E-Farmer Information System and Short Message Service (SMS) Implementation Gateway for Agribusiness of Palm and Rubber Plantations in Pulang Pisau Regency

Vincentius Abdi Gunawan[1], Licantik[1] and Leonardus Sandy Ade Putra[2]

[1]Department of Informatics Engineering, Palangka Raya University, Palangka Raya, Indonesia
[2]Department of Informatics Engineering, STMIK Palangka Raya, Palangka Raya, Indonesia

Keywords: E – Farmer, SMS Gateway, Website, Palm Oil, Rubber.

Abstract: Indonesia is an agrarian nation in which the majority of people work as farmers, especially on palm oil and rubber farming industry. Pulang Pisau is a district in Middle Borneo which produces palm oil and rubber commodities and a place where some parts of the plantation still have not received an access to the internet. The only available accesses are phone calls and Short Message System (SMS). This causes quite a problem for local farmers on knowing the latest price for palm oil and rubber commodities which will be sold on the market. This condition is often used by the merchants to mess with the price and seek bigger profit by buying the palm oil and rubber commodities in a cheap price and then sell them on the market with higher price. This problem disadvantages the local farmers.

1 INTRODUCTION

Indonesia is a country which the majority of people work in the fields of agriculture and plantation. According to Badan Pusat Statistik (BPS), 31.74% of Indonesia's labor force works on the plantation sector (Julianto, 2017). Many agricultural and plantation products are produced by the society and two of them are palm oil and rubber. The results of the production from the local farmers are 78.97%, 10.08% from the large state-owned plantations, and 10.95% from private plantations (Damanik, 2012).

In some countries in Indonesia, farmers receive informations of commodity prices from the internet or from the related official that gives information about the commodity prices. Even so, there are still many farmers who could not get enough access to know the produced commodities' price, this can be caused by the absence of internet network or because they live far from the needed source of information. This problem usually impacts on the many plantation products which are not well distributed and also causes the merchants to mess with the price (Olivya, 2017).

The Pulang Pisau Forestry and Plantation Departement's role on helping the farmers gain knowledge and information in the agricultural and plantation sector, distributing seed and fertilizer, and also controlling the price of the agricultural and plantation commodity, especially on the Pulang Pisau district, is important. Information system about the price of the commodity on agricultural and plantation sector is rarely found, and has yet to cover the whole community. Which is why a system that can cover the whole community, especially farmers, by using a method which is more simple yet still gives the information about the needs of farmers in terms of agriculture and about commodity prices is needed.

This research was done to help solve the problem above by making a web-based system by implementating the SMS Gateway technology which is a gate for information spreading by using Short Message Service (SMS) as one of the solution to reach each individuals on the society, especially the farmers who has yet to achieve internet network. The Pulang Pisau Forestry and Plantation Departement cooperates with the researcher in the means of disseminating information about the price of agricultural products through a website, so that the information can always be accessed by farmers using SMS or website.

2 RELATED WORKS

The previous information about commodity price has become popular and grows rapidly to be able to make a system which is more practical and has a wide range.

The first research is the design of agricultural product marketing information system (Olivya, 2017). By mentioning the merchant problem as a reason to create an android-based system.

Second, the design of an information system and an auction for agricultural products as a case study for the Departement of Agriculture. The system will be designed by creating a website and using PHP as the programming language (Gantini & Nurnajah, 2015).

Third, the system which was designed as e - farmer and act as a web-based information system. The website was designed by using OWL language (Web Ontology Language) and is divided into various classes and sub-classes (Pani & Mishra, 2016).

From the designed system application using an android or website application, some errors which are in need of perfecting can still be found. The system which was designed by the researcher has helped farmers on getting information more easily, but it still creates problems to some farmers who live on a region with no internet network. The writer thinks that a system that can help farmers give informations about plantation by using a more practical way and can cover all regions, especially to the ones who does not have any internet network, is needed.

3 METHODS

Figure 1: E – Farmer architecture.

Based on some references, this research was designed to make a use out of the technology of website and SMS Gateway to give information regarding the price of commodities and the availability of goods. The full architecture on the created system can be seen on Figure 1.

3.1 Website

Website is a page that serves information in the form of writing, picture, sound, or video that is put inside a server or a hosting which can only be accessed by using the internet.

