# DAR: UNIFIED DATA REPORTING SYSTEM WITH DATA ANALYSIS

A Capstone Project

Presented to the

Faculty of the Department of Information Technology

College of Engineering

Eastern Visayas State University

**Tacloban City** 

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science in Information Technology

Ву

Christian B. Caysido

Diana Jane C. Enero

Regine R. Villena

## **APPROVAL SHEET**

The Capstone Project Study entitled <u>DAR: UNIFIED DATA REPORTING SYSTEM WITH DATA ANALYSIS</u> prepared and submitted by Christian B. Caysido, Diana Jane C. Enero, and Regine R. Villena in partial fulfillment of the requirements for the degree of <u>BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY</u> has been examined and is recommended for acceptance and approval for **FINAL DEFENSE**.

# **WIT EXCELSIOR T. PAÑA, MSIT**

Adviser

APPROVED by the members of the Evaluation Panel on FINAL DEFENSE with a grade of PASSED.

### **CAPSTONE PROJECT COMMITTEE**

**VIENMAR S. OGRIMEN, MSIT** 

MILAGROS C. ENGAO I

**Panelist** 

**Panelist** 

### JUDE ALLAN A. URMENETA, MSIT

Lead Panelist

Accepted and approved in partial fulfillment of the requirements for the degree of BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY.

VINYL H. OQUIÑO, PhD

Dean, College of Engineering

### **JESSIE R. PARAGAS, DIT**

Head, IT Department

<u>December 6, 2024</u>

Date of Defense

### **ACKNOWLEGEMENT**

At the end of this thesis, we would like to express our deepest gratitude and sincere appreciate to everyone who helps us and made this journey possible.

First and foremost, we would like to thank our adviser, Wit Excelsior T. Paña, Thank you for your guidance and pieces of advice.

We would also like to extend our thanks to our instructors for their patience and sharing their knowledge to us. We highly appreciated the comments and advice given by our defense panel during our oral through the final defense.

We would like to offer a special thanks to our client, Miss Ronalyn Acol for always giving us her time even though she was busy. Thank you for your unending support, ma'am. You were one of those people who help us finish this thesis.

Our deepest thanks go to our family and friends for their constant love and support. Their encouragement and belief in me have been instrumental in helping us reach this milestone in our academic journey. Lastly, we would like to acknowledge the participants who took part in our research. Without their cooperation and willingness to share their experiences, this project would not have been possible. Thank you all for your support and encouragement throughout this journey. We are humbled by the kindness and generosity of those around us, and we will carry your support with us as we embark on future endeavors.

CBC

DJCE

**RRV** 

# **TABLE OF CONTENTS**

	Page
TITLE PAGE	i
APPROVAL SHEET	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	viii
CHAPTER I	1
INTRODUCTION	1
Objectives of the Study	3
Scope and Delimitations	4
Significance of the Project	4
CHAPTER II	6
THEORETICAL FRAMEWORK	6
Review of Related Literature	6
Concept of the Study	11
Definition of Terms	13
CHAPTER III	16
OPERATIONAL FRAMEWORK	16
Materials	15
Software	16

	Page
Hardware	16
Data Source	17
System Environment	17
Locale	17
Population of the Study	18
Description of the Present System	18
Limitation and Drawback of the Present System	19
Methods	20
Agile Development Process	20
Gantt Chart	22
Data and Process Modeling	24
CHAPTER IV	29
RESULTS AND DISCUSSION	29
CHAPTER V	32
SUMMARY, CONLUSION, AND RECOMMENDATION	32
Summary	32
Conclusion	33
Recommendation	34
REFERENCES	35
APPENDICES	39
CURRICULUM VITAE	47

# **LIST OF TABLES**

Table		Page
3-1	System Software	15
3-2	Specifications of Hardware used in Development	16
3-3	Data Source	17
3-4	Gantt Chart	22

# **LIST OF FIGURES**

Figure		Page
2-1	Conceptual Framework of the Study	12
3-1	Locale Map of Department of Agrarian Reform Region 8	18
3-2	Agile Model	20
3-3	Context Diagram	24
3-4	Data Flow Diagram	24
3-5	System Flowchart	26
3-6	Use Case Diagram	27
3-7	System Architecture	28
4-1	Status of Project	29
4-2	Captured the Status of Farm Machinery	30
4-3	Address the Late Submission of Reports	31

## **ABSTRACT**

Caysido, Christian; Enero, Diana Jane; and Villena, Regine "DAR: Unified Data Reporting System with Data Analysis" (Eastern Visayas State University, December 2024, Tacloban City)

Adviser: Wit Excelsior Paña, MSIT

IT- Faculty

**EVSU-Tacloban City** 

These proponents aim to develop a Unified Data Reporting System (UDRS) for the Department of Agrarian Reform – ARBDSP Division, with the goal of enhancing the processes of data collection, analysis, and reporting within the organization. The UDRS is a comprehensive and integrated solution designed to consolidate various data sources into a single platform, simplifying the management and analysis of large datasets. By centralizing data in one place, the system offers users the ability to automatically gather and process data, significantly reducing manual input and potential for errors. In addition, the system incorporates reliable data processing tools, which enable efficient and accurate analysis, making it easier for stakeholders to extract meaningful insights from complex datasets. The development of the DAR Unified Data Reporting System with Data Analysis involved a multi-step process that began with requirements gathering, where the team identified the key features and functionalities needed for the system. This phase was followed by system design, where the structure and architecture of the platform were carefully planned to ensure scalability and security. After designing the system, coding was carried out using a combination of modern web development technologies, including HTML, CSS, JavaScript, PHP, and MySQL. These technologies were chosen for their versatility and ability to meet the technical requirements of the project, allowing for the seamless integration of various data sources and tools for data visualization and reporting. UDRS offers a robust and reliable solution for the Department of Agrarian Reform -ARBDSP Division, addressing its need for an efficient, data-driven approach to reporting and

analysis. In the long run, the system is expected to streamline operations, reduce the time spent on manual reporting, and improve the accuracy and quality of data-driven decisions.

