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STAKEHOLDERS' TRUSTWORTHINESS TOWARD CO-CREATION AND CO-INVESTMENT IN SAFE AGRICULTURE

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ABSTRACT

The impact of the New Land and Building Tax Law will increase land holding costs, particularly for vacant land. Landowners who have insufficient cash may not be able to cope with a new tax burden. This study explored the possibility of bringing unutilized land plots into production towards co-creation and co-investment in safe vegetable farming by emphasizing minimization of the external derived inputs such as pesticides or synthetic chemical fertilizers to create more self-reliant sources of vegetables for consumers. The objectives of this study were: 1) to comprehend landowners', consumers', and investors' perceptions as the core stakeholders toward sustainable agriculture investment, and to identify the limitations and expectations of each group by using semi-structured interviews and questionnaires of 50 landowners, 100 consumers, and 50 investors. The findings indicated that lack of trust was one of the most crucial aspects; 2) to design a conceptual model, called CO-VEGGIES, based on some key applications of Participatory Guarantee Systems (PGS), i.e. the network of the strong stakeholder's relationship, shared values, open-information, and direct participation to build trust; 3) to test the conceptual model to identify key elements in the stakeholders' trustworthiness by using semi-structured interviews and questionnaires of 120 samples including 30 landowners, 60 consumers, and 30 investors. The findings suggested that stakeholders' direct participation in the conceptual CO-VEGGIES model resulted in greater empowerment and the positive development of trust and quality assurance.

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1. INTRODUCTION

According to the World Bank, Thailand is currently the world's fifth-biggest user of farm chemicals. The country imports more than 16,000 tons of farm chemicals per year. Since 2011, agricultural chemical imports have risen by 50 percent and about 70 percent of chemical pesticides used are highly hazardous; they are not allowed for use in Europe (Ekachai, 2017). Several different studies have shown a high level of chemical

contamination in fresh produce. Wanwimolruk et al. (2016) examined the pesticide residues on three commonly consumed vegetables (Chinese kale, pakchoi, and morning glory) purchased from local markets and supermarkets in Thailand. The results revealed the incidence of pesticide detection in the three vegetables was in a range from 97-100 percent, far exceeding the maximum allowable limit that ranges from 35 to 71 percent. The study of Wanwimolruk et al. (2016) compiled the 2nd Report on pesticide contamination monitoring on fruits and vegetable, released by Thai Pesticide Alert Network on October 7, 2016 (BIOTHAI, 2016). The 158 samples of commonly consumed fruits and vegetables were analyzed in a laboratory certified with the ISO/IEC 17025:2005 standard, and the use of multi-residue pesticide screens (MRPS). The results found that over half of the 158 samples tested, or 56 percent, contained chemical pesticide residues above the maximum allowable limit. A variety of labeling schemes have been used to build trust among Thai consumers that produce is safe to consume and good for the environment. The products with food safety labels have been distributed mainly through supermarket chains. Currently, Q mark is widely used as a safety guarantee label, but people do not fully rely on it due to their lack of trust in the information about it (Wongprawmas et al., 2015).

The weakness of agricultural pesticide management has resulted in several problems and subsequent increases in environmental contamination as well as human exposure. When considered from the supply chain in the fruit and vegetable distribution channel, it can be hard for consumers to know the source of the foods they eat. Surveys of Thai consumers revealed that most of them were concerned about the safety of food, but information sources were limited (Takeuchi and Boonprab, 2006). According to Johnson et al. (2008), there are two types of marketing chains in Thailand: traditional and modern. The traditional marketing chain is characterized by multi-steps and players, while the modern marketing chain or contract farming is simply with fewer steps to end-markets. However, for both types of supply chains, consumers will not get involved in the production process. The concern for food safety and looking for more reliable sources of safe fruit and vegetable produce has contributed to distribution channels that connect farmers to consumers. For instance, FARM-TO is a channel that they can use to buy and sell directly to each other by reserving fruits and vegetables grown by farmers through the platform. Consumers can visit the farms to see the production process, but this channel is still not widespread.

Sustainable agriculture is a worldwide growth industry that can be profitable, though serious food safety concerns among consumers, such as the growth of a safe and organic market, are significant. According to the Global Impact Investing Network (GIIN), a growing number of impact investors are raising their investment into food and agriculture. The impact investment in the sector has grown at an annual rate of 32.5 percent since 2013 (Global Impact Investing Network, 2016). The non-profit advocacy group "Impact Assets" assessed that the demand for safe products and fair-trade products has been increasing worldwide. Consequently, many corporations like Nestle, Starbucks, Green Mountain Coffee, or Cargill are buying raw materials from smallholders. Farming plays an important role in sustainable global societies.

In Thailand, changes in tax calculation from an income-based method to an assessment based on property's appraised value under the New Land and Building Tax Act B.E. 2562 will increase the landholding cost and encourage more efficient land use. The higher tax rate will push landowners to sell, rent, seek partners, or hire property consultants to develop their land to offset the holding costs. This study intends to explore the possibility of bringing unutilized land plots into production toward co-creation and co-investment in safe vegetable farming and to capture the limitations and expectations of landowners, consumers, and investors as core stakeholders.

2. RESEARCH OBJECTIVES

This study intends to explore the possibility of 1) bringing vacant land into production based on safe agriculture approaches, 2) provide consumers with a safer and more self-reliant source of vegetables to consume, and 3) provide alternative farming investment for safe agriculture. The main objectives of this study are as follows:

1. To comprehend landowners', consumers', and investors' perceptions toward safe and sustainable agriculture investment – and to identify the limitations and expectations of each group
2. To design a conceptual model that aims to enhance connectivity and enable information provision to connect the demands of each group and build a trusted network through synergy between stakeholders working toward safe agriculture farming
3. To test the conceptual model to identify the key elements in trustworthiness

3. RESEARCH QUESTIONS

1. How can a system be organized to build stakeholders' trust?
2. How does the stakeholder's direct participation in the systems influence the development of a trusting relationship?
3. What are the key elements to build the stakeholders' trust and boost creditability?

4. RESEARCH HYPOTHESIS

This study adopted the Participatory Guarantee Systems (PGS), a quality assurance system that guarantees the quality of safe agriculture products that rely on building networks and shared responsibility between stakeholders. The research hypothesis was formed to examine the proposed model: Stakeholders' participation in the system has positive potential to build trust and address quality assurance. The research framework is shown in Figure 1.

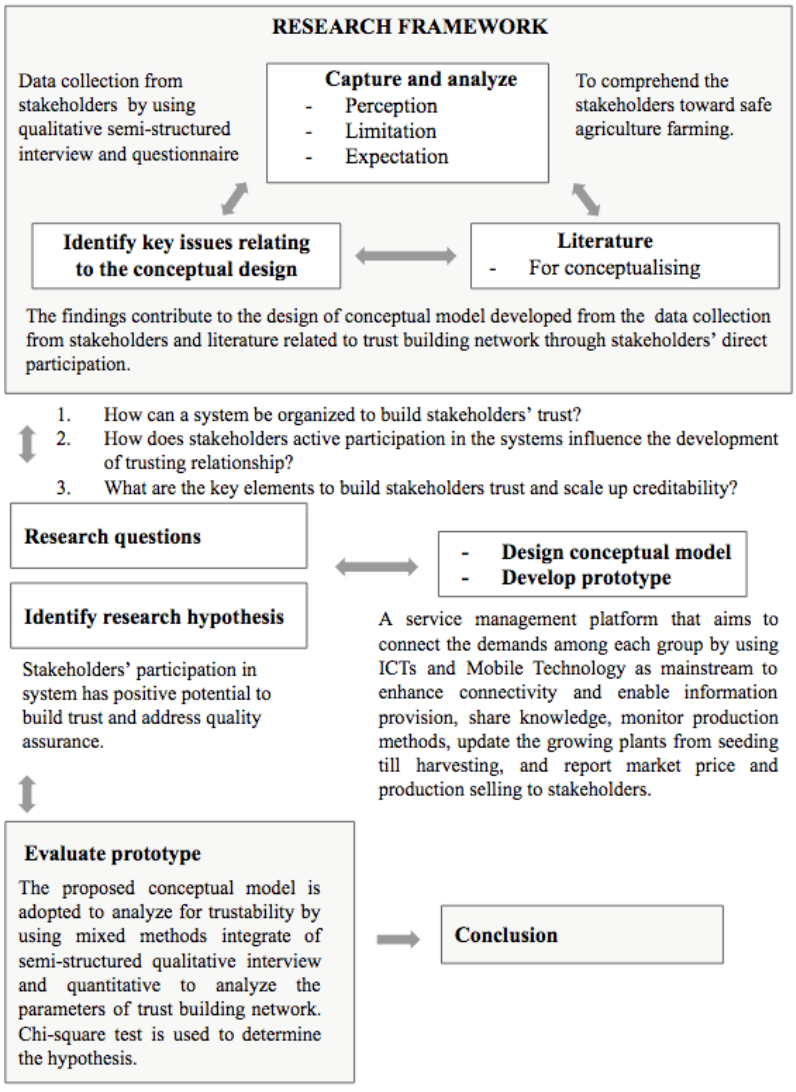

Figure 1: Research Framework

5. PARTICIPATORY GUARANTEE SYSTEMS (PGS)

Certification systems for organic agriculture were developed in Europe and the USA more than thirty years ago. It was organized by a farmers' organization with simple standards, and members who visited and

approved of each other. Meanwhile, the modern concept of certification is a set of procedures to guarantee certain characteristics through norms or established standards. The so-called third-party certification is a model where a party other than the buyer or seller provides assurances that make both of them comfortable. It has become the most common and important marketing instrument to access a special market for organic products at a premium price. Third-party certification is usually required for organic trade in international markets (Källander, 2008).

