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Development of Agricultural Resource Planning (ARP) Software

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ABSTRACT

Planning and management has been one of the major problems encountered by the agricultural sector in Nigeria and the world at large. The focus of this research work is to develop a graphical user interface (GUI) for farmers in order for them to manage their resources from the input to the output of their production process, including their payment and full accounting system. The development makes use of the cascade model while the materials utilized for the research work are: PHP programming language, Zinox corei7 laptop, Mysql, XAMP server, JavaScript, Microsoft Office software, Notepad++, Python script, html5, and CSS. It was recommended that government and non-governmental agencies should encourage expert in ICT area to train our local farmers with the software developed to manage their local farms and make agriculture real business.

Keywords: Agricultural resource planning, Software, Farm management, Local farmers, ARP

INTRODUCTION

Many researchers have investigated the adoption of smart agriculture into agricultural sector in Nigeria and beyond. Agricultural operations and production these days is a complex administrative errand that forces stringent necessities on farm management data frameworks. In different sectors, enterprise resource planning (ERP) frameworks are broadly actualized to meet such prerequisites [1]. Vendouw et al. [2] has discovered that, to guarantee the adequacy and proficiency of business forms, data must be consistently caught, altered and imparted. Enterprise information systems bolster the handling of data at various levels extending from operational to key. This simply involves (i) agricultural mechanization strategic frameworks, (ii) Enterprise management frameworks and (iii) business insight applications.

Precision farming innovations and space observing of farming are meant to build the nourishment security of the populace. Successful farming system relies upon timing and exact data. World cultivating is confronting the test of expanding crops in an asset obliged condition. This factor has carried information technology into the agro-system. Advanced innovations and technology are an indispensable piece of horticulture today. The entire world is moving toward this path. Farm management programming (FMP) permits taking a quick and effective choice. Agribusiness arrangements can be executed in all phases of creation.

The focus of this research work is to develop a software application that will help local farmers in the management of their farm inventory, production or manufacturing process, accounting, auditing, sales and personnel management.

The total populace is relied upon to increase by another two billion people in 2050, based on the study taken by the Food and Agriculture Organization, while the arable region is probably going to grow only by 5%. Consequently, shrewd and effective cultivating methods are important to improve agribusiness profitability [3].

Information analysis has gotten effective outcomes for future forecasts pretty much each and every application. Artificial intelligence based model structure is a difficult errand as the model ought to reproduce the watched parameters in the dataset. Parametric estimations are useful in taking care of the issues in a cutting edge way, and agribusiness issues. Agriculture data analysis is done with different machine learning algorithms. Expanding the result is the motivation for any AI model, and model evaluation measurements are useful in breaking down the outcomes got. Fitting preparing of the AI model will deliver the outcomes with most extreme exactness.

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LITERATURE REVIEW

Keswani et al. [4] has explored the determinants of selection of enterprise resource planning (ERP) innovation in horticultural homesteads situated in the Central-West locale of Brazil. The information was gathered from 200 inside and out meetings with soy, corn and cotton ranchers from the State of Mato Grosso, Brazil. Auxiliary conditions strategy was utilized to break down the information and theory. The calculated model was proposed by consolidating Diffusion of Innovations and Technology-Organization-Environment speculations. The outcomes give data to agribusiness proprietors, chiefs and chairmen to advance and boost the utilization of ERP. Government officials and ranchers can assess every situation and backing their political and regulatory choices through the assessment of financial and ecological exhibitions of farming investigation because of mechanical advancement. This prompts a requirement for an investigative instrument for the ranchers, with the target of supporting the selection of upgrading ERP for agri-food activities.

Caetano et al. [5] investigation talks about the view of the routinisation consequences for the post-usage and post-appropriation of the endeavor asset arranging (ERP) in ranches. A hypothetical model and nine theories were proposed utilizing factors as per the writing of asset based view (RBV) approach and on the ERP sway on ranch execution recognitions. This investigation adds to the writing by testing experimentally the balance impact of routinisation on the RBV. A subjective meeting was applied to bigger ranchers where ERP was at that point being used and for the quantitative methodology an example of 448 answers was gathered made out of 74% grain ranchers, 14% dairy cattle raising and milk makers and 13% sugar stick and organic products ranchers. The outcomes uncover that the model clarifies 63% of the variety in the effect on farm execution. Our outcomes show that routinisation directs just the connection between the effects on interior activities with sway on ranch execution. The end affirm the need to grow the RBV way to deal with the rancher observations, investigating different variables like the advantages and the effect of regular assets in the routinisation procedure. At long last, we propose an exchange of the advancement of agriculture 4.0 in an asset based view to the improvement of upper hand with regards to ranches.

