DEFINITION OF TERMS

Operational Terms

Admin. A person responsible for the performance or management of administrative business operations.

Agriculture. is the cultivation of plants and cattle. Agriculture was an important step in the growth of sedentary human civilization, since it produced food surpluses that allowed people to live in cities.

Crops. It is a plant or plant product that can be grown and harvested for profit or subsistence.

Department of Agriculture. It is the one who manages and monitors the system and also an administrator.

E-commerce. Commercial transactions conducted electronically on the Internet

Farmers. A person who owns and sells agricultural crops..

Online Shopping. The action or activity of buying goods or services via the Internet.

Technical Terms

Agri-Market. It is a platform that is used by the system.

Geotagging. is the process of adding metadata to a digital map that contains geographical information about a location.

CHAPTER I

INTRODUCTION

A farmer's life is frantic and stressful. A lot of chores and effort must be accomplished every day in order to reach their final aim. A typical day on the farm begins extremely early. This is to be done in order to do chores more rapidly. They prepare the tools and machinery they will need for the day once they are ready. If crop harvesting is required, it is normally done first so that the crops may be supplied promptly while they are still fresh. Multitasking is rather common among farmers, which is why a farm is run by a group of farmers rather than just one. Following the harvest, some individuals would work to bag the just gathered crop, while others would prepare the field in preparation for the afternoon's planting. Occasional pauses are taken to rest and eat in order to have enough energy for the remainder of the day. Because their duties are demanding, they must take frequent breaks. Many duties are completed throughout the day, such as transplanting seedlings, inspecting crops for insects or beetles, checking on animals, and many more. A farm life may appear to be exhausting and laborious. But, at the end of the day, these farmers are content and fulfilled because they know that the labor they perform supplies food for families all around the world.

Farmers having trouble on how they sell their products to the entire market. As they also have financial difficulties. For the near future, if this continues, local farmers might be lessened and/or gone. Most products, especially fruits and vegetables are imported, a reason why local farmers forcely sell their products at low cost, just to buy it from them.

In fact according to Ashokkumar et., al (2019) The development of agriculture has been on under development for the few years due to death of proper trading system for selling the harvest to the benefit of the farmer, for the Indian farmers it has become at raggedy over the market to get good price for their produce due to the dearth of information and the involvement of broker within the Agricultural turn out Market Committee.

Stated by Go (2021) Additionally Small-scale farmers dominate agricultural output in the Philippines. According to the 2012 Agricultural Census, about 90% of agricultural land holdings are less than three hectares, and most farmers rely on many layers of middlemen to concentrate and transport their goods to ultimate markets.

Farmers' reliance on these marketing platforms grows as they move further away from their markets. In these circumstances, middlemen frequently haggle down costs without passing the savings on to customers.

One of the reasons for the lack of bargaining power by farmers in dealing with intermediaries is high trade costs, which allow the latter to engage in price gouging. When trade costs are low, more intermediaries compete in both producer and consumer markets, and prices tend to decrease while farmers benefit. Studies have shown that lower trade costs take pricing power away from intermediaries. For example, intermediary profits tend to be larger for remote locations in Sub-Saharan African countries and are also associated with higher consumer prices. Reducing trade costs can alter the distribution of profits along the marketing chain and benefit farmers.

To solve this problem other marketing platforms like E-commerce can be used to boost the bargaining power of the farmers.E-commerce is the buying and selling of goods

or services via the internet, and the transfer of money and data to complete the sales. It's also known as electronic commerce or internet commerce (Zande, 2020). The convenience of this form of buying and selling has grown very popular, and we are now surrounded by e-commerce, where it performs an important function in the lives of most people.

According to Gokarni Dhande, Amit Chougule, Anuja Gode, Prof. Reena Deshmukh "Agremart Online Revenue for Farmers" (2022) with the help of using Agriculture Ecommerce farmers will have a way to present their yield in a wider market irrespective of the physical distance and reach the consumer directly. This will help improve the financial status of growers and economic growth of the country.

Apart from this According to Ruan et., al (2019) The world's growing population requires people to use innovative technologies to boost agriculture output. One possible technology for achieving precision agriculture, which is projected to dramatically boost yields, is the Internet of Things (IoT) such as geotagging.

Geotagging is the process of adding metadata to a digital map that contains geographical information about a location. The information typically consists of latitude and longitude coordinates, but it may also include a timestamp and links to additional resources. Geotag metadata can be manually or programmatically added.
Geotagging is also known as dropping a pin in Google Maps and other GPS services. To share information about a specific physical location, pins can be tagged with contextual information. Photos, videos, website URLs, and QR codes are all popular types of contextual information.