Third-party certification is often costly and complex, meaning it is not a viable route for smallholder farmers. In 2004, a workshop co-organized by the Latin American Organic Agriculture Movement (MAELA), International Federation of Organic Agriculture Movements (IFOAM) and Centro Ecologico in Torres, Rio Grande do Sul in Brazil, presented and analyzed a wide range of existing and functioning initiatives with different approaches to certification around the world. Participatory Guarantee System was the first-time issue on the agenda at a global level. As a result, a concept document has been elaborated describing what these different systems have in common.

Participatory Guarantee Systems (PGS) was defined by IFOAM as *"locally focused quality assurance systems that certify producers based on the active participation of stakeholders and are built on a foundation of trust, social networks, and knowledge exchange."* (IFOAM Organics International, 2008)

The PGS fundamental value is to share a common goal with third-party certification systems in providing a credible guarantee for consumers seeking organic produce. The difference lies in the approach, the participation of farmers, and even the consumers required. The consumers will be encouraged to participate in the production process and get involved in inspection to assure them of the quality of safe agricultural products, with no independent inspectors who intervene at various time points between production and consumption. The stakeholders are supposed to be aware of and participate in the farm operation, decision-making, and the establishment of standards. The principles and rules for safe production are conceived and applied to fit the local context, geographic area, cultural environment, and help to educate consumers about product growth (Cuéllar-Padilla and Ganuza-Fernandez, 2018; Källander, 2008). PGS is now spreading in developed and developing countries, which work from the same core principles but vary in their methodology and approach. Figure 2 shows the basic elements of PGS.

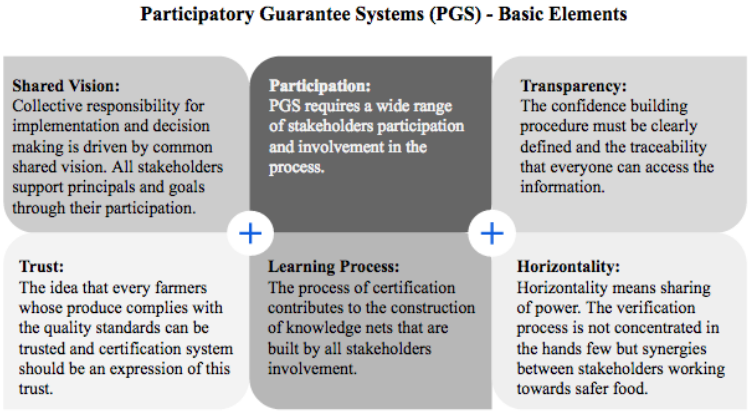

Figure 2: The Basic Elements of PGS
Source: Adapted from PGS of Källander (2008)

6. METHODOLOGY

This study uses a qualitative method through semi-structured interviews (Myers, 2008) and a questionnaire that was designed to explore the three major points:

1) To comprehend landowners' perceptions toward bringing their vacant land available for farming in the form of leasing.

2) To comprehend consumers' perceptions toward safer and self-reliance for the food they consume.

3) To comprehend investors' perceptions toward safe and sustainable agricultural farming investment.

6.1 Landowners' perceptions

The data were collected by conducting interviews and questionnaires with 50 landowners in the Bangkok area and nearby who hold vacant land from 1,600 m^2 or 1 rai up to 22,400 m^2 or 14 rai, which will be considered a micro-farm. Micro farms are small-scale agriculture operations that use less land than an average

commercial farm, typically under 5 acres or 12.65 rai, and are often located in urban or suburban areas. The target groups of landowners in this study are specified as 1) the landowners with capital who are interested in farm business but do not intend to farm it themselves for several reasons, e.g. busy work life or no experience in farm operation. These groups of landowners are interested in looking for any type of assistance to turn their land into a farming business to meet tax exemption criteria, and 2) the landowners with limited capital but may have the passion to develop their vacant land for safe farming agriculture and consistent income from rental. Findings concerning landowners' perceptions are shown in Figure 3.

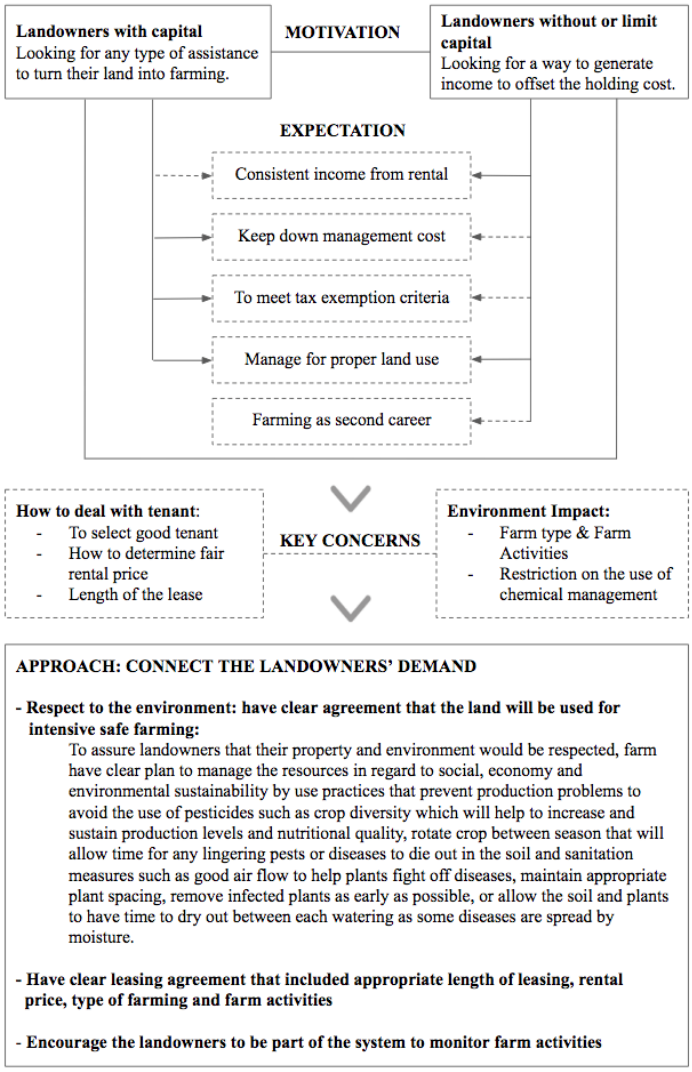

Figure 3: Findings Concerning Landowners' Perceptions

Of those landowners who received the impact from the New Land and Building Tax Law, 4 percent will dispose of their land, while 42 percent of the surveyed samples will lease their land to generate income for holding costs. Meanwhile, 46 percent of the samples are interested in making their idle plots available for farming, though the remaining 8 percent still have no plans. Leasing the vacant land for farming can help landowners to keep down the property management costs, and provide property tax advantages as well as additional economic returns. However, several landowners feel unsure about leasing their land; 52 percent of the samples showed concerns about how to find and select good tenants, while 22 percent did not know how to set or collect the lease fees. 6 percent worried about the duration of the lease and 16 percent of samples were concerned about the environmental quality.

