http://dx.doi.org/10.5455/sf.82482

Science Forum (Journal of Pure and Applied Sciences)

journal homepage: www.atbuscienceforum.com

A framework for automated green alternative solution for farm input distribution

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ABSTRACT

Quite a number of personnel in the Ministry of Agriculture and Rural Development, the general public and even farmers (who are the major beneficiaries of the government subsidy program), are aware of the existence of an online system of distribution known as "Electronic wallet," an information technology company. But this existing system does not allow proper accounting of subsidized inputs, thereby giving room for diversion of inputs and other corrupt practices and hence the need for a more robust and easy to use system. This paper proposed the frameworks of farm support application software for automated green alternative solution for farm input distribution which is a web-based open-source platform. The frameworks consist of the use-case diagram, entity relationship diagram, and system flow chart. These diagrams represent the graphical representations of the system that can easily be implemented using any suitable programming language.

ARTICLE INFO

Article history:
Received 19 May 2021
Received in revised form
01 August 2021
Accepted 01 August 2021
Published 12 November 2021
Available online 12 November 2021

KEYWORDS

Farmers
Online system
Subsidized inputs
Frameworks
Use-case diagram
Entity relationship diagram
System flow chart

1. Introduction

The Farm Input Support Services Department of the Federal Ministry of Agriculture and Rural Development is faced by major challenges, which have always been the issue of continuous capturing of farmer's data, getting the right farm inputs across to the farmers at a subsidized rate, warranting responsibility, and, at the same time, making sure the whole information is properly managed for easy response to the shareholders. Although there was an existing platform—the e-wallet system by Cellulant, an ICT company—there is also a need for an alternative system for less cumbersome experience. A software known as farm support was designed and implemented to effectively manage the information relating to farmers, agro dealers, and all the input distribution data.

Agricultural inputs subsidies have been a major feature of agricultural development policies in rural economies, from the 1960s to date. For agricultural subsidies, the theoretical case is based on their promotion of agricultural productivity by making investment in new technologies more attractive to smallholder farmers (Ephraim and Andrew, 2013). The primary responsibility of the Farm Input Support Services division is to make accessible satisfactory amounts of superb manures (inorganic and natural), agro chemicals, seeds, and machines to Nigerian farmers to increase rural creation, agricultural production, ensure food and cash crop self-sufficiency, and also increase farmer's income and overall well-being. The

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agriculture sector in Nigeria is presently facing several challenges as a result of insufficient and wastefully expensive costs of procurement, stocking, and distribution of agricultural inputs. Thus, the socio-economic growth has greatly been undermined; hence, it constitutes a threat to the Federal Government of Nigeria's "Vision 2020."

The objectives of the growth enhancement support scheme (GESS) were to remove the usual complexities associated with farm input (especially fertilizer) distribution by extending inputs delivery notification via mobile phones to 20 million farmers in 4 years by targeting 5 million persons annually; to encourage critical actors in the fertilizer value chain to work together to improve productivity; to provide direct support to farmers to enable them to procure agricultural inputs at affordable prices, at the right time and place; and enhance farmers' income and promote food security (Alabi and Adams, 2015; Nwaobiala and Ubor, 2016; Oyediran, 2014). GESS was introduced in May, 2012, as a pilot project in the 36 states of the country and the Federal Capital Territory. The scheme is also known as the e-wallet scheme. An e-wallet has thus been defined as an ancient and transparent electronic device system that makes use of vouchers for the purchase and distribution of agricultural inputs (Fadairo et al., 2015).

The major problem with most efforts made by government in the area of farm input support has been monitoring and evaluation of resources already in place (Kamiljon, 2009). While this is a typical case of farm support projects in some countries, at the World Trade Organisation's Doha Round in 2001, many developing nations—including Brazil, China and India—opposed agricultural subsidies in the US and EU, with the argument that the high subsidies were artificially driving down global crop prices, unfairly undermining small farmers, and maintaining poverty in many developing countries (Clay, 2013).