Keyword: Unified Data Reporting System (UDRS), Data collection, Data analysis, Web development technologies

# Chapter I

### INTRODUCTION

Information and Communication Technology (ICT) has revolutionized the way we access and share information. These changes applied science encompasses wide and continuous changes of technologies, from computers and the internet to mobile devices and software applications. From the PC which has become the biggest information base in the world from the mobile gadgets which are now fixed commodities in our daily life to the numerous applications of software which are the key tools we use in our daily lives today; ICT has completely revolutionized the handling of information.

Under the Comprehensive Agrarian Reform Program (CARP), the mandate of the Department of Agrarian Reform (DAR) is to lead and coordinate the provision of support services to agrarian reform beneficiaries within the ambit of the Program Beneficiaries Development (PBD). As such, the Department has assumed the responsibility to undertake planning, resource mobilization, implementation, monitoring and evaluation of the PBD with the ultimate goal of increasing productivity and income of the ARBs out of the lands distributed under the CARP (Adriano, 2008)

The organization is facing challenges in the timely submission of accurate and consistent reports by program implementers to the Department of Agrarian Reform Central Office and oversight agencies. There are several of possible reasons that were identified, such as redundant data, ineffective reporting procedures, and program implementers' late submissions. Redundant data can cause confusion and inefficiencies during the creation and submission of reports, which can compromise the consistency and accuracy of the information provided. Furthermore, the current procedures and technologies may not be sufficiently able to handle the requirement for divisions to communicate reports promptly, which would further impede the timely transmission of vital

information. A further factor in the whole issue is the program implementers' delays in submitting reports, which affects the central office's and oversight agencies' capacity to decide wisely based on the data that is available. To effectively address these issues, it is necessary to investigate the specific types of data redundancy that exist, how it may affect sending consistency and precision, how reporting processes can be simplified to allow for more rapid sharing of reports between divisions, and what factors contribute to program implementers' late report submissions. Through a thorough examination of these aspects, the organization may develop targeted solutions to ensure data accuracy, increase reporting effectiveness, and improve overall collaboration with oversight authorities.

As part of the Philippine Development Plan, DAR intends to make a significant contribution to the government's efforts to eradicate poverty and promote inclusive growth. Specifically, PBD expects to deliver the Agrarian Reform Beneficiaries Development Sustainability Program (ARBDSP) to attain the outcomes of improving farm productivity and income of ARB households.

In pursuit of these outcomes, DAR is presently implementing several locally-funded and foreign-assisted projects for the delivery of major support services interventions, namely: agritechnology/agri-extension, business development services, agri-credit, market access, rural infrastructure, common service facilities (CSFs) and land tenure stability. Major programs and projects consist of the Social Infrastructure Building (SIB), Enterprise Development and Economic Support (EDES), and Climate-Resilient Farm Productivity Support (CRFPS) (Mercado, Coloma, Baltazar, & Torres, 2021).

Taking into consideration the magnitude of projects and coverage of PBD and the massive budget allocated for the implementation of various support services projects, DAR must account for the accomplishments and achievements of the sector, keep track of the progress of work and performance, and eventually determine the results and impact of PBD. Through this study will help

the needs of Department of Agrarian Reforms (DAR) from collecting data, managing the information, preserving data, simply submit reports to other divisions and in analyzing data which resolve the problems of organization.

The DAR Regional Office (DARRO) VIII – ARBDSP Division has been diligently conducting monitoring and evaluation of its various PBD programs and projects. The various implementing units are using different methods and tools to generate and prepare their reports, making it challenging to conduct project performance assessment and program portfolio monitoring and evaluation. Thus, preparing a regional consolidated accomplishment report is time-consuming.

Also, the PBD databank is fragmented and redundant as each project is maintaining its databank, and such arrangement hampers access to and sharing of data and information. It is an outstanding challenge to gather different project implementers to adopt a unified and harmonized approach to facilitate PBD reporting.

### Objectives of the Project

This study aimed to develop web-based a Unified Data Reporting System with Data Analysis for the Department of Agrarian Reform Region VIII in the Philippines.

Specifically, the study sought to:

- 1. Create a web-based system to effectively monitor the status of project implementation and interventions provided to Agrarian Reform Beneficiaries Organization (ARBO).
- Capture the status of farm machineries utilization every after the conduct of Regional & Provincial CSFs Inspectorate Team.
- 3. Address the late submission of accurate and consistent report.

### Scope and Delimitations of the Project

The project is to develop a unified data reporting system with data analysis for DAR-ARBDSP. This aims to help the staff in charge with the data reports and prevent the data redundancy and human error of accomplishment reports. This will provide a template for tasks and late submission of the employees within the DAR-ARBDSP; it also encompasses creating a tool or database for effectively monitoring the employee's data, also to help monitor the supply of machines for every organization to improve their productivity on their farms; these machines and every piece of equipment provided by DAR will be monitored. This project is only within the Department of Agrarian Reform Regional Office VIII, particularly the ARBDSP division, the system will only cover the services provided by DAR Regional ARBDSP Division. Other division will not be included as their services are not directly involved in the implementation of ARBDSP Program and Services.

## Significance of the Project

Creating Unified Data Reporting System lies in the potential to improve the monitoring and evaluation of PBD programs and projects implemented by the DAR Regional Office VIII. By addressing the key challenges in consolidating accomplishment reports, managing the databank, and harmonizing reporting approaches, this can enhance the Department's ability to effectively track the progress, performance, and impact of its support services for agrarian reform beneficiaries. This can contribute to the overall goal of increasing the productivity and income of agrarian reform beneficiaries. The study will prove to benefit the following:

**DAR Management.** The DAR Regional Office VIII will be able to oversee the status of Implementation of various projects on the field through the unified data reporting system. This system would improve the communication, harmonization, and collaboration (project bundling) of other related projects to avoid duplication of service delivery and to ensure that all Agrarian Reform

Beneficiaries (ARBs) are assisted. Likewise, this would pave a way to identify if the projects are suited to the needs of the ARBs and implement an adaptable strategy that would enable ARBs to be enterprise-ready.

Regional ARBDSP Staff. This study will allow concerned staff to have easier access to the consolidated reports, including the accomplishments and challenges of all various programs and projects of the ARBDSP division. There will be a clear, comprehensive, accurate, and consistent report that is readily available once the DAR Central Office and other oversight agencies require data submission. Likewise, the unified data reporting system will lessen the complexity of analysis and interpretation as the system expects to produce a comprehensive PBD report.