From the in-depth interviews with landowners, there are many variables in leasing consideration; the length of the lease can pose risks to landowners, particularly a long-term lease that can be 10 years and up. For instance, if the land price increases during the contract period, landowners can miss out on potential income. The cost of the lease and how to determine the fair rental price is one of the most important challenges. The

rental price depends on many factors, location, soils, and their suitability for farming, water availability, infrastructure, and the forces of supply and demand in the area. The bottom line on rental price is both parties agree to pay and agree to accept. Another landowner concern is the type of farming, farming activities, and restrictions on the management such as the use of herbicides or other chemicals, building, or other infrastructure that is not part of the agreement. When the contract is terminated, how the tenant leaves the property or who will pay for improvement if necessary is still a question.

To build landowners' trust and provide assurance, CO-VEGGIES as a tenant has to provide:

1) Clear visions and goals

2) Assurance that there will be a group of consumers/investors who participate in this project

3) Clear agreement that the land will be used for intensively safe farming and there is a market for farm production

4) A clear clarified timeframe for the agreement

5) Assurance the property and environment would be respected

6.2 Consumers' perceptions

The data were collected by interviews and questionnaires with 100 consumers in the Bangkok area. The target group of consumers in this study focused on health consciousness and looked for more secure food for themselves and their families. In the survey, safe produce is defined as the production of farming systems without the use of pesticides, synthetic fertilizers, bioengineering, or ionizing radiation. The questionnaire was designed to understand the consumers' attitudes toward safe produce, the factors that affect their purchasing decisions and their interest in internship services (Table 1). Concerning the presence of pesticides in fruit and vegetables, several food safety certifications were used to help consumers recognize the produce. 68 percent of the samples did not trust in food safety certifications. For the question of what makes them trust safe produce, the survey found that 43 percent of the consumers trusted in the brand image, such as "Royal Project" (Figure 4), which represents the reputation of safe produce without the use of chemicals.

The Royal Project is a project of His Majesty King Bhumibol Adulyadej founded in 1969, following HM the King's efforts to provide hill tribe people with alternative winter crops to stop opium growing, which was widely cultivated in Northern Thailand during that time. The products of the Royal Projects are organic vegetables, herbs, nuts and grains, mushrooms, fruits, products of processed fruits and vegetables under the name "The Royal Project" and "Doi Kham", to support the development of Thai agricultural products that have high nutritional value with no chemical additives (Doi Kham).

Figure 4: The Royal Project Foundation Logo
Source: Royal Project Foundation (n.d.)

The survey shows that 13 percent of the respondents trust in food safety certification from a third party and 8 percent of the samples consider choosing from the appearance of fruit and vegetables such as color, texture, and smell. Meanwhile, 36 percent of the respondents said that participation or getting involved in the production process can build their trust and ensure that the food is safe to consume. The security of knowing how food is grown and what is used in the process has led to another new farm service package that offers internships for organic farming, known as "Farm Fhun" and located in Amphoe Pak Chong, Nakhon Ratchasima Province. The farm has converted a 50-rai plot of land into an organic area. People who are interested in organic farming can grow their own fruits and vegetables on the rented plots that are available in size 25 M^2 and 100 M^2, control the direction of water, trim, or seed all through a mobile application. The renters who are too busy to farm can also view their field every day through photos sent by farm staff. In the survey, 74 percent did not know that there was an internship organic farming service in Thailand. After they knew that there was an internship organic farming service, 67 percent of the samples were interested in joining the farming service. However, the important key factor to their decision in joining internship farming service was the service charges, as 49 percent would consider the service charge as the most important aspect, while 33 percent considered the planting methods. 18 percent said the location of the farm was a very important factor for their consideration.

Table 1: Important Attributes to Join Internship Services (100 Samples)

Health concerns for themselves and family	42
Outdoor activities with friends and family	19
Seeking an authentic experience, make a new friend who has the same interest and to exchange knowledge and ideas	17
Learning and practice through the internship for safe vegetable planting	22

This study also collected the data from the venue of learning exchange with Rayong Young Smart Farmer Group (YSF) and the local community in Rayong Province. YSF is a Thai government project that aims to accelerate the development of a new generation of farmers by promoting the exchange of knowledge among farmers. As a result, they can analyze problems, determine guidelines for the management and development of local resources, and use local wisdom, innovation operation, and technology to increase the value of their agricultural products, reduce production costs and increase competitiveness. Figure 5 shows findings concerning consumers' perceptions.

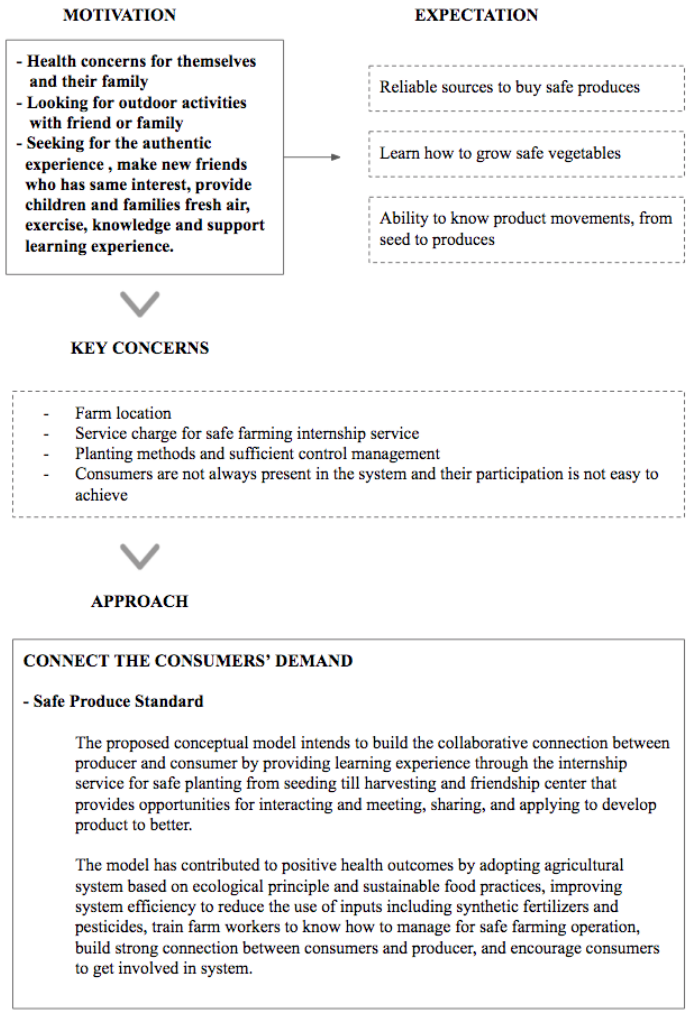

Figure 5: Findings Concerning Consumers' Perceptions

The discussion was focused on the following key questions:

1) How does the group trust in product labeling as safe and organic?
2) How does the group apply for good agricultural practices?
3) What are the uncertainties in organic farming and what are the opportunities?
4) What are the keys to building trust with consumers in safe produce?

The results showed that most of them did not trust the organic produce labeled with certification marks that they were safer than conventional produce. According to their direct experience in visiting organic farms from many parts of Thailand, many farmers lack the commitment to meet the organic standards mandate. Even though their farms are certified as organic, they still use chemicals on their farms. Rayong YSF group has developed collaboration between members to share knowledge and experience for safe and organic

farming, visit each member's farm to see the progress or any problem with planting, and allow consumers to visit their farm to see how produce is grown. At present, conventional agriculture has integrated organic techniques to reduce the use of agrochemicals and excessive tillage and increase biodiversity on the farm, beneficial insects, and soil conservation, which make the relationship between organic and conventional farming more complex. Rayong YSF group has been using a barcode to paste on their produce to guarantee the quality and identify sources of produce, which is beneficial for both the producers and consumers.

Consumers' Point of View: Trust is one of the most crucial aspects that motivate consumers in purchasing safe produce. The consumers generally cannot distinguish safe produce and conventional produce by their appearance. Thus, credence attributes such as safe and organic labels, personal trust in producers and retailers, and product brands play a crucial role in their buying decisions. On challenges to build the consumers' trust, the numbers of consumers are showing that clear guidelines, sufficient control measures, and competence of knowing the product movement, from seed to produce, are important factors that could build their trust in safe produce.

6.3 Investor' perceptions

Accessing affordable farmland is one of the greatest challenges for average investors who are interested in the farming business but may have limited capital due to the high price of land and the cost of operation. In the survey, safe farming was defined as a farming method that involves cultivating and nurturing crops without the use of synthetic-based fertilizers or pesticides. The data were collected by interviews and questionnaires with 50 samples of people who are interested in farming investment. The interviews focused on the people who have experience or knowledge in investment, whether in stocks, bonds, mutual funds, options, futures, real estate, or precious metals. The questionnaire was designed to capture the investors' perceptions and expectations in agricultural investment without owning a farm. By investing in the plot unit that requires minimal to no effort, and with a small amount of capital, the farm will manage the whole process including planting, growing, harvesting, and selling the produce. The investor will get profit-sharing from selling the produce. Findings concerning investors' perceptions are illustrated in Figure 6.

