

E-Farmer Management System for Empowering Sri Lankan Small-Scale Agriculture-Based Producers

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Abstract — Sri Lanka had a strong agriculturally based economy. The agriculture sector of Sri Lanka contributes seven percent to the national GDP. Agriculture Industry can be defined as one of the most difficult industries when it comes to trading Agri products. The thirty years of a long war and the crisis situation in the country and policy changes in the various government administrations had caused a huge impact on Sri Lankan agricultural market systems. And the agriculture crisis caused a huge impact on small-scale producers in Sri Lanka to sell their products. To overcome this situation government has done several projects. Dedicated Economic centers are an example of such a project. The research was carried out in the Dambulla dedicated economic center to find out some significant issues that happened in the Sri Lankan agro-economic sector. The main objective of the research is to provide a feasible solution for those identified problems and empowering Sri Lankan small-scale producers by providing an effective platform to sell their products.

Keywords — Agro Economy, Dedicated Economic Centers, E-farmer Management System

I. INTRODUCTION

Sri Lanka had a strong agriculturally based economy. The majority of Sri Lankans in rural areas depended on the agricultural economy. A large variety of crops are grown in Sri Lanka. Paddy is the main crop in the Dry Zone, vegetables, and fruits also important crops. There are two main cultivation seasons referred to as “Yala” and “Maha”. For paddy cultivation.[1] Therefore, the agriculture sector of Sri Lanka contributes a considerable percentage to the national GDP (Gross Domestic Product). After the 1970 's this agricultural economy drastically faced a crisis due to the economic reforms implemented in the country from 1978 after the crisis agriculture sector become one of the most difficult industries when it comes to trading Agri products. [2]To overcome this situation government has done several projects.to provide a sustainable solution for those shortcomings. In 1999 an initiative was taken to establish a large-scale market center that would change the marketing situation for farmers. Dedicated economic centers are an example of such a project.[3] Dambulla dedicated agriculture center is the main economic center in Sri Lanka.

II. OBJETIVES

According to the Ministry of rural development, the main objectives of Dedicated economic centers are, Ensure obtaining reasonable prices for agriculture producers for their

crops by providing a targeted market, Provide an opportunity for small scale producers to minimize their transport costs and wastage in transportation,[4] Provide opportunities for wholesale traders to purchase fresh fruits and vegetables, directly from producers, Encourage the business community by providing a competitive marketing environment for wholesale traders.[2] Create an opportunity to distribute area-specific agricultural products among consumers in all parts of the island, provide facilities for consumers to purchase food items at discounted prices. [4]

Marketing agro products are different when comparing to other marketing processes. As shown in fig 1 A large number of small-scale producers (farmers) and large-scale producers are participated in the marketing process because of The lengthiness of traditional market channels and unnecessary interference of the middle person to the marketing process, farmers are unable to get a reasonable price for their valuable crops. [5]Intermediate persons become key players of the marketing system as they have more power to decide the prices of agro products than farmers[6]. farmers have no idea about the market condition of their harvest.

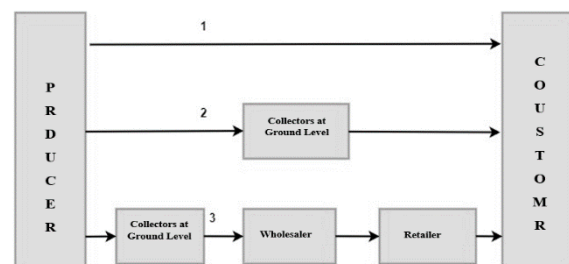


Fig. 1. Steps agricultural Marketing Source: Author

Therefore, the ultimate objective of the system is empowering small-scale farmers by providing a target market and limit the interference of intermediate persons to the marketing process, update farmers, with the latest market conditions. Encourage small scale farmers by providing competitive market information and reduce the lengthiness of current market channels by directly connecting farmers, buyers, and dedicated economic center into one platform to provide a sustainable solution for poor farmers who are great extent looking for a better life.[7]