Market direction, development, learning and human capital direction have been concentrated to quantify the impacts of the resources on essential farming [6]. So as to think about changes to agro-biological agrarian frameworks in the Mississippi river basin towards coordinated socio-environmental examination. Blesh and Wolf [7] assessed natural and ranch endeavor assets, subjective assets, relations with peers: rancher systems, information associations and farming strategy. In Romania, creators characterized agrarian efficient power vitality and upper hand of organizations as normal asset based view [8].

DEVELOPMENT

The cascade model which is popularly known as the waterfall model was adopted to develop this software. Therefore, a consecutive structure, process, regularly utilized in programming advancement forms, in which progress is viewed as streaming relentlessly downwards (like a cascade) through the periods of origination, commencement, examination, plan, execution, testing and upkeep was used. In this model, each stage was finished completely before the following stage can start **(Figure 1)**. Towards the end of each stage, an audit happens to decide whether the undertaking is on the correct way and whether to proceed or dispose of the venture.

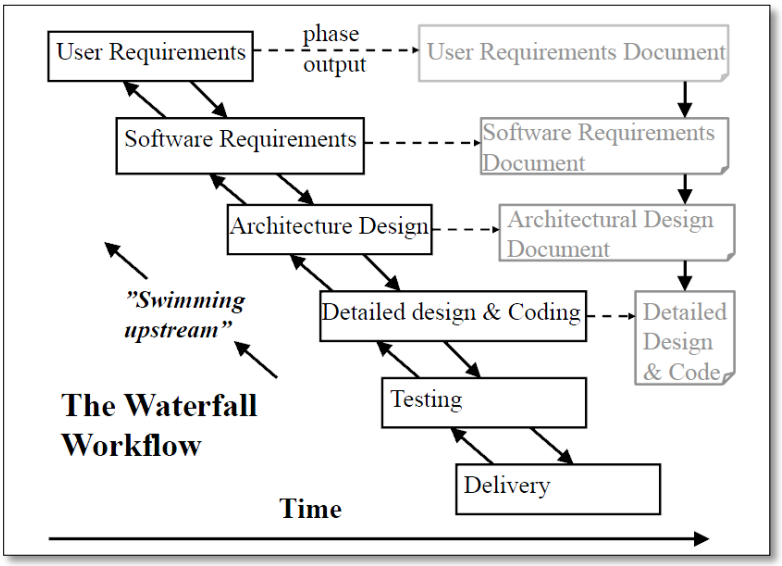

Figure 1. Cascade model.

MATERIALS

The materials utilized for the research work incorporate; PHP programming language, Zinox corei7 laptop, Mysql, XAMP server, JavaScript, Microsoft office software, Notepad++, Python script, html5 and CSS.

METHODOLOGY

The graphical user interface was developed in PHP files integrated with html5 with the help of weberp bootstrap and uses an embedded database of MySQL, with the XAMP server as local host. The code was segmented into eleven (11) major sections; which include:

1. Sales
2. Receivables
3. Purchases
4. Payables
5. Inventory
6. Manufacturing
7. General ledger
8. Asset Manager
9. Petty Cash
10. Setup
11. Utilities

The database was developed by structured query language (Mysql) while JavaScript was also used together with html5 to write some commands.

Different folders were created to store the images, cascading style (CSS), include (where function files were stored), JavaScripts and database.

Sales interface

The sales interface consists of the following:

- Sales area
- Product code
- Customer code-the actual charge account
- Sales type (or price list)
- Product type (or stock/inventory category)
- Customer branch
- Sales person

The report bunches on each level in succession. A report with group by 1 set to product code and group by 2 set to sales area, would show the item code, at that point the regions underneath the item code where the thing has been sold. Frequently the more coherent arrangement may be to show the business territory as group by 1 and the product code under the group by 2 with the goal that the offers of the item codes for every zone show up together **(Figure 2)**. Each group by segment requires a range to be determined. All criteria determined must allude to the coding as indicated in the arrangement area of the important grouping, e.g. sales areas criteria must be entered as the zone code - not the territory depiction. The criteria from ought to be not exactly the criteria to generally the report will have no yield.

Figure 2. Sales interface.

Receivables

The account receivables section comprises of the following:

- Overdue inquiry that takes into account delivery days to the customer's branch and the actual terms applicable to the customer, supported by detailed inquiry of actual invoices overdue.
- Full on-screen inquiry on a customer's account, complete with invoice details and narrative which appeared on the invoice. Inquiries on payments received

will show how a payment was allocated to invoices and the difference on exchange attributable to each invoice.