The main objectives of this paper is to design the frameworks for automated green alternative solution for farm input distribution with the aid of using a flow chart, use-case diagram, and entity relationship diagram for the subsidized inputs distributed to farmers through the right channel and techniques.

2. Materials and Method

Since a development of this magnitude is all-encompassing, involving inputs from various departments, this research focused on a comprehensive study of the needs of both farmers and policymakers by capturing the feedback of the various stakeholders and designing a system using workflow diagrams (use-case diagram, entity relationship diagrams, and a flow chart).

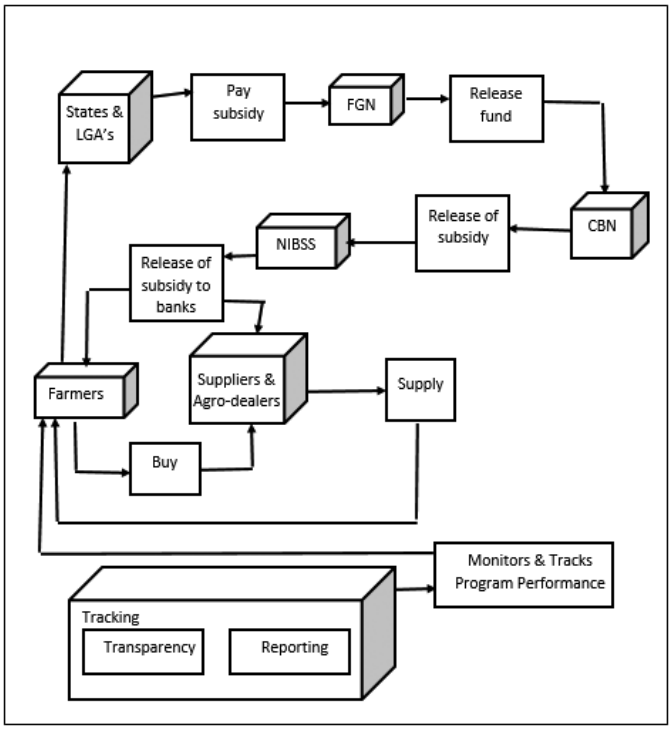

Figure 1. New system framework.

2.1. Framework to aid distribution of farm inputs

In this subsection, the framework of the proposed system is presented. The framework, as shown in Figure 1, indicates what a farmer, agro-dealer, and government can do.

2.2. Use-case diagram

Figure 2 shows a representation of the users' (administrator, farmer, agro-dealers, and touring companies) interaction with the system that shows the relationship between them and the use-cases in which they are involved.

2.3. Entity relationship diagram

The entity relationship diagram is used to show the structural relationship between the entities making up the entire database, as shown in Figure 3.

2.4. System flow chart

The system flow chart specifies the entire process, as shown in Figure 4. Each user is expected to belong to a class. The user is either a farmer, or an agro-dealer, or a ministry staff. On creation of users, the admin places him/her in a class and that class determines what the

Figure 2. Use-case description of the system's design.

user can do in the system. This is specified in the application using roles.

3. Results and Discussion

The above frameworks (Figs. 1–4) can be used to implement the proposed system. When implemented using suitable programming languages, the Farm Input Support Services Department of the Federal Ministry of Agriculture and Rural Development faced by major challenges such as the issue of continuous capturing of farmer's data, getting the right farm inputs across to the farmers at subsidized rate, warranting responsibility, and, at the same time, making sure the whole information is properly managed for easy response to the shareholders will be solved.

The system can be implemented using the Code Igniter framework based on Hypertext Preprocessor (PHP) as the frontend and MYSQL database at the backend to create full-featured web applications. This framework, being an open-source-based framework, was chosen to ensure easy integration of forms and pages in addition to some of the inherent built-in security and optimization facilities in the framework.

4. Conclusion

A number of personnel of the ministry and agro-dealers are aware of the existence of an online system of distribution and evaluation of the distribution channels, but their level of proficiency in the use of the portal is considerably low. A system that will serve the organization such as this is, therefore, needed at a time like this when efficiency of service delivery and effectiveness of organs of government is of paramount importance to the present administration. These frameworks presented can easily be transformed into codes using any suitable programming language.

