetables	o	o	o	o	o	o	o	o	o	o
Disease Management	o	o	o	o	o	o	o	o	o	o
Natural/ Botanical Pesticides	o	o	o	o	o	o	o	o	o	o
Integrated Pest Management (IPM)	o	o	o	o	o	o	o	o	o	o
Weed Management	o	o	o	o	o	o	o	o	o	o
Mulching	o	o	o	o	o	o	o	o	o	o
Irrigation, Drainage and Water Treatments	O	O	O	O	O	O	O	O	O	O
Irrigation/ Watering	o	o	o	o	o	o	o	o	o	o
Drainage	o	o	o	o	o	o	o	o	o	o
Water Treatment for ponds, rivers and lakes	x	x	x	x	x	o	o	x	x	o
Nutrient management (Production of Natural Farm Inputs-Fertilizers)	O	O	O	O	O	O	O	O	O	O
Regular Compost	o	o	o	o	o	o	o	o	o	o
Active Compost (Effective Microorganism)	o	o	o	o	o	o	o	o	o	o
Vermi Compost	o	o	o	o	o	o	o	o	o	o
Fermented Plant Juice Extracts	o	o	o	o	o	o	o	o	o	o
Fermented Fruit Juice Extracts	o	o	o	o	o	o	o	o	o	o
Fish Amino Acid/ Fish Emulsion Concentrate	o	o	o	o	o	o	o	o	o	o
Water-soluble calcium from eggshells and animal bones	o	o	o	o	o	o	o	o	o	o
Plant Breeding	**O**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Introduction	O	X	X	X	X	X	X	X	X	X
Why Organic Breeding and Seed Production	o	x	x	x	x	x	x	x	x	x
Importance of native and indigenous plants	o	o	x	o	o	o	o	x	x	x
World's Top Seed Companies	o	x	x	x	x	o	x	x	x	x
Industrial Farm Inputs	o	x	x	x	x	x	x	x	x	x
GMO and Pesticide Development Cost	o	x	x	x	x	x	x	x	x	x
Floral biology and genetics	O	X	X	X	X	X	X	X	X	X
Pollination Behavior and Crop Families	o	x	x	x	x	x	x	x	x	x

Genetic Jargon	o	x	x	x	x	x	x	x	x	x
Variety development process	O	X	X	X	X	X	X	X	X	X
Variety	o	x	x	x	x	x	x	x	x	x
Why are F1 seeds expensive?	o	x	x	x	x	x	x	x	x	x
Emasculation of Plant	o	x	x	x	x	x	x	x	x	x
Cross: Pole Sitao and Cowpea	o	x	x	x	x	x	x	x	x	x
Segregation	o	x	x	x	x	x	x	x	x	x
Breeding selected vegetables	O	X	X	X	X	X	X	X	X	X
Cucurbits (Squash, Cucumber, melon)	o	x	x	x	x	x	x	x	x	x
Solanaceous (Tomato, Eggplant, Pepper)	o	x	x	x	x	x	x	x	x	x
Pollination	o	x	x	x	x	x	x	x	x	x
Selfing	o	x	x	x	x	x	x	x	x	x
Grafting	o	x	x	x	x	x	x	x	x	x
Seed production	O	X	X	X	X	X	X	X	X	X
Drying Seeds	o	x	x	x	x	x	x	x	x	x
Organic Seed Treatments	o	x	x	x	x	x	x	x	x	x
Seed Storage	o	x	x	x	x	x	x	x	x	x
Fruit Trees Seedling Production	O	X	X	X	X	X	O	O	O	O
Sexual Propagation (Seeds)	o	x	x	x	x	x	o	o	o	o
Asexual Propagation (Grafting)	o	x	x	x	x	x	o	o	o	o
Orchard	O	X	X	X	X	X	O	O	O	X
Livestock Production	O	O	X	O	O	O	O	O	O	O
Hog	o	o	x	o	o	o	o	o	o	o
Poultry	o	o	x	o	o	o	o	o	o	o
Ruminants	o	o	x	o	o	o	o	o	o	o
Rabbit Raising	x	x	x	x	x	o	o	x	x	x
Aquaculture	O	X	X	O	X	X	O	X	X	X
Duckweed Production	X	X	X	X	X	X	O	X	X	X
Post-Harvest Handling	O	O	X	X	X	X	X	X	X	O
Definition and Importance of Post-Harvest	o	o	x	x	x	x	x	x	x	o
Causes of Post-Harvest Loss	o	o	x	x	x	x	x	x	x	o