- Full integration with stock records and general ledger-a full trail of journals for each transaction is maintained-a drill down to the general ledger transactions for each transaction on a customer's account is available from the customer inquiry page.
- Open item-full analysis of the outstanding balance is maintained and printed on statements for maximum information to the customer.
- Flexible user definable sales analysis reports to PDF or spreadsheet (CSV: Comma Separated Values).
- Retrospective-de-allocation and re-allocation of receipts or credit notes against charges with re-calculation of differences on exchange and corresponding general ledger journals.
- Any number of branch-delivery addresses can be added serviced by different sales people with different tax authorities and different areas for sales analysis purposes **(Figure 3)**.
- Unlimited free form notes can be maintained for each customer and an unlimited number of contacts can be stored against each customer.
- Email of customer statements to multiple customer contacts.

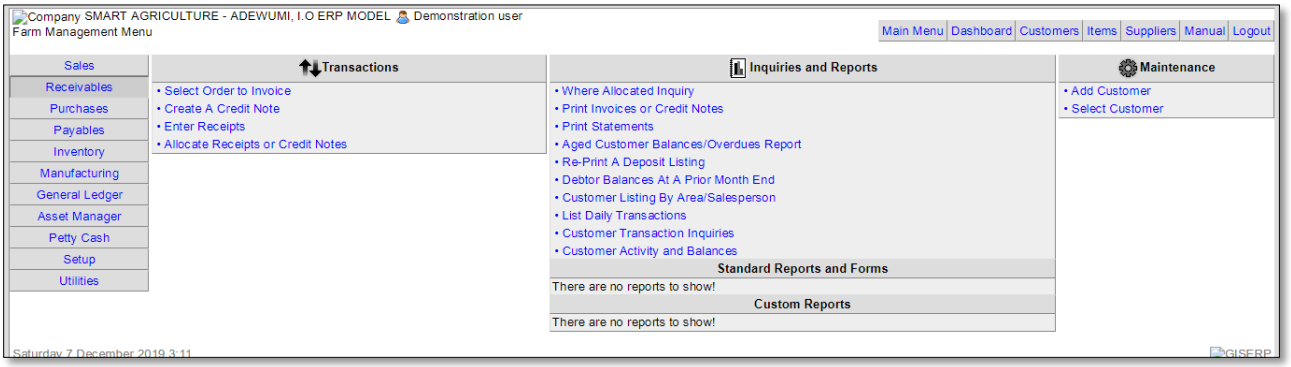

Figure 3. Receivables section.

Purchases

The purchases section consists of the new order, purchase orders, purchase order entry, create a new tender, edit existing tenders, process tenders and offers, order to authorize, shipment entry and select a shipment [9].

Account payables

The account payable section consists of:

- Suppliers aging report that takes into account the actual terms applicable to the supplier, and is supported by detailed inquiry of actual invoices due.
- Full on-screen inquiry on a supplier's account, complete with a general ledger breakdown of how each invoice and debit note (supplier credit note) was posted. Inquiries on payments made will show how a payment was allocated to invoices and the difference on exchange attributable to each invoice **(Figure 4)**.
- Open item-full analysis of the outstanding balance is maintained.
- Retrospective-de-allocation and re-allocation of payments and/or debit notes with re-calculation of differences on exchange and corresponding general ledger journals
- Any number of supplier contacts can be maintained against the supplier.
- Fully integrated to stock-whereby purchase order receipts of stock can be selected for entry against a supplier invoice.
- Full standard costing price variances between standard costs of stock received against the invoiced actual cost at invoiced exchange rate is recorded and posted to the general ledger.
- Purchase invoices and debit notes can be entered directly to multiple general ledger accounts with charges divided up at invoice entry time.
- Purchase invoices and debit notes can be entered as shipment costs-to accumulate against the cost of a shipment for costing of the stock items on the shipment **(Figure 5)**.
- Nominal purchase order items received can be selected for invoicing in the same way as stock items. Purchase price variance from the order cost is taken to the general ledger account that the order item was coded.
- Supplier payment run will create system entries to record payments for all suppliers with due amounts. Facilities allow for holding disputed invoices from

being included in the payment run, but still recording costs in the general ledger.