3.2 PHP

PHP (Hypertext Preprocessor) (Yusuf, Kusniyati, & Yurike, 2016) is a website server-side programming laguage which is open source and specially designed for website. PHP is a script which integrates with HTML and is located on a server (server side HTML embedded scripting). On a website system application, PHP functions as a server side scripting language, which means as a line of codes which will be fully executed on the server, then the result of the execution will be sent to the client.

3.3 Short Message Service (SMS)

Short Message Service (SMS) (Nurhalim & Gunawan, 2011) is a text component of telephone communication service, website or cellular communication system, using the communication protocol standard which allows short text message exchanges between fixed line or mobile phone device. The term SMS is used as a synonym to all types of short text message in many parts of the world.

3.4 GAMMU

GAMMU (GNU All Mobile Management Utilities) (Nurhalim & Gunawan, 2011) is an application which can be used to manage various functions in a cellphone, modem and other similiar devices. The functions which can be managed by *Gammu* are the Phonebook and SMS function. *Gammu* is one of the many library open-sources which was made as a gateway or connector between a cellphone and computer device.

3.5 MySQL

MySQL is a database server which is closely related to PHP. MySQL is a database relations management system which is open-source. This database management system was created by Michael

"Monty" Widenius, David Axmark, and Allan Larson on 1995. The reason why MySQL program was written was to develop web application. MySQL uses SQL language standard (Structure Query Language) as an interactive language on managing data. MySQL orders are usually called Query (Marsita, 2011).

4 RESULT AND DISCUSSION

4.1 Price Data Reference

Information about the content of the created website was obtained as a whole from the Plantation and Forestry Departement of Pulang Pisau District. Important data such as the price of palm oil and rubber is adjusted with the price on the market. Information about the availability of seeds and fertilizers will be displayed on the website which can be accessed as a whole by using SMS Gateway or by opening the designed website.

4.2 Website Feature

Website will be managed as a whole by the Plantation and Forestry Departement of Pulang Pisau District, both in information delivery and price determination that will be updated in real-time. Visitors and farmers are able to access the website and obtain a more complete information. Display of e - farmer website which was built can be seen on Figure 2.

Figure 2: Main display of E – Farmer website.

Aside the many features that can be found in the website, a main feature was made to achieve information regarding the price and availability of seeds. There is a feature to find out the price of the needed commodity and it is displayed on Figure 3.

A display to find out the price of palm oil and rubber can be seen on Figure 4, while Figure 5 shows a display of the availability of seeds and fertilizer.
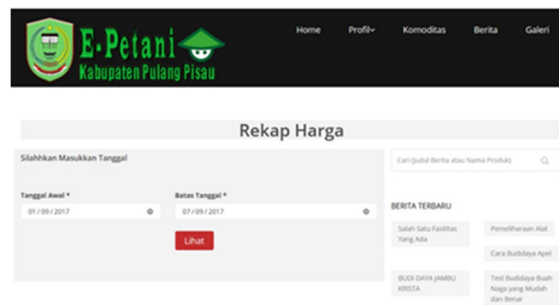

Figure 3: Display of price recap information.

Figure 4: Display of palm oil and rubber price information.
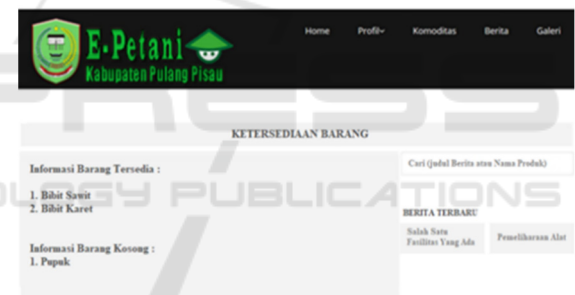

Figure 5: Display of the availability information of seeds and fertilizer.

4.3 SMS Process

The created system uses SMS Gateway to help farmers that live on areas with no internet network. SMS Gateway utilizes SMS service to be able to expand the coverage area, especially the area with no internet access.