From the survey, regarding the most important factor for investors to consider for investing, 48 percent of the samples said that steady growth is the most important for their decision to join the investment. The steady growth is considered from the company's past earnings, which has a history of producing relatively steady and predictable earnings growth. The 34 percent of the samples consider the Return on Investment (ROI) is the most important factor. Return on Investment is a measure of profitability that indicates the efficiency of an investment. It is calculated from the benefit of an investment divided by the cost of investment. Meanwhile, 14 percent of the surveyed samples consider safety the most important factor. Due to the factors fostering the trust to join the investment, 42 percent of the samples will consider the performance of past schemes, while 32 percent consider participation as the most important factor in fostering trust. 20 percent consider from the consensus and 6 percent of the sample said that they will consider from the recommendation of their friends or relatives. Most of the investors considered sustainable agriculture as a worldwide growth industry that can be profitable and have significant growth. However, investment in farming requires large startup costs. If there is an alternative to farming investment that requires a small amount of capital, they will be very interested in investing. Nevertheless, there are some concerns about whether or not it can be trusted, and how it manages the operation risks such as drought, flood, price change, farm work cost, prospective yields, or market risks such as the falling price.

To build the investors' trust and provide assurance, CO-VEGGIES will offer:

1) Clear business plans and management of investment goals
2) Clear adoption of sustainable agriculture techniques
3) Management plans for the operational risks and marketing strategies
4) Involvement in the inspection

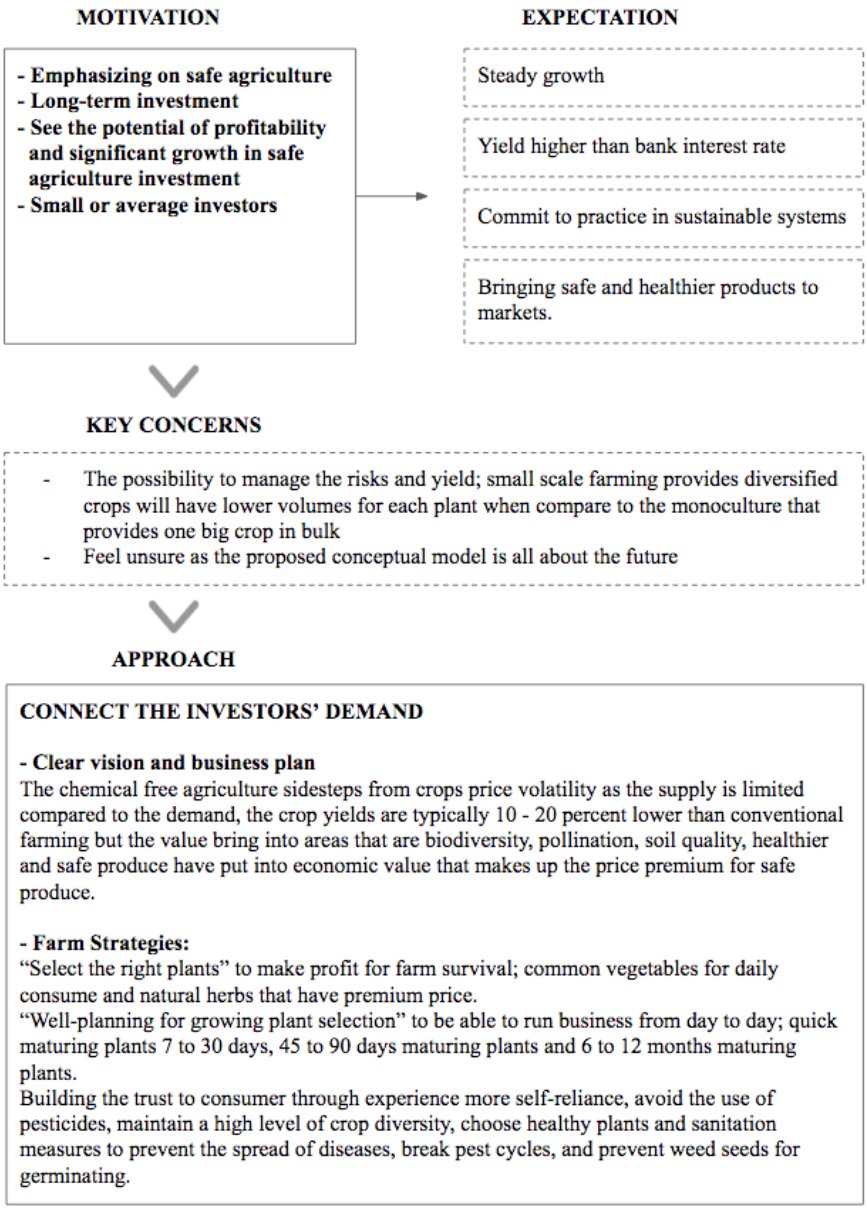

Figure 6: Findings Concerning Investors' Perceptions

7. MODEL PROPOSAL: CONNECT THE DEMAND AND BUILD TRUST NETWORK

The data collection from stakeholders gives a holistic view of what is unfolding across their concerns. The findings indicate that lack of trust is one of the most crucial aspects that contribute to the conceptual model named "CO-VEGGIES" as developed by the adaptation of basic key elements of Participatory Guarantee Systems (PGS) to create a social network between stakeholders and build trust by engaging all actors to participate in the production process, from planting till harvesting and selling, provide learning the process, regular visiting, monitor and inspection through visiting report to ensure safe and quality vegetables and scale-up credibility to:

1) Assure landowners that their land will be used in a sustainable way

2) Assure the consumers through the experience of safe and more self-reliance for the vegetables they have consumed

3) Assure the investors of clear management and investment goals

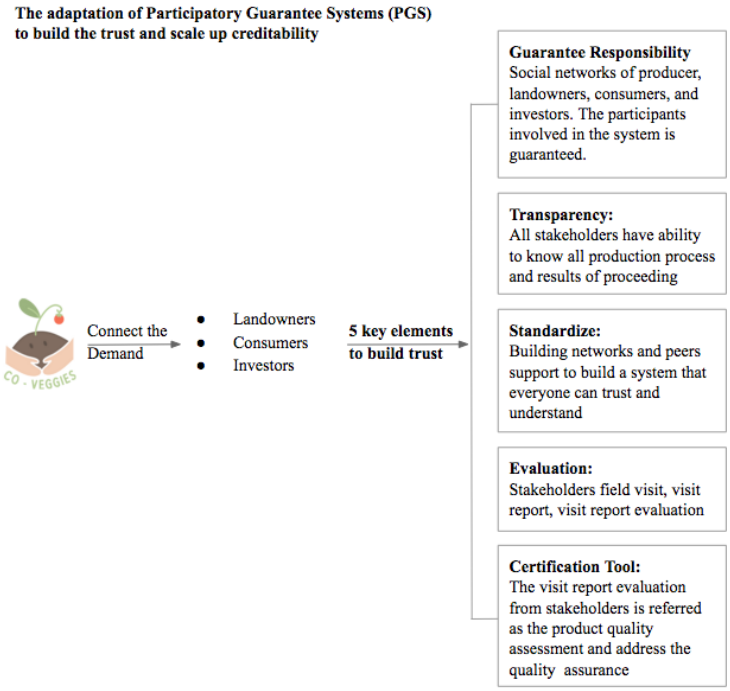

Figure 7: The Adoption of PGS Basic Key Elements to Build the CO-VEGGIES Conceptual Model