**Program Implementers.** This study would address the gaps in various data reporting systems of each project that often produces inaccurate and inconsistent data. There will be a clear and accurate data for submission from the DAR Provincial Office (DARPO) to the regional level. Qualitative and quantitative outputs will be systematically forwarded to field implementers to ensure on-time report preparation and submission.

# **Chapter II**

### THEORETICAL FRAMEWORK

This chapter presents the various ideas, related literature, systems, generalization, and studies on web-based system, type of research. This study focuses on whether it is feasible to develop a web-based system that included well-organized data of the Department of Agrarian Reform ARBDSP.

#### **Review of Related Literature**

In the sphere of acquiring goods and services for public purposes a Unified Data Reporting System with Data Analysis is a comprehensive structure created to bring together, organize, analyze, and present data from various sources within a company. Its core strength lies in its capability to conduct sophisticated data analysis using tools like statistical analysis, predictive analytics, and machine learning. According to Pfeuffer (2021) Unified data management systems allow organizations to collect, organize, and analyze data from multiple sources in a centralized system, enhancing data alignment, reducing redundancy, and improving data quality for decision-making. These tools empower organizations to derive practical insights from their data, revealing trends, patterns, and relationships that inform strategic decision-making. Interactive dashboards and customizable reports enhance usability, enabling stakeholders to view data in insightful ways and delve into specifics as required.

The researcher stated that automated technologies allow for real-time data collection and lower the possibility of human error. They also emphasize the usefulness of web scraping and APIs as methods for obtaining data from various sources. This means that with correct data readily available, authorities can gain a better understanding of the current situation, identify specific

requirements or challenges, and modify their actions appropriately, having accurate data on market trends, supplier performance, and pricing can help governments negotiate better contracts, maintain fairness (John, 2021).

According to (Deepak R., 2022) Many organizations have shifted to the cloud for quality services in business and security related matters. Sensory data quality is very important in today's activities. Information is created and acquired from data that reflects current reality that includes facts and activities. Lack of quality data impacts on the organizational decision-making policy the level of customer satisfaction, and the organization's scheme of execution. Another area, which has an enormous impact on the subject, and the accuracy, complexity, and efficiency of the machine and deep learning tasks' results, is data quality. Thus, the quality of data can be assessed by several methods and tools in order to avoid the obstacles during further including into models. Most of the tools for data quality enable the evaluation of sources of data only at a specific point in time and the arrangement and automation is therefore a prerogative of the user. A unified system collects and organizes all data, making monitoring and analysis easy. With all procurement data in one place and in a uniform format, stakeholders can easily discover trends, track spending, and detect abnormalities or inefficiencies.

In accordance with Zhang et al., (2023) it emphasize the importance of data analysis in enhancing procurement decision-making procedures. They say that using advanced analytics on unified data platforms allows firms to spot patterns, anomalies and inefficiencies, optimizing resource allocation and lowering procurement risks.

This is consistent with (World Bank, 2021) findings, which emphasize the need of incorporating open contractual data standards into unified systems to promote transparency and successfully prevent corruption.

The increased of visibility ensures that procurement procedures are consistent with company goals and requirements. Furthermore, a single system enables more effective data analysis, resulting in improved insights, more informed decision-making, and the capacity to forecast future procurement demands and issues. Such systems are pivotal in ensuring compliance with procurement laws and regulations, as highlighted by research on government procurement reforms.

According to (Biagi, V., & Russo, A., 2022) organizations must quickly adapt their processes to understand the dynamic nature of modern business environments. As highlighted in the literature, centralized governance supports decision-making and performance measurement processes in technology companies. For this reason, a reliable decision-making system with an integrated data model that enables the rapid collection and transformation of data stored in heterogeneous and different sources is needed. Therefore, this paper proposes the design of a data model to implement data-driven governance through a literature review of adopted approaches.

### Web Based System

A web-based system is becoming more recognized as an essential instrument for improving government efficiency and transparency, especially agrarian reform programs. According to (Santos, A., Garcia, B., & Reyes, C., 2020) such systems improve data collecting, processing, and distribution, allowing for evidence-based decision-making and policy formation. The Department of Agrarian Reform (DAR) Unified Data Reporting System reflects this trend by consolidating data on land distribution, beneficiary profiles, and program outcomes onto a single online platform ((DAR), 2021).

The researchers state that this will encourage stakeholder participation by giving access to accurate and up-to-date information, hence boosting collaboration among government agencies, civil society organizations, and beneficiaries (Rivera, J., & Cruz, M., 2019). Furthermore, these tools help

to allocate resources efficiently and monitor program outcomes, which improves the impact of agrarian reform projects.

This web-based approach allows stakeholders, including government officials, researchers, and the public, to access real-time and accurate information, supporting effective monitoring and evaluation of agrarian reform efforts. Moreover, the system promotes accountability through transparent reporting practices and ensures data integrity and security measures are in place to protect sensitive information.

As stated by (Chen, J., 2020) the same effect, using a traditional reporting system and other forms of analytical tools, have pointed out the following benefits. They prove that this integration results in better accuracy of the business forecasts and enhanced BI offerings. Nevertheless, the gains are not bound to mere reporting. Complex analysis means finding patterns and tendencies in the business data that ordinary reporting systems do not search.

#### Role-based access control

RBAC is remarkably useful when it comes to safeguarding reporting systems. Since the program creates numerous accounts and the users get assigned roles that have some right, the principle of least privilege can be easily implemented and followed in the organizations' structure, especially concerning the system resources corresponding to the employees' positions (Johnson, A., & Brown, P., 2020). This is also applicable with sensitivity; RBAC is capable of distinguishing sensitivity of data and thus rights on reporting may be divided according to their sensitivity levels. This is in relation to improved security, policy enforcement, and user administration of large databases of users. However, for the right implementation of the RBAC the following must be taken into consideration; the user roles, the permission levels, and the policy reviews that are supposed to be done from time to time.