Location identification has become a standard feature of many social media sites and can be a useful tool when integrated into business and medical applications. Some social networking sites, for example Some social networking sites and services reveal their users' locations, allowing users to know exactly where their friends are while they are logged in to that website (or check in to the service). As devices and tracking become more common, social media tracking becomes a more powerful and valuable tool for users.

The main aim of this paper is to provide an online web platform for poultry and agriculture farmers, where they can sell daily produced goods directly from their field location or from home itself without going elsewhere, even to the market. The produce that is brought from farmers will be available for customers who can buy vegetables, fruits, eggs, etc. online which will be home delivered to them.

Farmers will be asked to pin their location in this system so that customers know where they will get the crop products they want to buy and to estimate their delivery time if it will be delivered soon due to the distance they will see in the pinned location. To accomplish this goal, we will employ geotagging technology in conjunction with the use of google map API that will give us the way to integrate the said tech in our system.

Research Objectives

General Objectives

This study aims to develop an E-commerce Portal for Farmer's Field Crop Agricultural Product with Geotagging.

Specifically, it aims to meet the following objectives:

1. Create an E-commerce portal that helps the local farmers to:

    a.   sell products;

    b.   pin farm and product's location;

2. Integrate the geotagging to the system.

3. Test the functionality of the system.

4. Evaluate the acceptability of the developed system.

Conceptual Framework

Figure 1 shows the concept of the Agri-Market web based application. The system requires the farmer and consumer to register their data information. Upon logging in, Admin will accept or decline who registered the seller. Registered farmers can access the following features; they can add their product and pin their location and see the sales of his/her business while the consumer can access the features of displaying the products and can see the location of the farmer. And also, the admin can monitor the sales of the seller/farmer.

The registered farmers are delivered on the database, to be reviewed by the admin.

Project Purpose

The goal of this project is to help farmers using an e-commerce system speed up and make it easier for them to do business with potential buyers.

Farmers. To help them to trade online.

Department of Agriculture. Monitoring and assisting farmers in their agricultural field crops related issues will be more convenient.

Future Researchers/Developers. The future researchers can gain some idea on how to improve the system and can have an additional point of view on the development process related to the system.

Scope and Limitation of the Study

The proponents will be developing a web-based e-commerce portal for selling farmers crop products from Kalayaan to Siniloan Laguna. This E-commerce Portal uses geotagging features to pin the exact farm or shop location the farmers own that will allow the customers to see where exactly the crops came from. The portal also comes with responsive features which makes it accessible on mobile devices.

There were also few limitations of the portal, first the portal was only accessible when there was an internet connection. Second, the portal itself is not an application so it can only be opened using any browsing apps. Third, the products you can sell using the portal are only crop products. Fourth, farmers are the only users that are allowed to register as sellers.

CHAPTER II

REVIEW OF RELATED LITERATURE

The goal of this Literature Review is to discuss the data, ideas, and articles gathered for the researcher's study, as well as how e-commerce supports local farmers for their everyday life. This literature review will concentrate on the web applications for local farmers. The researcher ensures and verifies that the information below is relevant and closely related/similar to the proposed topic.

Studies and Literature

Agriculture

According to Anthony King (2017) As farmers have accepted more technology in their quest of higher yields throughout the ages, the concept that "more is better" has come to dominate farming, making small-scale enterprises unworkable. However, developments in robotics and sensing technology are threatening to destabilize the current agricultural economy. "There is the potential for intelligent robots to revolutionize the economic model of farming so that it becomes profitable to be a small producer again," says Carnegie Mellon University robotics engineer George Kantor in Pittsburgh, Pennsylvania.

Apart from this according to McKena Lipham , Wilson RobertVanBuren (2022) C4 grasses dominate in both natural and agricultural contexts, and their broad success is largely due to their resistance to environmental extremes. As a result of domestication and intense selection, major cereals have lost most of their natural stress tolerance. Millets are an exception, having been domesticated in semi-arid Sub-Saharan Africa and

Asia, where selection rewarded tolerance and stability above production. We examine the evolutionary and domestication histories of millets, as well as the features that allow them to withstand stress, adapt to a wide range of environments, and have superior nutritional attributes when compared to other cereals. We address genome editing and sophisticated breeding technologies that can be utilized to generate future cereals that are nutritious and climate resilient.