Gammu acts as a connector between the farmers and e – farmer server by communicating through SMS. SMS Gateway architecture using Gammu can be seen on Figure 6.
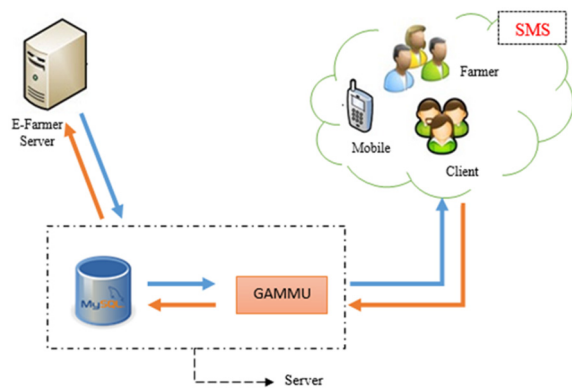
Figure 6: SMS application architecture with GAMMU (Stone, n.d.).

SMS Gateway system has three features which can be used by the farmers to achieve information regarding the price and availability of seeds and fertilizer. Table 1 displays the SMS format which is used to obtain information.

Table 1: Information format of prices, seeds and fertilizer information.

Keyword	Format
Price of Palm Oil	HARGA <SPASI> SAWIT
Price of Rubber	HARGA <SPASI> KARET
Information of Seeds & Fertilizer	INFORMASI <SPASI> PERKEBUNAN

This SMS message format will be sent to the system to obtain information. The system will receive SMS message according to the format and will confirm the incoming message and process the data. The system will then send the needed information back to the message sender. Replies from the system regarding the price of commodity is displayed on Figure 7 and Figure 8. Information regarding the availability of products is shown on Figure 9.

Figure 7: SMS reply for the price information of palm oil.

Figure 8: SMS reply for the price information rubber.

Figure 9: SMS reply for information on the availability of seeds and fertilizer.

From the test result which has been done by using SMS Gateway, it is now known that the system can respond to the orders which were sent. Replies from the system give information on the latest price and information about the availability of seeds and fertilizer in real time.

5 CONCLUSIONS

E – Farmer system have been used by farmers, the society, and also the Pulang Pisau Plantation and Forestry Departement as a media to achieve and give information regarding the price of palm oil and rubber, availability of fertelizer and seeds, and also to reduce price-play which is done by the merchants on the harvesting season.

SMS application through SMS Gateway which was designed and became one with the e - farmer system helps expand the access range for farmers and the society to achieve information, especially on the areas without internet network.

REFERENCES

Damanik, S. (2012). Pengembangan karet (Havea brasiliensis) berkelanjutan di Indonesia. *Perspektif*, Vol 11(1), pp 91–102.

Gantini, T., & Nurnajah, R. (2015). Sistem Informasi Periklanan dan Pelelangan Barang Hasil Pertanian (Studi Kasus Dinas Pertanian), Vol 1(April), pp 33–39.

Julianto, P. A. (2017). Negara Agraris, Mengapa Harga Pangan di Indonesia Rawan Bergejolak? *Kompas.Com*. Retrieved from https://ekonomi.kompas.com/read/2017/02/19/1639 12926/negara.agraris.mengapa.harga.pangan.di.indo nesia.rawan.bergejolak.

Marsita, D. (2011). PEMBUATAN SITUS WEB ALMAMATER PERGURUAN TINGGI MENGGUNAKAN PHP DAN MySQL. *Universitas Diponegoro*.

Nurhalim, I., & Gunawan, D. (2011). PSTN VoIP application support system design using mobile short message service (SMS): Case study of PSTN VoIP missed call notification to mobile phone by SMS. *Proceedings of the 2011 International Conference on Electrical Engineering and Informatics, ICEEI 2011*, (July), pp 4–7.

Olivya, M. (2017). Sistem Informasi Pemasaran Hasil Pertanian Berbasis Android. *Jurnal Inspiraton*, Vol 7, pp 60–69.

Pani, S., & Mishra, J. (2016). Building semantics of E-agriculture in India: Semantics in e-agriculture. *Proceedings - 2015 International Conference on Man and Machine Interfacing, MAMI 2015*, pp 0–3.

Stone, N. (n.d.). Penjelasan Lengkap Tentang Gammu SMS Gateway • Istanakecilku. Retrieved from https://www.istanakecilku.com/gammu-sms-gateway/

Yusuf, R., Kusniyati, H., & Yurike, N. (2016). Aplikasi Diagnosis Gangguan Kecemasan Menggunakan Metode Forward Chaining Berbasis Web Dengan Php Dan. *Sistem Informasi*, Vol *9*(1), pp 1–13.