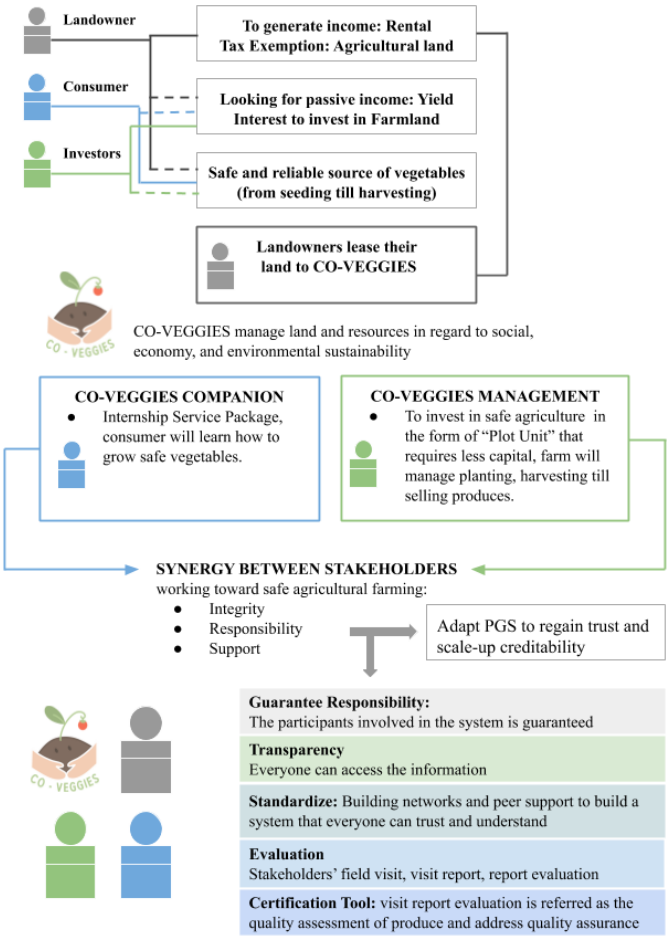

Figure 8: CO-VEGGIES Conceptual Model

CO-VEGGIES is a service management platform that aims to connect the demands of each group, 1) landowners who are interested in safe agriculture and have unused land or holding large plot and may convert part of their land for safe agriculture, they can lease their land to CO-VEGGIES for farming purpose, 2) consumers who are interested in farming for health concerns or looking for a more safe and reliable source of vegetables, CO-VEGGIES offer a 'Companion Package', the internship service for safe planting, and 3) investors who are looking for a channel of farming investment, CO-VEGGIES offers them 'Management Service' that require minimal to no effort and with a small amount of capital to invest in farming in the form of a plot unit; CO-VEGGIES will manage what to grow and do the whole process till harvesting and selling. The investors will receive benefit from profit sharing. CO-VEGGIES uses ICTs and Mobile Technology as mainstream to enhance connectivity and enable information provision, sharing knowledge, monitor production methods, updates for growing plants from seeding till harvesting, report market price, and products selling to stakeholders. See Figure 7-12.