Crops

According to Jincky D. Dogello , Ulysses A. Cagasan (2021) The Philippines' crop production innovation techniques must be evaluated in order to identify the country's capacity to achieve maximum productivity and income.Furthermore, rising food demand from a fast growing population has increased the need of developing a more productive and safer diet. As a result, there is a need to explore and evaluate agricultural production innovation solutions in the Philippines. Thus, the purpose of this article is to identify new crop production techniques in the Philippines, appraise current technological breakthroughs in crop production in the Philippines, and explore the significance of crop production innovations and advances. The focus of study is on the creative tactics enforced by researchers through the implementation of various smart farming innovations (SFI) and digital agriculture (DA). In contrast, advancements include the use of F1 seeds, a solar power irrigation system, a crop planning website (Farmers' Guide Map and Agri-information assistance portal), and several apps that have been developed (Rice Crop Manager, AgriDOC, and KROPS). This enhancement assisted farmers in making more effective use of water, fertilizer, and other agricultural inputs in an ecologically

responsible manner, hence increasing crop output while preserving a safer environment for farmers and the general public.

Issues in Agriculture

According to Aarthi Dhakshana Jd, Rajandran Kolanda Velu Rethinavelu (2017) Direct marketing is a one-on-one interaction between producers and consumers. This paper discusses some of the fundamental components and challenges of direct selling. The examination of the obstacles faced by farmer direct marketing will be useful in taking efforts to improve direct marketing. This study aims to identify farmer constraints and investigate the elements that make direct selling more difficult. Based on the literature analysis, a variety of difficult aspects affecting direct marketing are measured. The survey was done among 61 farmers who were active in direct selling and other vegetable marketers. The difficult aspects were quantitatively assessed. According to the research findings, farmers lack cold storage and face intense competition in direct selling.

E-commerce

According to Gokarni Dhande, Amit Chougule, Anuja Gode, Prof. Reena Deshmukh "Agremart Online Revenue for Farmers" (2022) with the help of using Agriculture Ecommerce farmers will have a way to present their yield in a wider market irrespective of the physical distance and reach the consumer directly. This will help improve the financial status of growers and economic growth of the country. The projects' main objective is to help farmers ensure greater profitability through direct farmer to end user communication. This projects major perspective is to get the farmers benefitted by selling online products at better prices.

Simply put, Agriculture Ecommerce will prove profitable to farmers to present their yield in a wider market irrespective of the physical distance and reach the consumer directly. Successful development of E-Commerce of agricultural products will help to improve the financial status of the growers and economic growth of the country. The main objective of this project is to help farmers ensure greater profitability through direct farmer to end user communication. Our project deals with a major perspective that the farmers get benefitted by selling the products online at better prices. The main users of this agricultural app are farmers, customers, and admin. Farmers will get a unique interface where they can perform selling of their products, get the correct rates of the products, get in touch with SMS or Email and gather knowledge of different schemes and get paid online.

In fact According to Ruan et., al (2019) The world's growing population requires people to use innovative technologies to boost agriculture output. One possible technology for achieving precision agriculture, which is projected to dramatically boost yields, is the Internet of Things (IoT). However, the large-scale implementation of IoT systems in agriculture faces hurdles such as high investment in agriculture IoT systems and non-tech-savvy farmers. To address these problems, we categorize IoT applications in agriculture into four categories: controlled environment planting, open-field planting, animal breeding, and aquaculture and aquaponics. The emphasis on installing agriculture IoT systems should be broadened beyond the growing cycle to the agri-products life cycle. Meanwhile, the energy issue should be considered while implementing farm IoT devices. The implementation of green IoT systems throughout the agri-product life cycle will have a significant influence on farmers' interest in IoT approaches. Emerging

finance, operation, and management (FOM) challenges in the adoption of green IoT systems in agriculture are noticed using the life cycle framework, such as IoT finance, supply chain and big data financing, network node recharging and repairing, and IoT data management. These FOM concerns necessitate novel farm production methods and new sorts of agribusiness firms.

Geotagging

According to Ate Poorthuis "International Encyclopedia of Human Geography (Second Edition) 2020, Pages 137-140 Elsevier" (2020) the geotag is a form of geographic identifier that can be linked to any digital object Because of a wide array of new technologies that developed around the time of the revolution, much digital information now includes a geotag. These massive geotagged datasets, which range from simple websites and Wikipedia to social media platforms and transportation records, impact the world around us and how we undertake a geographic study on it. Although it is a simple concept, the geotag has enabled a new generation of geographic research that is commonly referred to as "digital geography."