Direct Causes (Injuries)	o	o	x	x	x	x	x	x	x	o
Indirect Causes (Economics, Gov`t, Storage)	o	o	x	x	x	x	x	x	x	o
Technologies to minimize post-harvest losses	o	o	x	x	x	x	x	x	x	x
Temperature Management	o	o	x	x	x	x	x	x	x	x
Food Processing	**O**	**O**	**X**	**O**	**X**	**X**	**O**	**X**	**X**	**X**
Business side of the operation	**X**	**X**	**O**	**O**	**O**	**O**	**O**	**X**	**O**	**O**
Partners	x	x	o	o	o	o	o	x	o	o
Customers	x	x	o	o	o	o	o	o	o	o
Services and Products Offered	x	x	x	x	x	o	o	x	x	o
Farm Planning & Record Keeping	**O**	**X**	**X**	**X**	**X**	**X**	**O**	**O**	**O**	**O**
Farm Planning	o	x	x	x	x	x	o	o	o	o
Integrated Farming	o	o	x	o	x	x	o	o	o	o
Record Keeping	o	x	x	x	x	x	o	o	o	o
Sales and Marketing	**O**	**O**	**X**	**X**	**X**	**O**	**O**	**O**	**O**	**O**
Agri Tourism	**O**	**X**	**O**	**O**	**O**	**X**	**O**	**X**	**X**	**O**
Farm Experience (Tour in Demo Farm)	**O**	**X**	**X**	**X**	**X**	**O**	**O**	**O**	**O**	**O**

*Note: Topics or technologies that sources in the study area offered **O**-means included and **X**- means excluded*

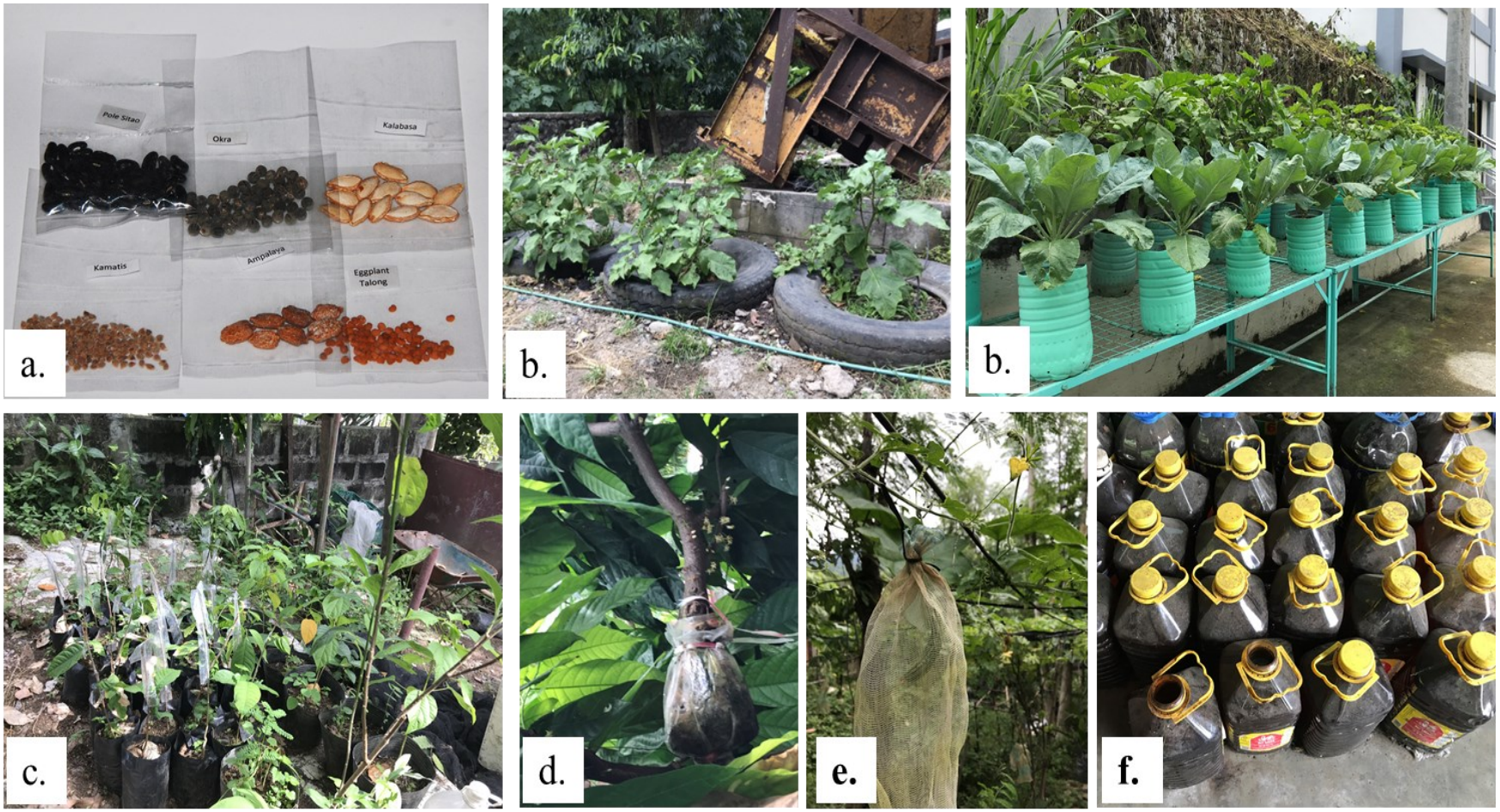
Sources: Different Actors and Institutions during the field surveys in July,2019; March-Aug.,2020