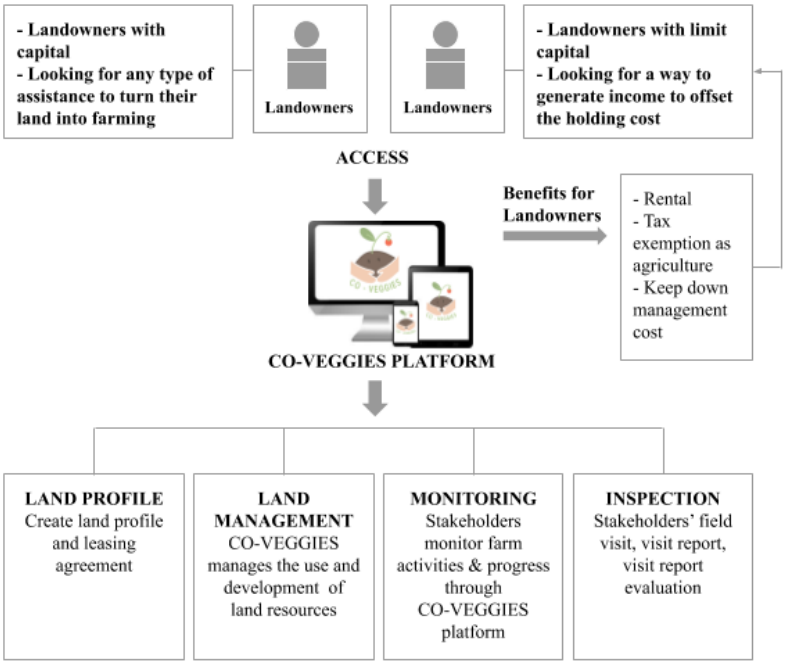

Figure 9: CO-VEGGIES Usage Scenario for Landowners

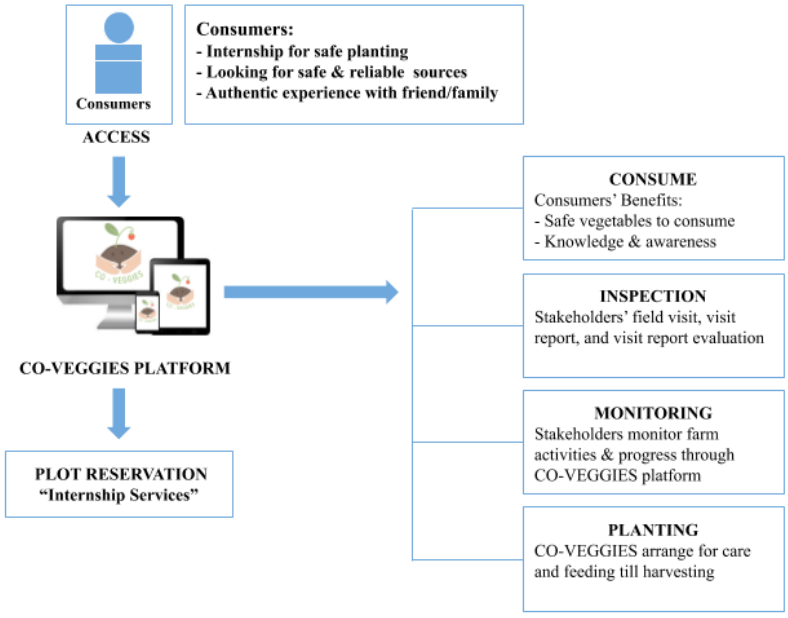

Figure 10: CO-VEGGIES Usage Scenario for Consumers

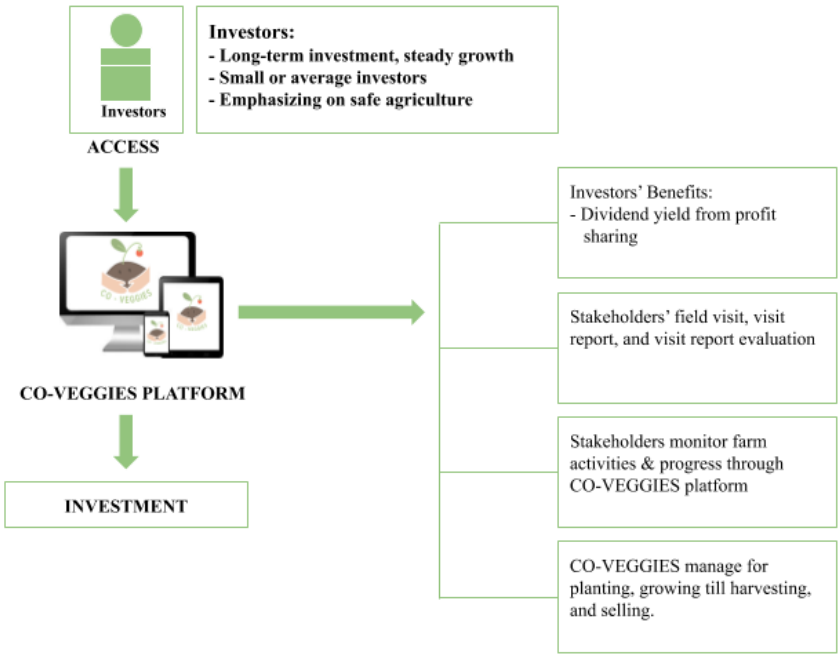

Figure 11: CO-VEGGIES Usage Scenario for Investors

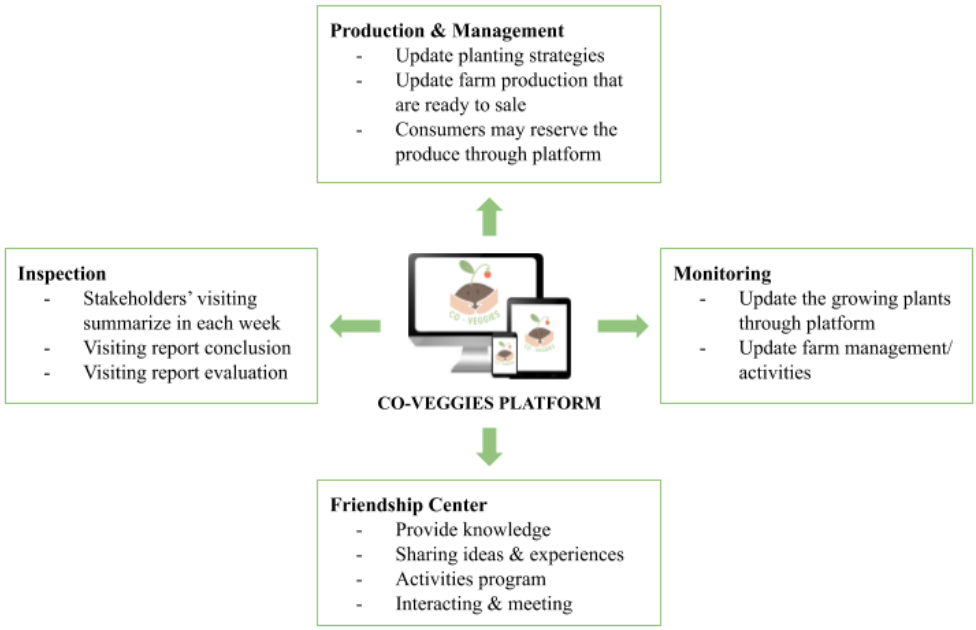

Figure 12: CO-VEGGIES's Report and Information Scenario

8. TESTING RESULTS

In this section, the CO-VEGGIES conceptual model was adopted to analyze whether the stakeholders' direct participation in the systems can build trust and boost creditability as well as to examine the five key elements of trustworthiness. By using simple random sampling, every individual has an equal chance to be selected together with convenience sampling; the respondents are conveniently available or are willing to participate. Face-to-face interviews and telephone interviews were used for data collection from 30 of 50 landowners, 60 of 100 consumers, and 30 of 50 investors from the first part of data collection who were selected to determine the research findings. This study used mixed methods that integrated semi-structured qualitative interviews and quantitative data to analyze the key elements of trustworthiness. A Chi-square test

was used to determine the research hypothesis. Table 2 shows landowners' perceptions toward the CO-VEGGIES Conceptual Model.

Table 2: Landowners' Perceptions toward the CO-VEGGIES Conceptual Model (30 Samples)

Leasing Agreement Clear leasing agreement in terms of the rental price, length of leasing, farm type and activities, and limitations on its use for other purposes.	27
Vision and Goals To enhance effective land usage by turning vacant plots into safe farming and to generate passive income to absorb holding cost.	25
Farm Operation Clear plan for how land will be used; for safe agriculture, provide consumers for safe and self-reliance source of vegetables	24

From the first part of the interview, many landowners felt unsure about how to deal with tenants; some of them were also reluctant to let others use their assets. With a clear leasing agreement between landowners and CO-VEGGIES, 27 respondents felt more comfortable to lease their land, while 3 respondents said that even though there was a clear leasing agreement, they still felt unsure about whether the tenant would follow the contract or restriction on the management such as the use of chemicals. The CO-VEGGIES conceptual model is intended to build a strong relationship based on shared values and good communication. To bring landowners to be part of the initiative, it requires a comprehensive clear vision and goals to make sure that the land will be used in a sustainable agriculture manner and to assist landowners to keep down the property management cost as well as provides an additional economic return. The 25 respondents agreed that the CO-VEGGIES model has a clear vision and goals, while 5 respondents showed concerns for how the model can achieve the goal since it is a new player and a new business model that can involve different risks such as production risks, marketing risks, or financial risks. 24 respondents agreed that the CO-VEGGIES conceptual model had clear farm operation planning that can be achieved and there will be a market for safe produce as the demand from corporations and consumers is growing tremendously. Nonetheless, 6 respondents showed their concern for farm revenue as it normally requires 1 to 1.5 years to convert fields to chemical-free cropping. Further, the yields are often lower than for conventional farming.

Table 3: Consumers' Perceptions toward the CO-VEGGIES Conceptual Model (60 Samples)

Contribute to positive health outcomes Adopting sustainable food practices, applying organic fertilizers, natural pesticides, and diversifying crops to help preserve topsoil.	49
Trust Building The collaboratively established processes can contribute to assuring the quality of produce.	52
Strengthening the connection between producers and consumers The consumers will learn how to grow safe vegetables, share knowledge and experience or ideas, and increase awareness.	55

Conventional farming methods have used harsh chemicals to maximize crop yields, resulting in several problems, a subsequent increase in environmental contamination, and human exposure. The traditional marketing chain and modern marketing chain (known as contract farming) prevent consumers to obtain information about sources of produce and pesticide practices. The consumers should have the right to know where the food they eat comes from. The CO-VEGGIES conceptual model has proposed a CO-VEGGIES Companion Package to consumers who have health consciousness to learn how to grow safe vegetables, encourage them to participate in the system, and provide them with quality assurance of the products. The CO-VEGGIES conceptual model has contributed to positive health outcomes by adopting an agricultural system based on ecological principles and sustainable food practices. The 49 respondents agreed that the CO-VEGGIES conceptual model makes produce safer for consumption and can positively alter the environment, while 11 respondents said that they felt unsure about whether farms will lack commitment; farms or farm workers may use chemicals to prevent production loss during farm closing hours since the farm business is driven by profit. Many consumers generally cannot distinguish safe produce from conventional produce by its appearance. The Participatory Guarantee System (PGS) was adapted in the conceptual model. The role of stakeholders in developing a trusting relationship between producers to consumers, information exchanges, and synergies between stakeholders working toward safe food has helped build momentum and trust in produce. The 52 samples agreed that collaboration and participation in the systems between all stakeholders was one of the

efficient tools to build trust. Collective visits to the farm are key elements to the assessment of producer practices in farm operation. Nonetheless, 8 respondents said that product brands, brand image, and third-party certifications had sufficient control measures that can contribute to trust. The CO-VEGGIES's conceptual model aims to build a collaborative connection between the producers and consumers by providing a learning experience through internships for organic planting and a friendship center that provides opportunities for interacting and meeting, sharing, and applying to develop better products. The 55 samples agreed that internships and friendship can strengthen the relationships between stakeholders as well as contribute to product quality assurance. Meanwhile, 5 samples said that the urban lifestyle and busy work life prevented them from having a presence in the system. Table 3 shows the consumers' perceptions toward the CO-VEGGIES Conceptual Model.

Table 4: Investors' Perceptions toward the CO-VEGGIES Conceptual Model (30 Samples)

Safe agricultural investment as long-term growth The investment opportunity for long-term growth as the world current demands for sustainable agriculture that; promote sustainable practices, sustainable consumption for healthy food and strong food safety, and environmental conservation have been increasing and there are plenty of rooms to grow.	26
Chemical-free agriculture sidesteps from the crops price volatility Several studies showing that consumers are willing to pay for the premium price of safe produce 15 to 50 percent which contrasts with the sinking commodity farm product prices.	27
Building trust with a clear plan and business goals Feel comfortable with the farm's ability to deliver on the project. The investors' participation in the systems can create a long-lasting sense of trust between both parties.	20
Loss of commitment Feel unsure whether the farm will lose commitment to practice sustainably when scaling up the business and being driven by profit.	11

Today, a growing number of consumers are moving toward the consumption of safe food in place of conventional food. According to the Global Impact Investing Network (GIIN), several investors have been starting to explore high-impact investing opportunities in food, farming, and forestry across asset classes. In the past, it required significant capital to buy an entire farm. The CO-VEGGIES conceptual model for Management Package offers investors a chance to invest in sustainable agriculture that does not require massive upfront costs since the plot unit starts at Thai Baht 15,000 for a plot size of 30 SQM. CO-VEGGIES will manage the farm in sustainable manners. It is suitable for investors who are looking for long-term growth; they can add agricultural investment into their portfolios as crops provide a yield each year. The 26 samples of 30 samples agreed that there was plenty of room to grow for sustainable agriculture and could provide profitability to investors, while 4 samples showed concerns about the lower volume of production. Small-scale farming provides diversified crops with lower volumes for each plant when compared to the monoculture that provides one big crop in bulk. This will affect wholesalers and retailers in sourcing and selling produce as there are increases in the relative costs of transportation, processing, distribution, and marketing.

For the agricultural sector, production levels, market supply, and demand changes can cause an unforeseen and uncertain swing in prices. To maintain long-term profitability, it is imperative for the farm to manage price risks. While the chemical-free agriculture sidesteps from the crops price has volatility as the supply is limited compared to the demand, the crop yields of organic agriculture are typically 10-20 percent lower than conventional farming. Still, the values brought into areas such as biodiversity, pollination, soil quality, healthier and safe produce have been put into an economic value that makes up the price premium of organic foods. The 27 samples agreed that chemical-free agriculture was more profitable than the conventional kind as they have seen the popularity of organic food growth, while 3 samples said that even though organic produce had a higher price, there were lower crop yields and it was not easy to move towards truly sustainable production systems.