Furthermore geotagging in photos involves inserting location data. Latitude and longitude are formatted into a picture file. Inserting location data can be done manually or automatically by a location-aware picture at the capture device (often a camera or cell phone) creation period.

In addition to this according to Rushi Sheth, Keyur Brahmbhattgeo "Geo-Tagging of Agricultural products using mobile application in remote areas" (2021) geo-tagging is a buzzword in the industry right now. Things are being geotagged, whether it's a blog

article or a social network status update. When a user creates a new post on social media platforms such as Instagram, Facebook, and Snapchat, he has access to tools such as adding a location to the post, which is an example of Geo-Tagging. Geo-tagging entails adding critical geographical information such as longitude, latitude, and altitude to the metadata of pictures, video files, audio files, and so on. In a country like India, where agriculture accounts for around a quarter of GDP and employs roughly half of the workforce, the notion of geotagging may serve a variety of purposes.

Various laboratories in India conduct timely tests on agricultural goods to verify quality, nutrition efficiency, and pesticide residues; as a result, sample collectors go out to collect various agricultural items. However, determining whether the samples were collected from the same location as claimed is difficult. They proposed a system that laboratories can use to collect samples by capturing a picture of the sample in a mobile application, retrieving latitude and longitude in the background to geotag each sample, thus keeping the authenticity of the sample.

The proposed technique of geotagging agricultural items via a mobile application appears to be a superior alternative to the present practice of sample collectors manually entering data into registers. Geotagging samples would also aid in avoiding unethical acts and preserving the validity of the samples gathered. Because the data after digital entry would be synced to the central server with a single tap on the screen, a significant amount of time and manual effort might be saved.

Related System

Features	Registration	User-Friendly	Payment Option	Notifications	Social Media Integration	User rating	Chart	Feedbacks	Navigations	Checkout	Geotagging
Agri-Market	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Application 1	✔	✔	✔	✔	✔	✔	X	✔	✔	✔	X
Application 2	✔	✔	✔	✔	✔	✔	X	✔	✔	✔	X
Application 3	✔	✔	✔	✔	✔	✔	X	✔	✔	✔	X
Application 4	✔	✔	✔	✔	✔	✔	X	✔	✔	✔	X
Application 5	✔	✔	✔	✔	X	✔	X	✔	✔	✔	X
Application 6	✔	✔	✔	✔	X	✔	X	✔	✔	✔	X
Application 7	✔	✔	✔	✔	✔	✔	X	✔	✔	✔	X
Application 8	✔	✔	✔	✔	X	✔	X	✔	✔	✔	X
Application 9	✔	✔	✔	✔	X	✔	X	✔	✔	✔	X

Application 1 was founded in May 2020, amid a global pandemic, by people who shared the same passion for nature. They offer hassle-free online shopping, safe delivery options, and premium customer service.

Application 2 is a wholesale marketplace for buyers looking to purchase large quantities of products at the lowest price. Alibaba allows buyers to negotiate directly with manufacturers, create custom products, and achieve significant cost savings.

Application 3 is an e-commerce platform that lets you shop online from the brands you already know while discovering new shops and sellers.When you're ready to make a purchase, be sure that the Shopee platform lets you do so in a safe and seamless manner. You can browse product ratings and reviews, make risk-free payments with Shopee Guarantee, and track your products' delivery hassle-free.

Application 4 is one of the fastest growing e-commerce marketplaces in the Philippines. Southeast Asia is an area that is experiencing rapid growth in e-commerce. There are numerous cross-border vendors who wish to get into this market, and Lazada is the most effective way to do it.The platform helps product owners and merchants to find digital services, provided by selected Lazada partners, like customized store design, product details template design, customer service, logistics support, fulfillment centers, digital marketing, photography and video, ERP, livestream, and more.

Application 5 is India's largest fresh produce supply chain company that is solving one of the toughest problems in the world through technology. We connect producers of food directly with retailers, restaurants, and service providers using in-house applications that drive end to end operations.

Application 6 provides a digital supply chain of fruits and vegetables from farm to business. The application enables fruits and vegetable stores to procure fresh produce directly from farms. It manages the logistics, storage, supply to clients in retail chains like Big Bazaar, Reliance Retail, and online stores like BigBasket and Grofers. The company claims to use AI-enabled proprietary digital tools for supply chain management and logistics optimization. The company offers mobile applications for Android and iOS platforms.