As stated of the study of (Smith, 2019) this provides a thorough comparison of role-based access control (RBAC) and attribute-based access control (ABAC), outlining each approach's merits and shortcomings. RBAC, a widely used model, streamlines access management by dividing users into specific groups such as manager and employee. This simplicity improves scalability and manageability since administrators can efficiently assign and adjust permissions based on roles rather than individual attributes. RBAC may struggle in scenarios demanding fine-grained access control, when conditions other than roles are critical for decision-making. Unified reporting systems are considered to include data analysis as part of the process as it provides the information used in decision making. (Sun Junwei, 2020) discussed the possibility to increase the complexity of reporting by using the software in order to analyze the data. Some of them note that the incorporation of realtime analytics into these systems enables organizations to act to new trends and novelties within a short span of time. As such there is wisdom in this method of interactivity as it does make information presented more insightful as far as the relations and patterns of data are concerned as compared to static quality visualizations. This is due to the fact that users can sort it (filter) and emphasize on those fields which they want to check in detail: this array improves the experience of data analysis.

Mishra et al,. (2019) as the name suggests, descriptive statistics offers the contained data set's basic properties in a compact form. Uses of mean, median, mode and standard deviation in quantitative research include understanding the mean (the average or the most representative value) and variability (dispersion or how spread out the values are). These statistics and displayed frequency distributions show the general picture and nature of the data. This initial analysis can be beneficial not only in the identification of potential data quality as well as in laying the structure for further exploratory and even inferential statistical processes.

Reporting systems are today being enhanced through the use of various technologies, with the modern one being machine learning, as pointed by (Lee, S., et al., 2020). Thus, apart from using it in conducting business and other commercial activities, ML can work on healthcare analysis to anticipate potential health challenges. These systems can incorporate a diverse ML algorithm, for instance, supervised ML for detection of cases of fraud, or the use of the unsupervised ML for discovering latent structures. However, challenges exist. The quality of data that is fed to these algorithms then has to be of good quality since bad data generates bad outputs. Furthermore, understanding the pattern of a complex algorithm can be downright challenging, thus we are likely to be/not understanding the findings they point us to. Lastly, biases may be inherent in the training data that may be taken by the algorithms, thus need for BIAS check and ways on how to deal with it. Nevertheless, machine learning can effective approach to extend value from the data and improve the reporting environment in different kinds of fields.

## Concept of the Study

The conceptual framework of a study serves as a foundational blueprint, illustrating the anticipated relationships between variables and guiding the research process. By employing visual representations, such as diagrams or flowcharts, researchers can effectively depict the cause-and-effect dynamics within their study. This approach not only aids in clarifying the study's objectives but also ensures that the research design is aligned with the theoretical underpinnings and empirical goals. Proponents of this methodology argue that when the purpose of the research is harmoniously integrated with its structural framework, it facilitates a coherent pathway from theoretical concepts to empirical investigation. This alignment is crucial, as it informs methodological decisions, including the selection of research design, data collection techniques, and analytical strategies

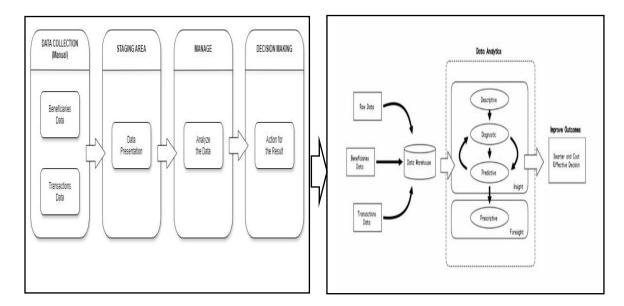


Figure 2-1. Conceptual Framework of the Study

Figure 2-1 illustrates the enhancement process from the traditional method to the Department of Agrarian Reform.

In the traditional method, data is collected from beneficiaries and transactions. This data is then staged, managed, and used for decision making. The enhancement process adds a data analytics step to the traditional method. This step involves using data mining and machine learning techniques to make an insight from the data. These insights can be used to improve decision making and outcomes.

In enhancement method process involves a data analytics component. Beneficiaries, transactions, and other relevant data are put into a data warehouse. Advanced analytics techniques, including descriptive, diagnostic, predictive, and prescriptive analytics, are employed to make a meaningful insight from this data. These insights subsequently inform and optimize decision-making, leading to smarter, more cost-effective strategies and ultimately, improved outcomes.

#### **Definition of Terms**

The following terms are conceptually and operationally defined to aid researchers in understanding their significance in the current study.

**Application Programming Interface (API).** This focuses on developing and evaluating a single software platform within the DAR. This platform aims to simplify data collection, reporting, and analysis for agrarian reform initiatives, aiming to enhance operational efficiency and decision-making across different regions and stakeholders involved in DAR's activities.

ARB (AGRARIAN REFORM BENEFICIARY). An individual or entity that is granted land under a government-supported agrarian reform program. Typically, ARBs are farmers, farmworkers, or their families who are given the legal right to own or cultivate land that was previously distributed through land reform initiatives. These beneficiaries usually qualify based on criteria such as being landless, working in agriculture, or meeting certain income requirements. The goal of agrarian reform is to promote social justice, increase productivity, and improve the living standards of those who rely on land for their livelihood.

**Data analysis.** This study helps to make an analyze data from a data report, it allows the employees of the DAR to use the analyzed data for decision-making and pin pointing where the problems exist and where the gaps are, which in turn creates a positive image and efficient outcomes for the agricultural businesses.

**Data integrity.** Data integrity has a huge contribution in this study or in a system, it helps the land owner and farmers for data quality and also for DAR organization that the data they gathered was legit from their clients.

**Procurement data.** As for the services, the DAR employees can use the web system with procurement data to support the decision making, automate the different processes and analyze the

expenses. This makes them enable to fund themselves, improving efficiency, and align to their intended mandate.

**Role-based access control (RBAC).** In web systems, Role-Based Access Control is vital needed for the DAR it works as the one who can manage and allows authorized employees to access. It also allows to control job separator such as editor or viewer that define every role of DAR employees.

# **Chapter III**

# **OPERATIONAL FRAMEWORK**

This chapter presents the methodology and materials employed in the study. It outlines the process used and the tools utilized to gather and analyze data.

### **Materials**

The requirements needed for the project's development are shown and specified in detail in this section.