III. RELATED WORKS

Table 5.Summary of Literature Survey



Autor	Title	Findings					
		Compatibility with any cell	Support the main three	Convenient	Understandable	SMS facility	Daily update Information
Karunaratna KNNS Vidhanagama DU(2015)	“E-farmer Management System for Agrarian Service Centre in Sri Lanka” The system provides information to get decisions through the internet in the form of text and images.[3]					✓	✓
Fernando ONN Wickramanaya ke GN (2014)	“Web-Based Agriculture Information System” design and development of a web-based agricultural information system for the main crops of Sri Lanka.[8]			✓	✓		✓
A consortium of local firm led by e-development labs	Govi Ganana Service A project that strengthen farmers knowledge about market condition[1]			✓	✓		
Similar apps Available in play store							
Seed Code Lab(2019)	“Weladapola” An app that provide price indexes and other related information about agro market[9]			✓			✓
S.I. Developer & Technology (2019)	“Badu Mila” App provides exact the daily commodity prices in Sri Lanka[10]		✓		✓		✓
Govipola (2018)	“Govipola” Govipola is an Agri App offering a digital marketplace for the farming community[11]		✓	✓	✓		✓

IV. METHODOLOGY

Quantitative and qualitative methods are used to correctly identify the information, process, and communication requirements. Mainly knowledge is acquired using both structured and unstructured interviews with domain experts and from relevant documents by using a document analysis method to find the solution to the problem. All the Details and requirements are given from the head of the department and the staff members of Hector Kobbekaduwa Agrarian and the research center to get a broad idea about the Proposed system. As well as all the other important data were gathered by interviewing local farmers and buyers from the Dambulla area.



Fig. 2. Work Process of the system

farmer management system uses a centralized database, as shown in figure 2, Hector Kobbekaduwa Institute is deciding the prices of the vegetables, fruits, and rice along with the government. Those price indexes are sent to dedicated economic centers. From this new web-based system, those price indexes will be Sent to the registered. Farmers, according to their relevant crop by simple SMS alert every morning, then farmers can decide their prices and send them back to the economic center.[12] Then only buyers can know about price indexes. With this new system, the developer has reduced the lengthiness and interference of Intermediate persons to the marketing process by connecting Farmer, Buyer, and economic center into one platform. The researcher uses the agile Dynamic System Development Method (DSDM) for development. Mainly PHP, HTML, jQuery, AJAX, Bootstrap framework, Google Charts, SMS gateway technologies. The E-Farmer Management system has three main modules. Login Module, Administration module, and SMS module. The system will send daily updates of price indexes of vegetables to the registered farmers. And farmers can send their prices to the system too. Then the system will send those prices to buyers. Buyers can see all those prices by simply login to the system. The system will show the price of relevant crops with the farmer's details. buyer can order their preferred vegetables from there with this simple step, it reduces the lengthiness of market channels and reduces unnecessary participation of intermediate person to the marketing process, and give full power to farmers to decide the prices of their valuable crops.

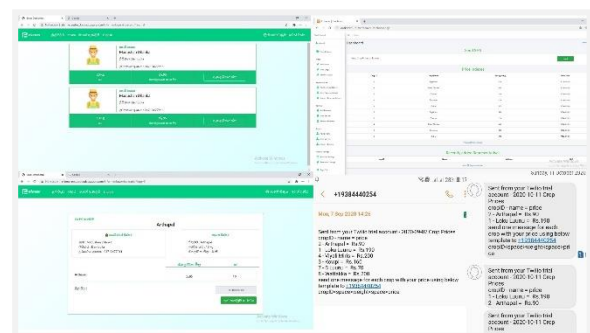


Fig.5. Screen shots of the web site and SMS notifications

V. RESULTS AND DISCUSSION

Evaluation of the system is done by using 50 farmers of the Dambulla area. It registered those 50 farmers to the system with their relevant crops and sent them to price



indexes of vegetables every morning for one week. A printed list of vegetables with their ID was given to farmers to provide a clear understanding. And ask them to send back their prices using those numbers. The system was evaluated considering the following identified criteria, Achieving project specifications and objectives Functionality of the system User-friendliness, Accuracy, Efficiency Usability, and Compatibility of the system. Evaluation results as follows.