Application 7 is an Online E-distributor of farm products. The company procures fruits, dairy, and vegetables directly from farmers, aggregators, and cooperatives to supply in hotels, restaurants, retailers, wholesalers, and retail outlets. It also offers an online ordering application that enables the existing clients to order food and Agri products. The company offers mobile applications for Android and iOS platforms.

Application 8 is an Online B2B platform offering seafood products. The company offers the platform for the wholesale trade of seafood with integrated shipping, payment protection, and quality assurance services. It uses deep tech technology for offering the fastest harvest-to-retail solution. The application provided by the company is available on the Android platform.

Application 9 is an app-based marketplace to trade agricultural commodities. It allows farmers and producers to sell the products to retailers, wholesalers, and individual customers. It allows buyers to buy fruits, vegetables, grains, meat, seafood, etc. It delivers products through an in-house delivery team Tani-Express. The mobile platform is available for Android users. The company claims to offer free shipping over the purchase of a minimum amount.

Synthesis

Studies show that farmers face some problems including intense competition in direct selling, lack of bargaining power by farmers in dealing with intermediaries and high trade costs, which allow the latter to engage in price gouging. These problems can be solved by introducing e-commerce technology in agriculture as its selling platform. Agriculture Ecommerce will prove profitable to farmers to present their yield in a wider market irrespective of the physical distance and reach the consumer directly and will also help to improve the financial status of the growers and economic growth of the country.

The Agri-Market: An E-commerce Portal for Farmer's Field Crop Agricultural Product with Geotagging is an online shopping web based application for field crop agricultural products made for the Local farmers. This will provide farmers a way to sell and promote their products and with the use of geotagging they can map their location for the customers to choose where to get their needs according to their convenience.

CHAPTER III

METHODOLOGY

In this chapter, we will discuss the research design, population of the study, sampling design, data collection instrument, statistical treatment, project design, planning and requirement analysis, designing the software, building the software, testing, deployment and maintenance, and story board.

Research Design

Descriptive research is defined as a research method that describes the characteristics of the population or phenomenon that is being studied. This methodology focuses more on the "what" of the research subject rather than the "why" of the research subject. In other words, descriptive research primarily focuses on describing the nature of a demographic segment, without focusing on "why" a certain phenomenon occurs (Bhat, 2019). Moreover, Hubbard (2016) stated that descriptive research is the collection of data describing some phenomenon that may or may not be quantifiable such as close-ended scales, open-ended survey questions, observation, and interviews. The purpose of the research is to evaluate or measure the results against some known or hypothesized standards.

In terms of gathering the information, the proponents utilized phone and face to face survey methods in collecting the necessary information. The project was designed to create an ecommerce web application with geotagging to help local farmers to easily trade their agricultural crop products.

Population of the Study

The study will have the following population of farmers in Kalayaan,Paete, Pakil, Pangil and Siniloan of Laguna who are known for planting agricultural crops here as the main focus of the study.

Sampling Design

Slovin's formula was used to calculate the sample size. With regard to the level of accuracy, a confidence level of 95% as suggested by Kothari (2005), this means that there are 95 chances in 100 (or .95 in 1) that the sample results represent the true condition of the population within a specified precision range against 5 chances in 100 (or .05 in 1) that it does not.

Data Collection Instrument

Interview. We gather the data and masterlist of the farmers to the selected municipalities. We conduct an interview with the municipal agriculturist of each municipality. Following the development of the agri-market ecommerce system website, the interview will disseminate and respond by exchanging information through a series of questions and answers, as well as presenting the system's conceptual framework that includes two or more persons. The researcher will gather the data and analyze it with the help of a statistician and IT professionals. The findings and recommendations will be noted for future studies.

Internet. The Internet helps the researcher to find associated information on the development of agri-market ecommerce systems. With the use of Google Scholar as well as other sources of information and YouTube tutorials for basic website design are helpful

for the design of main features of the website. The researcher receives 100 Review of Related Literature (RRL) and carefully examines it, selecting the most important RRL that has as many citations as possible to fit their study into 30 RRL.

Statistical Treatment

As indicated in the table below, a Likert scale is used to gather the views and opinions of the people interviewed. It has a range of 1 to 5, with 1 being the lowest scale and 5 as the highest to indicate their level of satisfaction.

Table 1. *Likert Scale for System Evaluation*.