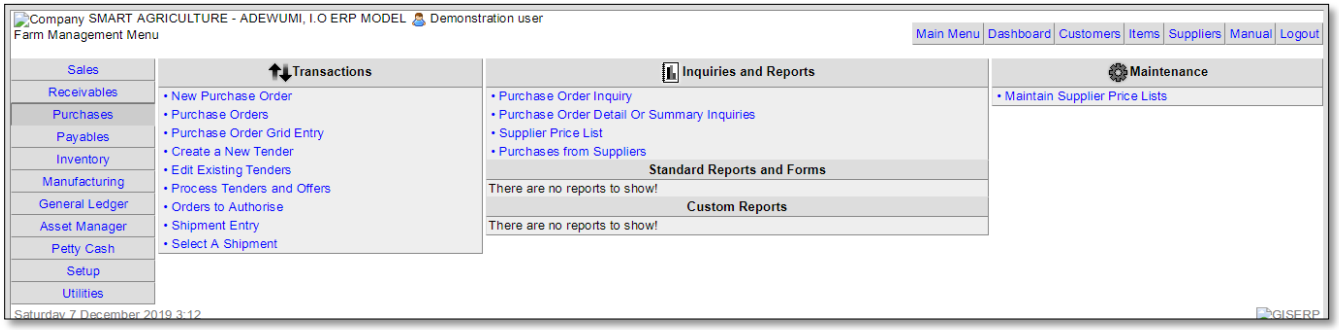

Figure 4. Purchase section.

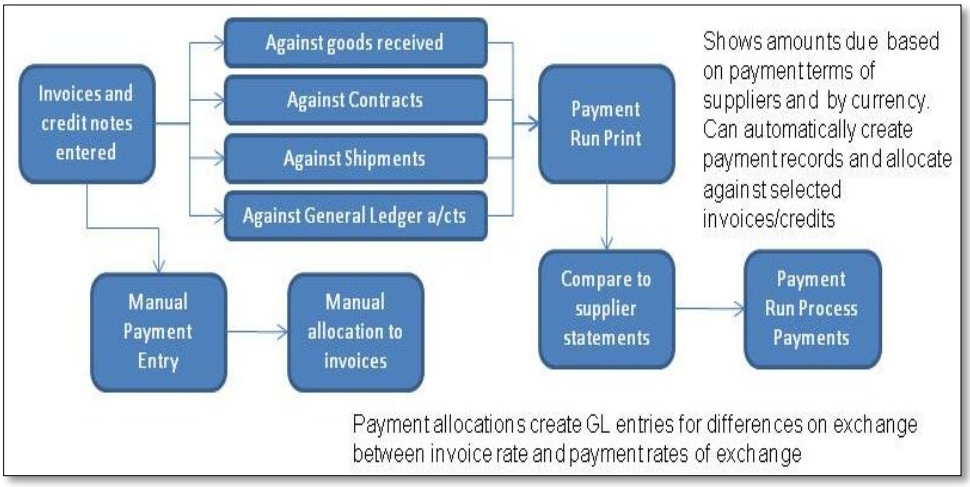

Figure 5. Payment structure.

Inventory

Inventory is usually referred to as stock. There is a need for farmers to take stock of their raw materials that will be used for the production system. For instance, poultry feed mill will need maize as one of the raw materials for feed production.

The inventory section consists of:

- Multiple warehouses, stock quantities maintained for an unlimited number of locations.
- Prices for a stock item can be set for each sales type defined in any (and all) currency(ies) allowing great pricing flexibility **(Figure 6)**.
- Automatic back ordering. Sales orders yet to be delivered can be automatically back ordered at the time of invoicing or the balance of the order cancelled as appropriate.
- History of stock movements maintained by stock item
- Allows dummy stock items which can be invoiced, priced, costed but with no stock record maintained for items such as labor or services [10].
- Kit-set parts can be defined. An order for a kit-set part explodes into the components defined for the parts at the predefined quantities as extended by the number of the kit set item ordered. These component quantities are then available on the order for modification by the user.
- Assembly parts can be defined in a similar way to kit sets. These parts exist only for ordering, invoicing and sales analysis. No stock balance is maintained; instead the quantities of the components are updated in proportion to the quantity defined in the assembly.
- Each inventory category can have an unlimited number of properties. Each item of that category can then record its value for each property. Like additional fields depending on the type of inventory.
- Inventory can be set to serialise-where each item of inventory requires its own serial number.
- Inventory can be set to batch controlled-where each batch/lot of inventory of an item must refer to a batch or lot reference.