### **Software**

The following table presented the software that was used to develop a system. These tools include build system plugins, programming languages, real-time database platforms, and libraries for displaying the reports, all of which contributed to the functionality and implementation of the system

Table 3-1. System Software

Software	Version	Description
PHP	8.3.8	Utilized the administrator side to build a website
JavaScript	ES2015	Used to design the front-end and prioritize mobile responsiveness
HTML	5	Used to structure the web page and its content
CSS	3	Used to design the web page's attributes

MySQL	8.0.38	Used to create, manage, design, create, and maintain databases as well as generate SQL within an integrated development environment for the MySQL database system.
Visual Studio Code	1.91.1	The main IDE use for coding and implementing the project
Google Chrome Browser	127.0.6533.43	For building the system's back end

# Hardware

Table 3-2 highlights the materials and technologies used in the development of the application. Below are the specific requirements for the computer needed for coding, debugging, and system operation.

Table 3-2. Specifications of Hardware used in Development

Hardware Used	Model	Specification
Laptop	Ideapad Gaming 3	CPU: Intel i5
		RAM: 8 GB
		ROM: 512 GB

GPU: RTX 3050 Ti

### **Data Source**

Table 3-3 is an overview of the data sources used in this study is provided in this part, together with information on the significance and the collection of procedures used.

Table 3-3. Data Source

Data Source	Significance	Methods
Current System Assessment	Identify inefficiencies and challenges	Interviews, observation
User Feedback and Needs Analysis	Identifies specific points and desired improvements	Surveys, feedback forms
FAQs Analysis	Identifies recurring inquiries and patterns	Data mining of registrar records, categorization and frequency analysis

# **System Environment**

### Locale

The study and implementation of the Unified Data Reporting System with Data Analysis is centered on Department of Agrarian Reform-ARBDSP Region VIII. Encompasses all department, and facilities to meet the needs of employees, staff, and beneficiaries. Designed specifically to

organize and avoid human errors and to simply submit the needed reports to other divisions.

Monitoring of the machineries that are given by DAR to the ARBOs.



Figure 3-1. Locale Map of Department of Agrarian Reform

The map view shows where the project will be implemented, Department of Agrarian Reform Regional Office VIII is located at Sto. Niño Extension, Tacloban City, Leyte.

### Population of the Study

The respondents of this study were all active employees assigned at DARRO VIII – ARBDSP Division. The problem and solutions on various issues encountered were generally derived from all the respondents.

### **Description of the Present System**

The company employed a standard practice of documenting reporting structure details using a computer and Google Drive due to the lack of an existing tool or system within their division. They organized the files into folders so that they could be easily accessed when requested by the central office or other divisions. Often data was handled using old-fashioned techniques where staff were

required to save files within shared folders on the desktops or even Google Drive. The setup helped staff to label and sort documents as per their convenience, document retrieval became simpler when needed.

This approach of information management meets the diverse needs of the staff and assisted in the operations by tracking reports or papers ensuring important data was available as needed. This contributed in cultivating team spirit where members could easily work together even when they were physically apart. Traditional information management techniques might not now be considered informative but they certainly did undergo and benefit from adjustments over time to contemporary innovative workplace demands. It would have been easier and collaborative if more advanced tools were embraced for greater responsiveness to the staff.

### Limitation and Drawback of the Present System

The mostly manual report generation and document storage approach of DAR using Google Drive presented several challenges to DAR. To solve these challenges, a web-based system was necessary. It offered a centralized controlled document access and management repository, comprehensive document listing with efficient searching and filtering, as well as collation features for ensuring document integrity. Although a web-based report management system could enhance the efficiency of DAR, certain factors also needed to be taken into account.

Technological issues included dependency on the Internet, system unavailability, and exposure to data security threats. Operationally, challenges included data transfer, user backlash, American dependence on IT support, and over-reliance on IT support. Beyond that, functional issues such as limitations on file size, formats accepted, and searchable queries also diminished the overall effectiveness of the system. Using the web-based system greatly improved the efficiency, productivity, and effectiveness of report management at DAR.

### **Methods**

This study employs an agile methodology to develop the Unified Data Reporting System in web based. Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams. Agile promotes adaptive planning, evolutionary development, early delivery, continuous improvement, and encourages rapid and flexible response to change (Alliance, 2024).

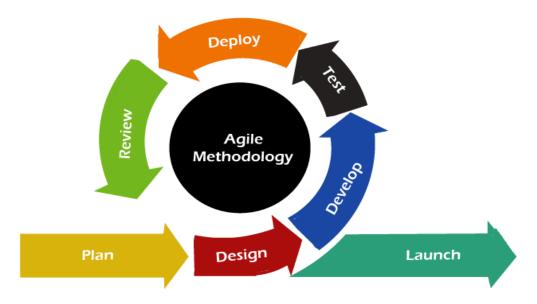


Figure 3-2. Agile Model

### **Agile Development Process**

## Requirement

In this phase, the resources required for the planned project must be identify and chosen to ensure the success of the web system. It entails establishing the project's scope and identifying the reasons behind the absence of a unified data reporting system through critical analysis, brainstorming, interviews, and observations administered in DAR Regional Office VIII—ARBDSP Division.

### Design

The researchers set up goals to develop the main concept and added better features to the Virtual Assistant. A prototype was be developed as a means to test and recognize the entire concept of the system. The proponents meticulously defined the system's components, their interactions, and data flow to ensure efficient performance and maintainability. In parallel, they developed a user-centered design, conducting thorough user research to inform the creation of intuitive interfaces and engaging user experiences.

### Development

The researchers wrote code based on the designs and requirements of the system using Android Studio in making the reporting system. Java was utilized for its reliability and various features. PHP, HTML, CSS, and JavaScript was utilized in the development of the web app, with the combination of the preceding coding languages, the researchers were able to develop a robust, comprehensive and dynamic web system. As for the Compilers/IDEs utilized, Visual Studio Code was utilized in developing the admin site and MySQL was utilized in developing the system's database. Performing continuous integration, where code is regularly tested and integrated into the main codebase was also done.

#### **Testing**

The proponents performed various types of testing, including unit, integration, system, and user acceptance testing. This was also where the proponents identified and fixed bugs or defects and obtained feedback from stakeholders or end-users.