CO-VEGGIES Management is an alternative way of farming investment that uses minimal capital. Farms will manage the planting, growing, harvesting, and selling of produce. The farm's policy aims to provide consumers with safe vegetables by building the trust of consumers through the experience of more self-reliant consumption that avoids the use of pesticides, maintains a high level of crop diversity, increases and sustains production levels and nutritional quality chooses the healthy plants and sanitation measures to prevent the spread of disease, breaks pest cycles and prevents weed seeds for germinating. The investors, as partners, will receive benefit in the form of dividend yields from profit sharing with the farm. The 20 samples said that the farm model had a clear business plan and goals, and they trusted in the opportunity as they had seen the market opportunity for chemical-free agriculture. Investors' participation is one of the most important tools to build

relationships between each other and could lead to trust in farm operation, while 10 samples said that the farm has little or no performance data, even though they agreed with the farm policy and the transparency. The plan is all about the future, so they shared their concerns about how the farm could deliver on the opportunity.

When a business is focused on the financial outcome, it may face pressure from investors to hit revenue goals. Profit-driven corporations can make management blind to ethics. The 11 samples of the 30 show their concerns that if the farm is driven by profit and the business can be scaled up as mainstream, the farm can be encouraged to maximize productivity. Thus, the farm may lack commitment to chemical-free agriculture. Table 4 shows the investors' perceptions toward the CO-VEGGIES Conceptual Model.

To regain trust, the farm will record daily activities in a logbook, from planting the seeds till harvesting, facilitate regular face-to-face meetings with stakeholders, provide clear information on costs, up-to-date information on market prices, feedback on product quality, and exchange knowledge among stakeholders. Farms will utilize a combination of high-tech advancements such as robots, temperature and moisture sensors, aerial photographs or GPS technology, and traditional methods that aim to protect the land's natural fertility, remain environmentally friendly, and allow farms to be more profitable.

9. KEY ELEMENTS IN TRUSTWORTHINESS MEASUREMENT

The quantitative approach was selected for this study to measure five key elements in trust-building; Guarantee Responsible, Transparency, Evaluation, Standardize and Certification Tool. For the question about whether or not they agreed with the fact that the stakeholders' active participation in the system can contribute to these five key elements for trustworthiness, the answers are shown in Table 5.

Table 5: Measure for Five Key Elements of Trustworthiness

Parameters	Landowners 30	Consumers 60	Investors 30
Guarantee Responsible			
Building networks of producers, consumers, landowners, investors. The participants involved in the system are guaranteed.			
Agree	22	49	20
Disagree	8	11	10
	30	**60**	**30**
Transparency			
All stakeholders have the ability to recognize all the production processes and the results of the proceedings. Active participation directly results in transparency as everybody is aware of the confidence-building process			
Agree	26	52	26
Disagree	4	8	4
	30	**60**	**30**
Evaluation			
All stakeholders participate in field visits, monitoring, inspection, and traceability			
Agree	26	55	24
Disagree	4	5	6
	30	**60**	**30**
Standardization			
Building networks and peer support to build a system that everyone can trust and understand			
Agree	22	42	23
Disagree	8	18	7
	30	**60**	**30**
Certification Tool			
The participation of stakeholders in the system at different stages, visiting reports and visit report evaluation can be recognized as certification tools for safe produce			
Agree	25	51	20
Disagree	5	9	10
	30	**60**	**30**

The CO-VEGGIES conceptual model requires the active participation of stakeholders, resulting in greater responsibility that will lead to the trustworthiness of the product quality. However, the stakeholders

are not always present in the systems due to their busy lives, which will be an obstacle and difficulty to achieve the building of trust.

In terms of transparency, all stakeholders are aware of how the guarantee system works and know the results of the proceedings. On the other hand, some stakeholders show their concerns that the quality of the guarantee procedure may be at stake if farms have close relationships with stakeholders.

To assure product quality, it requires stakeholders to participate in the field, visiting, monitoring and inspecting. The stakeholders' involvement in the quality assurance process is a key element to evaluate farm operation and develop trusting relationships. A small number of respondents shared that they felt unsure about whether farm or farm workers would lack commitment for chemical-free agriculture as farm survival will be driven by profit. As a result, the farm may use chemicals during the close hours to maximize the crop yields.

The guarantee system in CO-VEGGIES conceptual model is created by the direct involvement of stakeholders where the principles and rules are conceived and applied with the contribution of stakeholders. Meanwhile, some of them stated that they may feel insecure in the system if they lack knowledge about sustainable practices.

The CO-VEGGIES conceptual model reflects the group's capacity to demonstrate trust through the collaboration of stakeholders by visiting, monitoring, visiting report, and visiting report evaluation. The farm should provide necessary management to ensure the product quality, which can be considered as self-certification. However, some of the respondents feel more trust and security if the certificate is arranged by external inspectors who have expertise and skills.

10. TEST OF RELIABILITY

For the reliability test, the 120 samples were divided into two groups: (1) those who participated in the system and (2) those who did not participate due to various reasons such as a busy life, lack of knowledge and experience. The Pearson Chi-square was used to determine the likelihood that stakeholders' participation and trust-building are independent by using an online java-based program for calculation. The alpha value of 0.05 was used as the cutoff for significance. The result shows in Table 6 that the P-value is 0.023, lower than the alpha value of 0.05. Thus, stakeholders' participation and trust-building are dependent on one another. The research hypothesis that was built to examine the model; Stakeholders' direct participation in the system has a positive value to build trust and address the quality assurance as accepted. The direct active participation of stakeholders resulted in farm performance, the establishment of standards, and product quality assurance. However, this study may not be entirely representative as the sample sizes were small. Further studies with larger numbers of samples are needed to confirm the findings.

Table 6: Chi-square Test

Total samples: 120 (30 landowners, 60 consumers, 30 investors)

	Build Trust	Unable to Build Trust	Total
Participate	68	21	89
Non-participate	17	14	31
	85	35	120

CHI-SQUARE	5.18
Degree of Freedom	1
Probability	0.023

11. DISCUSSION AND CONCLUSION

To lease the vacant land for farming can be beneficial to landowners for property tax advantages and to provide additional income. However, many landowners feel unsure about how to deal with tenants. The CO-VEGGIES' conceptual model provides a clear leasing agreement that includes an appropriate length of leasing, rental price, type of farming, and farm activities together with a clear plan to manage resources regarding social, economic, and environmental sustainability. This will ensure landowners that their land will be improved and utilized for safe agricultural purposes sustainably. The most important thing is to build strong relationships based on shared values and good communication to encourage them to participate in farm operation, visit the farm, or monitor through the platform. The results show that landowners feel more comfortable to lease their land to CO-VEGGIES and to get involved in the system.

For the consumers, 'trust' is one of the most crucial aspects of their buying decision. The different forms of trust may be relevant. The consumers may base their trust on the creditability of information, labels, brands, or personal trust in the competence and integrity of producers. Several previous studies identify that most consumers require more information on safe and organic produce even if it is labeled as "organic" (Nelson, 1991). Meijboom et al. (2006) concluded that information is not enough to establish trust, while Eden et al. (2008) stated that consumers start to consider food production processes instead of assurance schemes, such as labels, certification, or information which may increase skepticism rather than strengthen trust.

The third-party certification that is proven by technical expertise has been an excellent means of guarantee for world trade of organic and safe products. The certification process is based on an annual visit by external inspectors who verify that the production methods comply with the established mandate, thus enabling producers to access a special market with a premium price. However, there are some questions from the producers who do not subscribe to the third-party certification on its objections to the underlying philosophy - the idea that people can safeguard the organic integrity with an annual visit by inspectors. On the consumers' side, the chemical contamination found on fruit and vegetables that were labeled as safe and organic and supposedly controlled by technical expertise generated confusion and distrust among consumers.