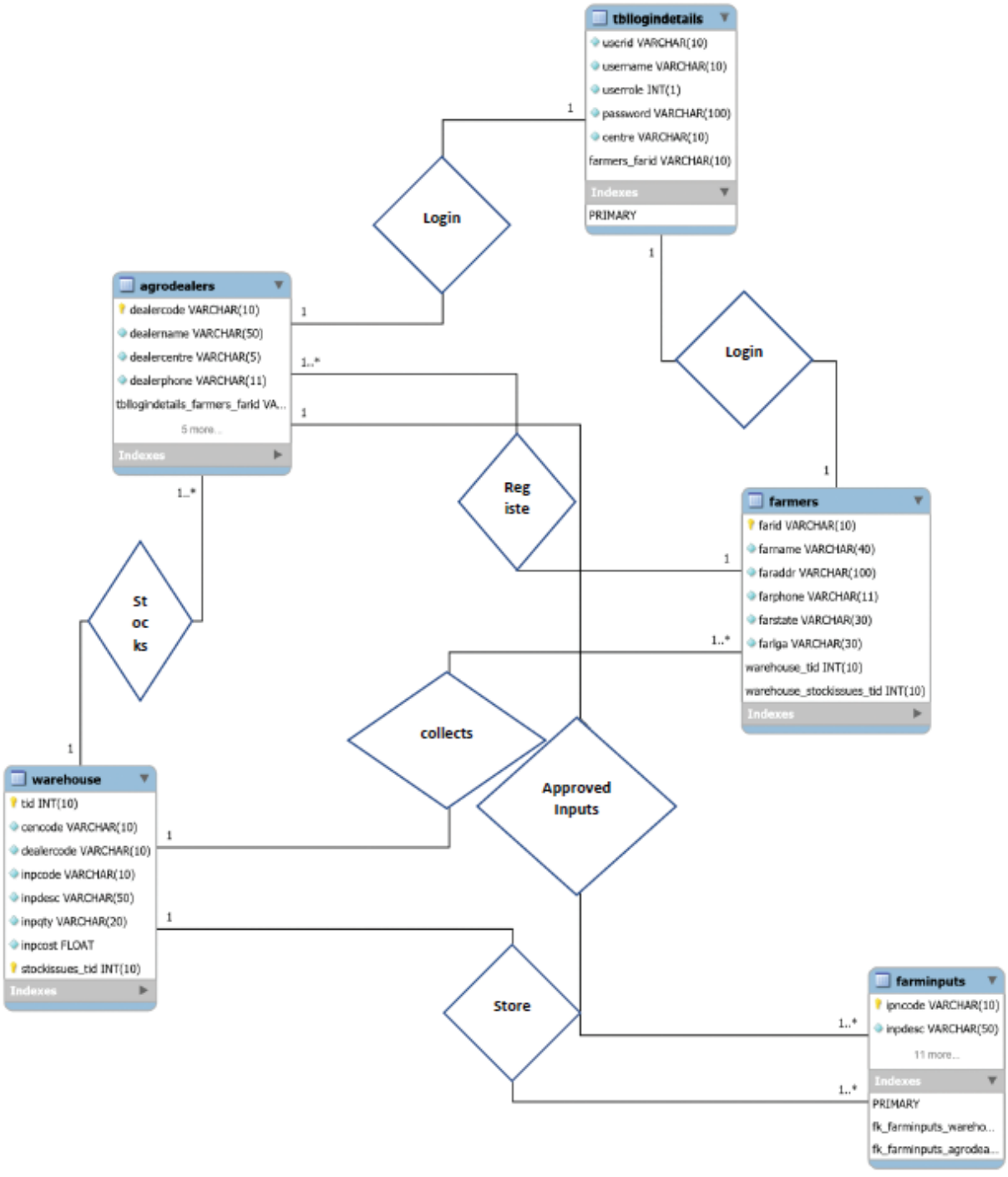

Figure 3. The entity relationship diagram of the system.