### Deployment

The proponents set up the deployment environment, including servers, databases, and configurations. They also conducted testing to check that the deployment was successful and monitored the deployment for any problems or errors.

#### Review

The researchers conducted a sprint review meeting to showcase the completed work to stakeholders. The researchers also gathered feedback on the system's performance from the stakeholders and reviewed the feedback closely. The proponents conducted a sprint review meeting to showcase the completed work to stakeholders. They also gathered feedback on the product increment and prioritized it for future sprints.

### Launch

Lastly, the proponents finalized the deployment to the production environment, announced the release to stakeholders and users, provided training, documentation, and support for the new release, and monitored the release for any issues or bugs. They also gathered user feedback.

### **Gantt Chart**

Figure 3-4 showed the timeline that the Gantt chart outlined and key tasks involved in the project's development process. It provides a visual representation of the various phases, including requirements, design, development, testing, and deployment, ensuring a structured approach to achieving project goals.

Table 3-4. Gantt Chart

ACTIVITIES	2024					
	July	August	Sept.	Oct.	Nov.	Dec.
Planning     Gathering     Requirements     Data Gathering						

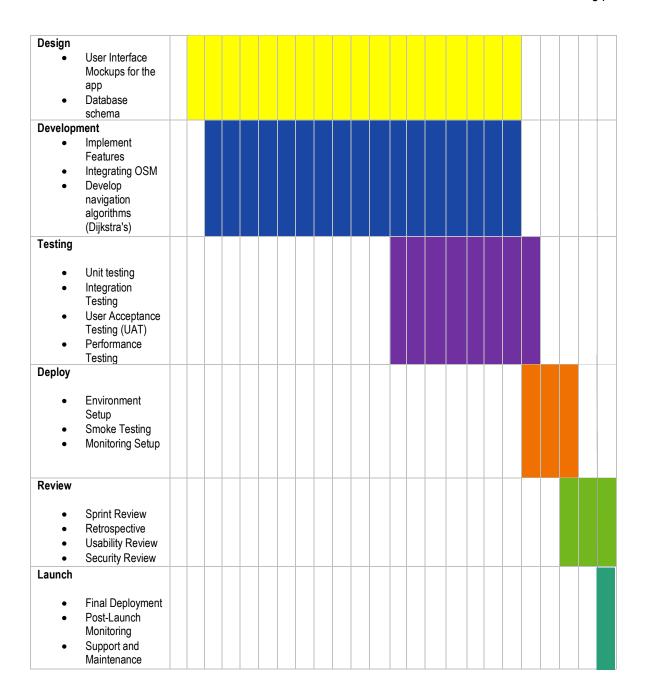


Table 3-4 Indicated the duration of activities planned for the proposed system development. This phase served as the proponents' activity guide for the requirements, design, development, testing, and deployment stages.

## **Data and Process Modeling**

**Context Diagram.** A System Context Diagram (SCD) depicts the entities that interact with a system and defines the boundary between the system and its environment.

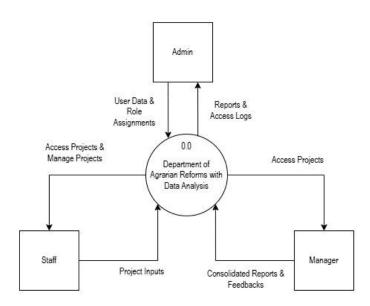


Figure 3-3. Context Diagram

Figure 3-3 showed the process of the data in the UDRS from its external entities, which included users (Admin, Manager, and Staff). The graphic illustrated the flow of data and services, including the monitoring of ARBOs and ARBs machineries and the other assistance provided by the Department of Agrarian Reform (DAR) for the development of their project program.

**Data Flow Diagram (DFD).** The figure showed how data flowed through the system, including interactions between users (admin, staff, and ARBOs).

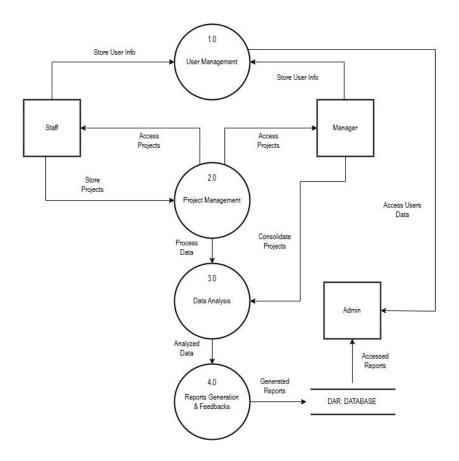


Figure 3-4. Data Flow Diagram

Figure 3-4 Illustrated how users utilized the system to search for reports, projects, send files, and view and manage user information. The system was managed and updated by the admin

**System Flowchart.** A system flowchart showed the sequence of activities and data flow within a system, demonstrating how inputs were processed and outputs were generated. It helped in understanding the logical flow and interactions among the system's many components.

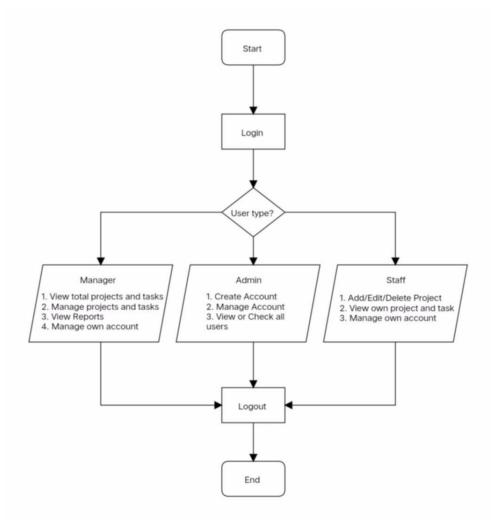


Figure 3-5. System Flowchart

Figure 3-5 System flowcharts were a means to show how data and reports moved through a system and how choices were made to direct occurrences. Symbols were used to demonstrate this. To illustrate what happened to data and where it went, they were linked together.

**Program Flowchart.** A diagram that depicted an algorithm, workflow, or process showed the stages as various types of boxes and their order by linking them with arrows. This diagrammatic representation illustrated a solution model to a given problem

**Use Case Diagram**. A use case diagram showed how users interacted with a system, including the interactions between actors and system operations. It helped visualize the system's functional requirements and interactions with external entities.