Appendix 5. Photos during Field Surveys

Sources: Field surveys in July,2019; March-Aug.,2020

Different research participants' verification of their life histories

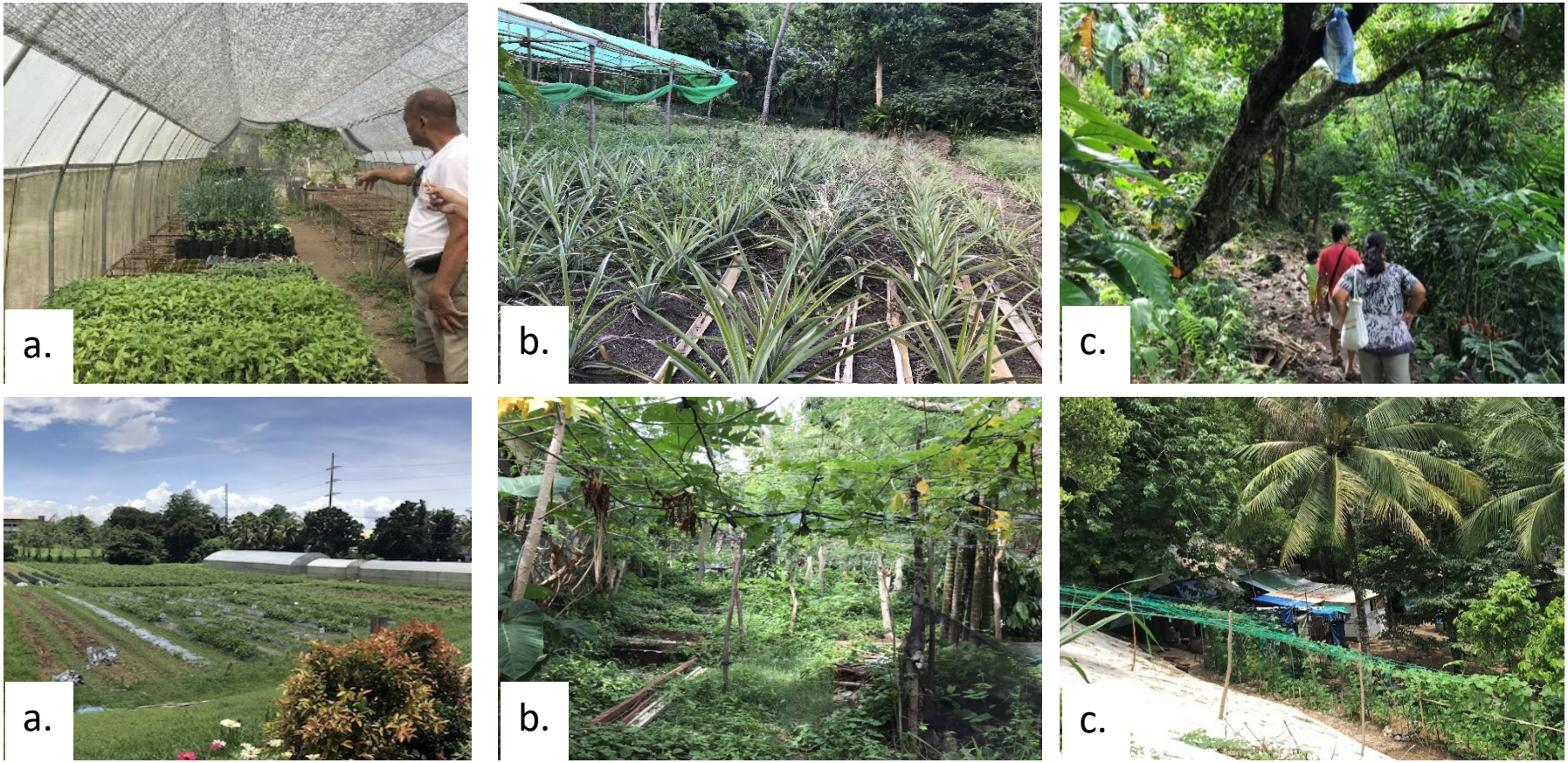
Sources: Field surveys in July,2019; March-Aug.,2020



Technologies from different sources adopted by farmers (a. use of native seeds, b. recycling/ container gardening, c. grafting, d. marcotting, e. bagging, f. botanical concoctions)
Sources: Field surveys in July,2019; March-Aug.,2020

Farmers showing while explaining different technologies and knowledge they adopted and using.
Sources: Field surveys in July,2019; March-Aug.,2020

Market/ Selling Types (a. own store -usually near their farms, b. Municipal Trading Post), others through traders
Sources: Field surveys in July,2019; March-Aug.,2020



Land Types (a. flat, b. Partially sloped, c. sloped)
Sources: Field surveys in July,2019; March-Aug.,2020