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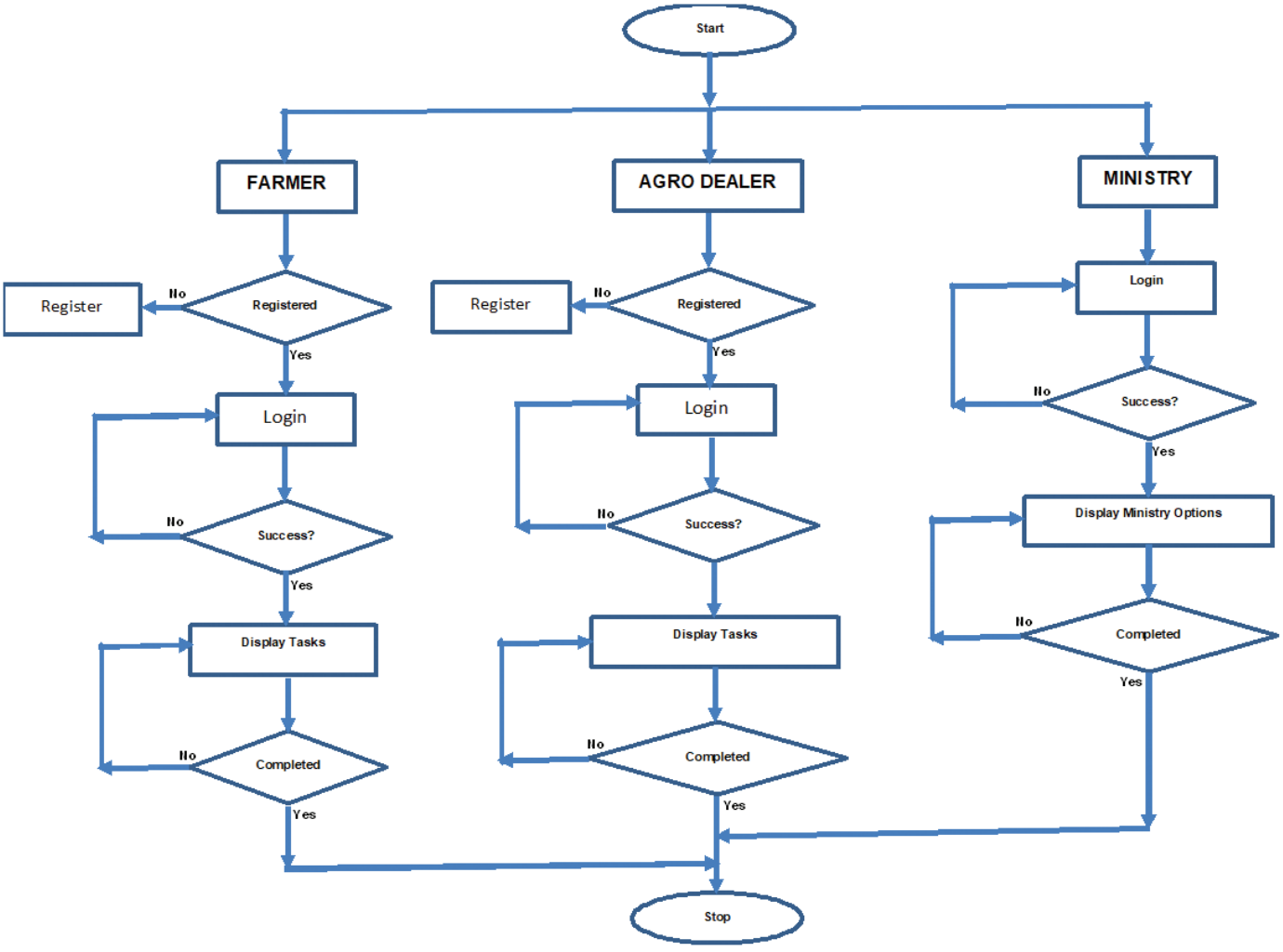

Figure 4. System flow chart for the farm support system.

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