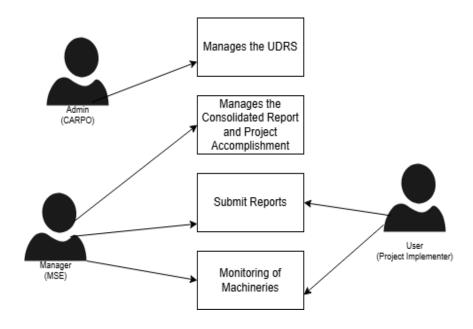


Figure 3-6. Use Case Diagram

Figure 3-6. This use case diagram explained how users and administrators interacted with the system, with a focus on important tasks such as data management and monitoring. It visually outlined the roles and actions available to each type of actor within the system.

**System Architecture.** This system architecture included a number of components, including the expanded system, all of which were intended to work together to achieve the complete navigation solution. Each component was critical to the system's integration and functionality.

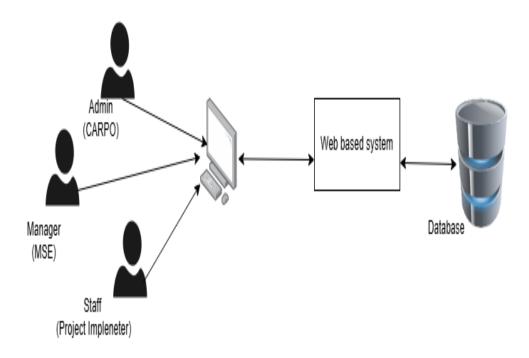


Figure 3-7. System Architecture

Figure 3-7 showed the system interaction through users and process from the web application conducted input and output through web-based system then to the server and gain information to the database.

.

# **Chapter IV**

### **RESULTS AND DISCUSSION**

This showed the results of the objectives of the study as well as how the Unified Data Reporting System with Data Analysis has considerably improved the administrative process of DAR ARBDSP Division.

The web-based system effectively enabled real-time monitoring of project implementation and interventions provided to Agrarian Reform Beneficiaries Organization (ARBO). Improving the goal of this project was to develop a web-based system that automated the monitoring of project progress and the generation of reports. By incorporating advanced technologies, the system streamlined project management, minimized manual tasks, and greatly enhanced overall efficiency, enabling users to easily track progress and produce accurate reports. The results were presented in this, with data visualized through figures and each statistical evaluation thoroughly discussed. The findings highlighted the system's effectiveness in addressing the objectives, including improved monitoring, timely reporting, and accurate tracking of project progress.



Figure 4-1. Status of project implementation

every conduct of the Regional and Provincial CSFs Inspectorate Teams. Comprehensively documenting farm machinery utilization following inspections by regional and provincial CSFs inspectorate teams. The resulting data, now integrated into a unified reporting system, enables detailed analysis of machinery deployment effectiveness. This improved data management allows for the identification of key performance indicators (KPIs) and the development of data-driven strategies to enhance agricultural productivity. The comprehensive dataset provides a robust foundation for future research and informs policy decisions regarding resource allocation and the optimization of agricultural practices. The successful integration of this data represents a significant advancement in agricultural data management and contributes to more efficient and sustainable

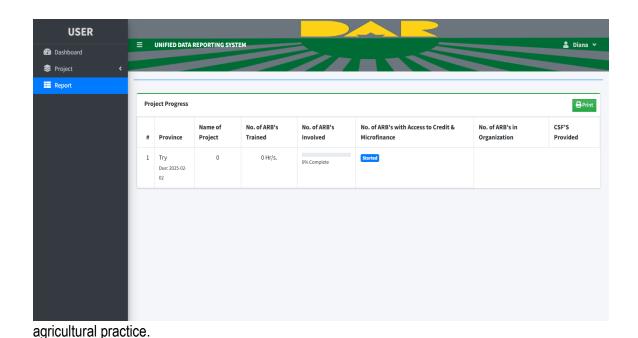


Figure 4-2. Captured the status of farm machinery

The issue of late submission of accurate and consistent reports was effectively addressed, resulting in improved timeliness and reliability of reporting. Utilizing technology

can streamline reporting processes and increase accuracy. This tool can help reduce errors, improve data accuracy, and save time. Additionally, UDRS help provide real-time reporting, allowing reports to stay up-to-date with regulatory requirements.

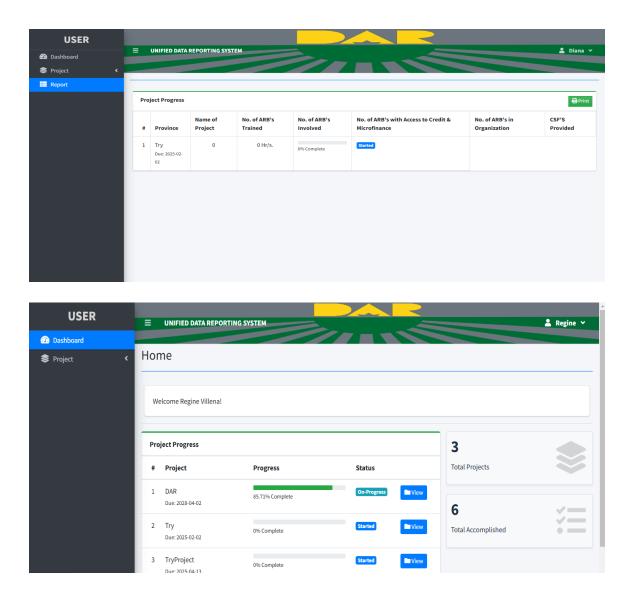


Figure 4-3. Address the late submission of reports

## **Chapter V**

## SUMMARY, CONCLUSION, AND RECOMMENDATION

This chapter included the summary, conclusion, and recommendations of the proposed system entitled, "DAR: Unified Data Reporting System with Data Analysis." The summary highlighted the purpose and concept behind the system. The conclusion was based on the findings, emphasizing the effectiveness of the system and its advantages in terms of actual implementation. The recommendations, on the other hand, presented possible improvements and adaptations that could be made for future system upgrades.