- Invoice and credit note inquiries are inked to stock movements so the detail of items sold on an invoice can be queried.
- Standard cost maintained and valuation reports
- Inventory usage by month inquiry by location and overall
- Inventory planning report
- Integration with purchasing, accounts payable, accounts receivable and general ledger
- Any number of custom fields can be added specific to each inventory category
- Internal stock requests with departmental authorization
- Users can be allowed access to only certain locations and will be unable to process transactions to locations where they are not authorized **(Figure 7)**.
- The languages for which item descriptions are to be maintained can be configured. Invoices and credit notes can be produced in the language preferred by the customer.

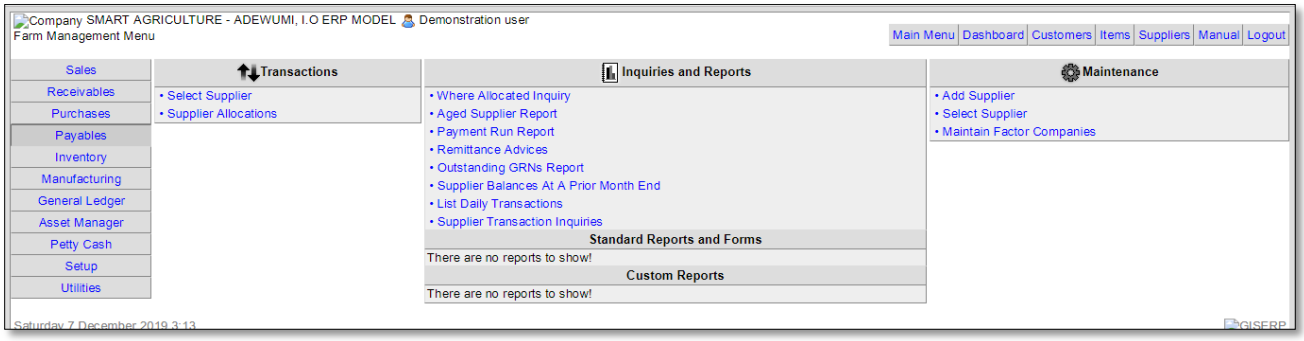

Figure 6. Account payables.

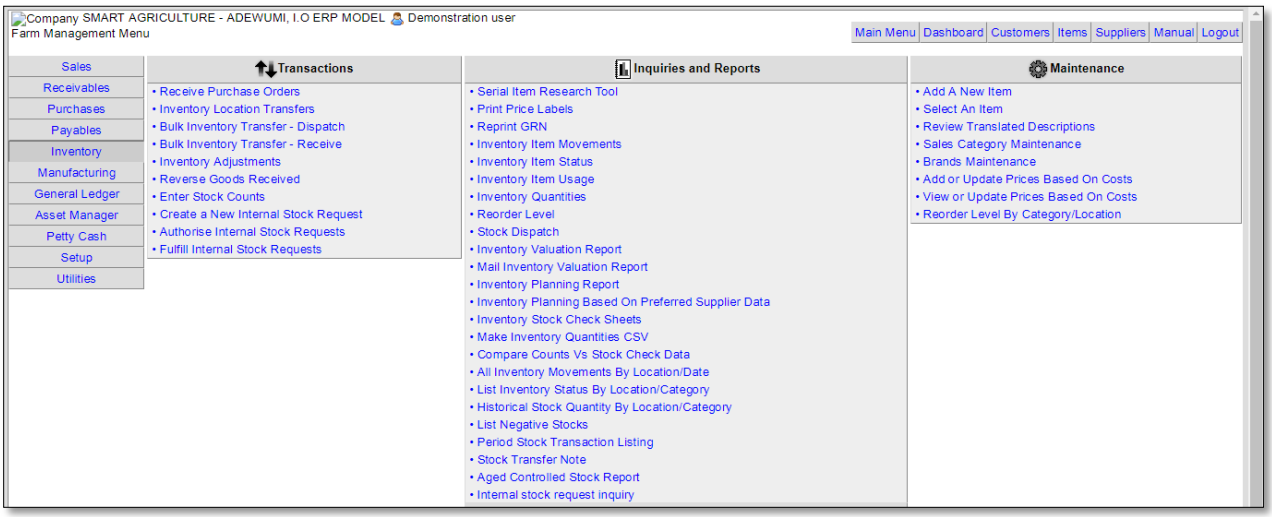

Figure 7. Inventory.

CONCLUSION AND RECOMMENDATION

The agricultural resource planning has been developed through the framework analysis of webrp with the help of PhP language, Mysql and JavaScripts. The program has been tested through XAMP server and it runs properly.

Application of technology has been a key driver in the development of agricultural sector. It is therefore recommended that government and non-governmental agencies should allow experts to train local farmers with this tool in order to make farm management easy and make agricultural production a profitable business.

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