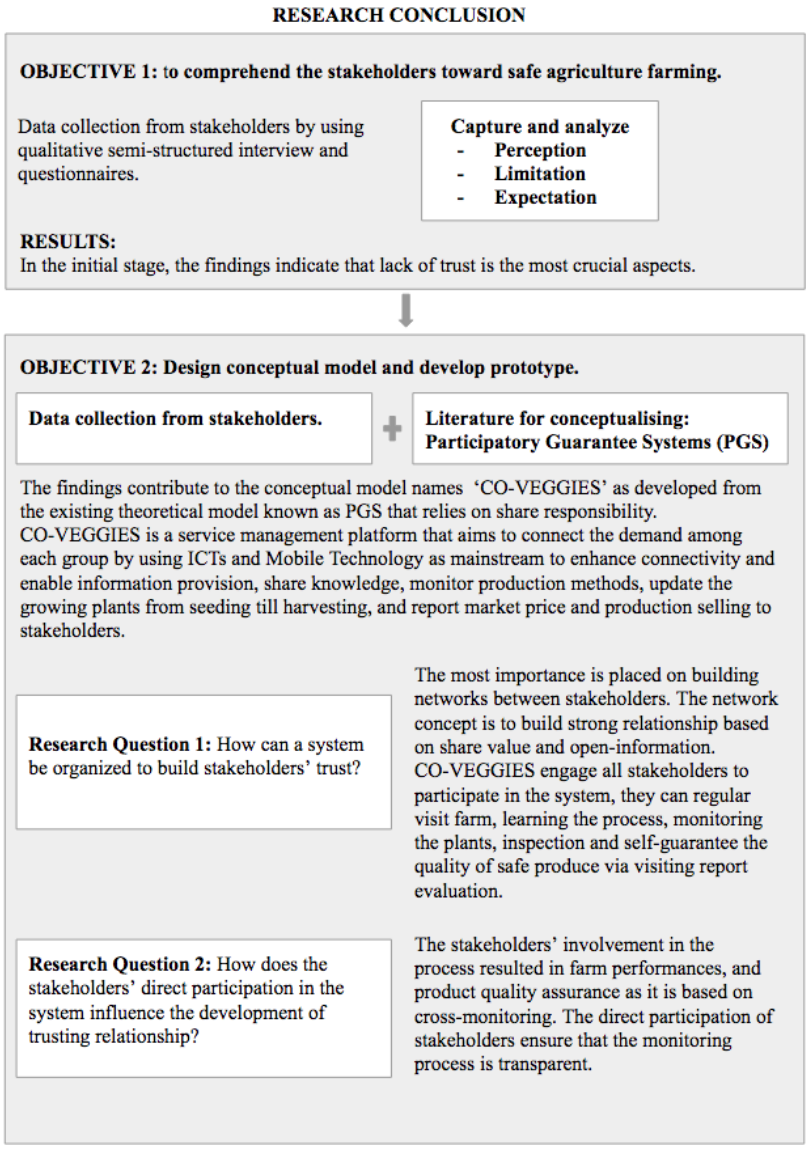

Figure 13: Research Conclusion I

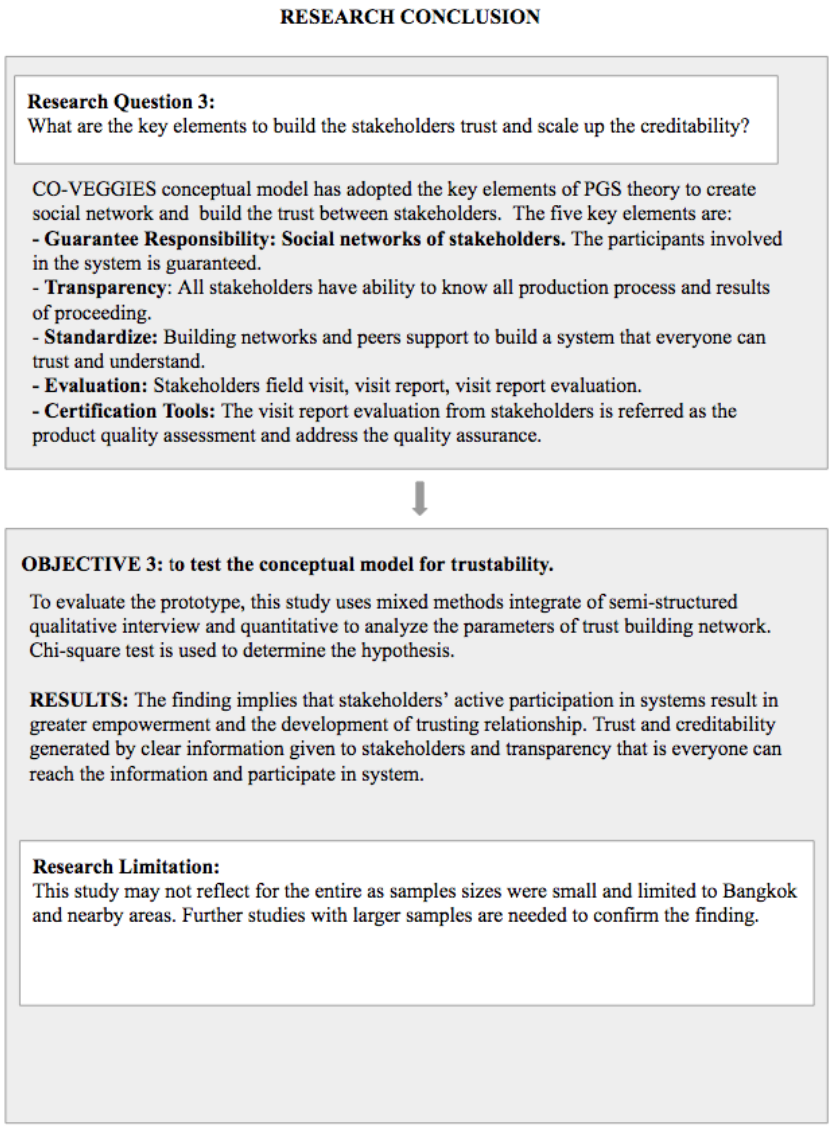

Figure 14: Research Conclusion II

The CO-VEGGIES' conceptual model has adopted PGS to build a trusted network. The concept of food networking is to set up links between producers and consumers as well as develop alternatives and practices for sustainable food production systems. There are no external inspectors, while all the stakeholders involved in the production process evaluate compliance. Farms adjust the production system according to sustainable agriculture practices. The production is self-certified without any official certification, but based on the active participation of stakeholders, social networks, knowledge exchanges, transparency, monitoring and self-certified by visit report evaluations. The conceptual model benefits consumers as they can gain more information and have the ability to know where the food they eat comes from as well as how it is grown. The result shows that consumers tend to have more trust in the farm's produce. However, a busy life will prevent them from being present in the system. Meanwhile, some consumers have confidence in brand image and third-party certification.

For investors, investing in sustainable agriculture is considered a long-term growth investment. Today, consumers are interested in how food grows and getting to know who produces it, resulting in pushing the producers to practice more sustainable agriculture. To invest in sustainable agriculture, it holds the potential to generate strong earnings growth due to the increasing demand for safe produce, rapid population growth, and urbanization. It can also be considered a socially-responsible investment, which focuses on investing in the corporates whose practices are based on ecological principles having a positive impact on society and the environment. The investors' perception toward investing in agriculture is less risky than other asset classes as crops provide a yield each year with little to no correlation with the stock market. However,

some of the investors show their concerns about the different risks associated with agriculture as it depends on the climate and biological variables. Natural hazards such as excessive rainfall, flooding, storms, drought, and the outbreak of pests or diseases can limit crop growth as well as market risks such as price changes. The availability and reliability of the information, such as farm records, the supply of produce, demand for produce, cost of production that depends on input costs and crop yield, market price data and price movement of each plant before being harvested, harvesting and end of seasons could help a farm with rational risk management and protect it from uncertainties.

Building trust with stakeholders is an important factor for business, followed by ethical standards. Such trust and creditability are generated by the information given to stakeholders, clear business goals that sustainably enhance effective land usages, commitment to a managing farm that respects social and environment, and providing consumers safe-to-consume produce. There should be transparency so that everyone can get the information. Meanwhile, regular farm visits of stakeholders involve more than monitoring. They should also provide learning exchange, meeting, and interaction to encourage continuous improvement and address product quality assurance through their experience rather than via certification. Trust and creditability are a consequence of participation. However, the main difficulty encountered is the necessary time investment of stakeholders to participate in the system, since it requires significant involvement. The participation of stakeholders in the system at different stages, visiting report and report evaluation, which can be recognized as certification tools for safe produce, is still in doubt even the results in this study show that stakeholders' participation in the production process has positive effects to build trust. However, the sample sizes were small and limited to Bangkok and nearby areas. Furthermore, the recognition of self-guarantee is low compared with third-party certification systems and may not be acceptable for export; produce can be marketed locally or within the country. CO-VEGGIES's conceptual model should create an in-house logo that aims to earn consumers' trust in the farms' produce and to be recognizable as a guarantee of food safety. The study of Wongprawmas et al. (2015) found that the top store brands tend to be considered as the prominent indicators of food safety than food safety labels as the consumers believe that private farms will be more concerned about their reputations, leading them to be more effective in food safety controls. Figure 13-14 show the conclusion of this study, the answer of research questions, and the research limitation.

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