Scale	Numerical Rating	Descriptive Rating
5	4.40 - 5.00	Excellent
4	3.40 - 4.19	Very Good
3	2.60 - 3.39	Good
2	1.80 - 2.59	Fairly
1	1.00 - 1.79	Poor

Project Design

The Agile methodology is popular among product teams because it allows them to create products faster that meet customer needs better. Though Agile's roots are in software development, it's very effective in design as well.
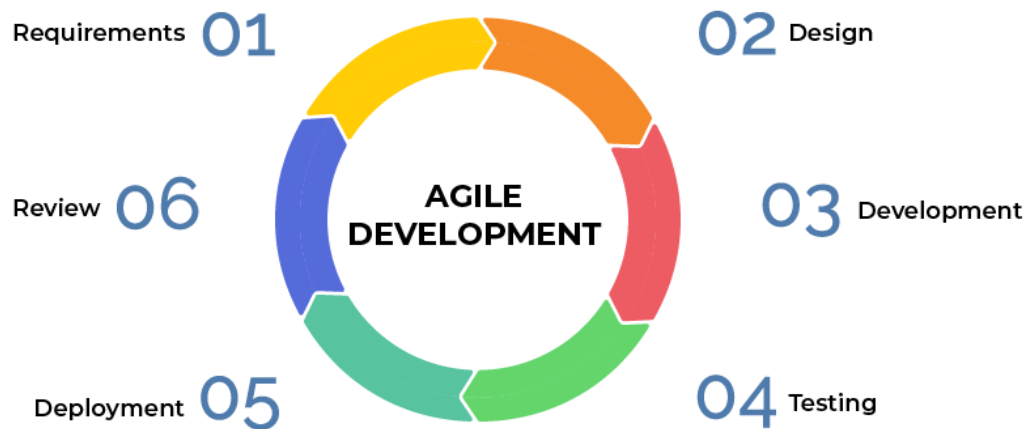
Figure 2. Agile Methodology model

Any modifications were the result to client's feedback using the system. The following steps were undertaken by the developers to design the project.

Requirement Gatherings. During this phase, the researchers identified the need for the system based on the study being conducted on An Ecommerce website as the requirements identified.

Design the Requirements. The developers will create a web application with geotagging. For this kind of feature, geotagging is the way to pinpointing the location of farmers to easily locate them by the customer.

Construction. In this phase, software development will start. The developers will be using the following tools in development; MYSQL DATABASE, SUBLIME TEXT, API, PHP AND BOOTSTRAP . During the development, the proponents and developers will communicate the features of the system.

Testing/Quality Assurance. In this phase, the system should be completed and tested to check if the system is completely working and checking for some bugs. This phase will be done through brainstorming, debugging and developing.

Deployment. After the testing of the system, it was deployed to the clients. In this phase, the proponents and developers will be able to finish the system. After presenting the features of the system, the clients tested the system if it was able to meet the users expectations. During this phase, the developers jotted down notes of the client to improve the system and would be more user friendly.

Feedback. In this phase, it is also known as Maintenance phase. During this phase, the system was tested by the clients. Any/error or bugs encountered were documented and reported to the developer team to modify the system to client specifications.

Planning and Requirement Analysis

Agri-market is an ecommerce system that will help the farmers to sell their agricultural crop products online. Promoting our own crop products by the farmer can see they will be more willing to work to plant their crops

For the documentation of the proposed system, the developer will need the following tools and equipment:

• Laptop/Desktop

• Android Phones

• Related Literature

• Paper / Bond Paper

• Ballpen

The developer will be needing the following software for the preparation in developing and designing of the proposed system:

• Sublime Text

• MySQL Database

• Google Map API

Testing

After the development of the system, the researcher will test the app to see if there are any errors that need to be fixed and change other mechanics of the system so that the system may be improved as quickly as possible. The system will be tested by IT experts.

Testing will also include functionality, portability, usability, and security test to determine if the system meets the purpose towards its user. The system will be tested by farmers to monitor the system progress of the researcher. The researcher will use the Functionality, Sustainability and Usability of the ISO 25010 and it will be evaluated by the IT Experts.

Deployment and Maintenance

      After the system has been checked and validated as an effective system that can help farmers to their trading online, the system will now proceed to implement in LSPU. Upon using the web application by the farmers and Department of Agriculture, the researcher will conduct a survey to the user about their experience in the web application and get feedback that can help the developers for the future improvements.

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