Table 6. System Evaluation

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Easy to use	20	9	5	6	10
User Friendliness	18	10	10	7	5
Accuracy	25	10	3	7	5
Easy to access the main functions of the system	16	9	6	10	9

VI. CONCLUSION AND FURTHER ENHANCEMENT

The research was conducted to empower the small-scale farmers to sell crops through a system to minimize intermediate involvement. [13] This system has not covered other stakeholder considerations and product quality aspects issues faced by the buyer. Therefore, the following recommendations and future expansions are proposed. The researcher hopes to connect the government to the system as an end-user and develop an ERP system by connecting all the dedicated economic centers in Sri Lanka. Moreover, implement a cloud-based centralized database system where all the Buyers, Sellers, and farmers can access online with providing an island-wide market. Therefore, the wholesalers, retailers, and farmers to reduce the lengthiness and complexity of the current market process in Sri Lanka through; the system. It provides a new direction to the Sri Lankan agro-economy by providing new opportunities with the online vegetable market. Currently, the system has a smaller number of stakeholders, including mainly farmers, buyers, consumers, and Dedicated economic centers but with future enhancement government will become one of the main stakeholders. The government can also capture all the data

about harvesting details, cultivating vegetable types, expected harvest season, harvest amount, and relevant areas. Furthermore, it will be given statistical information on the harvest and which crops to be produced within the country in the upcoming season. The system will provide a good understanding of the agro-economy field and its direction. Moreover, the government can encourage Sri Lankan small scale producers to grow some certain crops and provide them with fertilizer subsidies according to their requirements. As well as for the payment procedures system will link up with all the banks within the country. or another money transferring method such as Genie, Amex, or EZ cash.

REFERENCES

- [1] H. De Silva, Building Successful MSP : ICT Applications Govi Gnana Seva , Sri Lanka, 2004.
- [2] FAO, The farming systems approach to development and appropriate technology generation, no. c. 1995.
- [3] K. Karunaratna and D. U. Vidanagama, E-farmer Management System for Agrarian Service Centre in Sri Lanka, no. November, 2015.
- [4] R. Development and K. Unive, Dambulla Dedicated Economic Centre - a new Initiative in food marketing in Sri Lanka, no. November, 2016.
- [5] S. P. Nayak, P. P. Shenoy, and S. Rajesh, An Integrated User Interface as Farmer ' s Assistant System, pp. 1–6.
- [6] H. De Silva and D. Ratnadiwakara, Using ICT to reduce transaction costs in agriculture through better communication : A case-study from Sri Lanka.
- [7] C. Husemann and N. Novkovic, Farm management information systems: A case study on a German multifunctional farm, Ekon. Poljopr., vol. 61, no. 2, pp. 441–453, 2014.
- [8] O. Noel, N. Fernando, and G. Wikramanayake, Web Based Agriculture Information System, no. October 1998, 2014.
- [9] Weladapola - Apps on Google Play. [Online]. Available: <https://play.google.com/store/apps/details?id=com.scl.weladapola&hl=en>. [Accessed: 06-Nov-2020].
- [10] badu mila (බදු මිල) - Apps on Google Play. [Online]. Available: <https://play.google.com/store/apps/details?id=io.ionic.prog5c894c2ec47b1425588c8ac6&hl=en>. [Accessed: 06-Nov-2020].
- [11] Govipola - Apps on Google Play. [Online]. Available: <https://play.google.com/store/apps/details?id=com.fg.krushi&hl=en>. [Accessed: 06-Nov-2020].
- [12] P. Z. Eds, I. Conference, and D. Hutchison, LNCS 8029 - Online Communities and Social Computing, no. July. 2013.
- [13] D. Gray, W. Parker, and E. Kemp, Farm management research: a discussion of some of the important issues, J. Int. Farm Manag., vol. 5, no. 1, pp. 1–24, 2009.