#### Summary

The purpose of the Department of Agrarian Reform's Unified Data Reporting System for the Agrarian Reform Beneficiaries Development Support Program (ARBDSP) was to increase the precision and effectiveness of the department's reporting procedures. The technology greatly decreased human error by automating data entry and report generation, guaranteeing accurate and dependable information. Additionally, it offered standardized accomplishment report templates, which made reporting easier for project implementers and guaranteed consistency in both content and formatting. UDRS also captured the status of farm machinery utilization following each inspection conducted by the Regional and Provincial CSFs Inspectorate Team. The monitoring system, enabling for real-time tracking of report submissions by each project implementer, was a crucial component of the UDRS. Effective management was made possible by this tool, which detected problems or delays in report submissions and made sure that deadlines were fulfilled and reports were turned in on time.

#### Conclusion

In the development of this project, the proponents worked diligently to create a successful and functional system that would be highly beneficial to their selected client, the DAR-ARBDSP. By implementing an online data reporting system, the goal was to enhance the staff's experience and improve the efficiency of report generation and management. This system aims to streamline workflows, reduce manual processes, and ultimately make the reporting process more seamless and efficient for all users involved. It's crucial to address the potential challenges that could arise during the system's implementation, ensuring that it is user-friendly, secure, compatible, and accessible to all staff members. The system effectively tackles key challenges faced by the Department of Agrarian Reform, such as human error, inconsistent reporting formats, and inadequate oversight of project implementers. By automating reporting processes, standardizing templates, and enabling real-time monitoring, the system significantly enhances the accuracy and efficiency of data reporting. After every inspection by the Regional and Provincial CSFs Inspectorate Team, the UDRS also recorded the current state of farm machinery utilization. These insights were important in enhancing the ARBDSP's machinery deployment and administration, enabling the department to make better decisions about resource allocation, equipment use, and maintenance.

This results in more informed decision-making, greater accountability, and improved management of agrarian reform projects. Ultimately, the Unified Data Reporting System (UDRS) contributes to the success and sustainability of these initiatives by streamlining and strengthening the reporting process within the department. The project's primary objectives have been successfully accomplished, setting the foundation for better management and oversight of DAR's projects.

The project's results and the basis for findings can be utilized to generate the following recommendations that develop into significant topics to enhance project development for researchers in the future.

#### Recommendation

To enhance the system for both users and administrators, several recommendations have been suggested:

To strengthen evaluation and monitoring, enhancing the evaluation and monitoring components of the system is crucial for ensuring that project implementation is progressing as planned and that interventions provided to Agrarian Reform Beneficiaries Organizations (ARBOs) are effective.

To develop additional features for the project implementer. Adding more functionalities for project implementers such as custom report generation, access to historical data trends, user-specific dashboards, and data validation tools will enhance the system's usability and relevance.

Addition of notifications and reminders to enhance user engagement and ensure timely updates.

## **REFERENCES**

- (DAR), D. o. (2021). Unified Data Reporting System.
- Adriano, F. D. (2008). CARP Institutional Assessment in a Post-2008. Retrieved from https://hdl.handle.net/10419/127968
- Alliance, A. (2024). Agile Alliance. Retrieved from Agile Alliance: https://www.agilealliance.org/
- Batra, M., & Agrawal, R. (2018). Comparative analysis of decision tree algorithms. *Nature inspired computing*.
- Benwell, B., & Rhys, C. S. (2018). Social Science & Medicine.
- Biagi, V., & Russo, A. (2022). Data Model Design to Support Data-Driven IT Governance Implementation. *Journal of Business and Technology*, 14(4), 210.
- Chen, J. (2020). "Combining Reporting Systems with Advanced Analytics. *Business Intelligence Journal*, 24(1), 78-89.
- Cote, C. (2021, Febuary 04). WHAT IS DATA INTEGRITY AND WHY DOES IT MATTER? Retrieved from https://online.hbs.edu/blog/post/what-is-data-integrity
- Cruz-Martínez, R., & Gratacós, E. (2018). Obstetric Imaging: Fetal Diagnosis and Care (Second Edition).
- Deepak R. (2022). A Short Review of the Literature on Automatic Data Quality. *Journal of Computer* and Communications.
- Dhesi, J., & Swart, M. (2016). Specialist pre-operative assessment clinics. *Anaesthesia*.
- Huseynov, E., & Seigneur, J.-M. (2017). Computer and Information Security Handbook (Third Edition).
- Jevtic, G. (2019). What is SDLC? Phases of Software Development, Models, & Best Practices.

- Jijo, B., & Abdulazeez, A. (2021). Classification Based on Decision Tree Algorithm for Machine Learning. *Journal of Applied Science and Technology Trends*.
- John, D. &. (2021). The impact of automated technologies on data collection: Reducing human error and leveraging web scraping and APIs. *Journal of Data Science and Technology*, 15(3), 45-62.
- Johnson, A., & Brown, P. (2020). Data Visualization Techniques for Decision Making. *Journal of Data Visualization*, 12(4), 55-70.
- K.Kruuse-Jensen, K.S.Madsen, D.M.Bruun, & M.Pilegaard. (2021). Radiography.
- Lee, S., et al. (2020). Machine Learning in Data Reporting Systems. *Data Science Quarterly*, 17(3), 201-218.
- Mazorchuck, M., Dobriak, V., & Chumachenko, D. (2018). Web browser application Development for Tasks of Prediction in Medical Domain.
- McConnell, G. (2024, Febuary 4). Retrieved from responsive.io: https://www.responsive.io/blog/procurement-data/#:~:text=For%20example%2C%20procurement%20data%20can,and%20compliance%20and%20resource%20management.
- Mercado, J. J., Coloma, P., Baltazar, E., & Torres, N. (2021). Evaluation of Agrarian Reform

  Beneficiary Organization (ARBO) under the Market Oriented Agri-Technology and AgriExtension Services (2nd cycle) of the Agrarian Reform Community Connectivity and

  Economic Support Services (ARCCESS) Project. Retrieved from

  https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3929163

- Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22(1), 67–72. https://doi.org/10.4103/aca.ACA\_157\_18
- Netoff, T. I. (2019). Engineering in Medicine.
- Olawale, A. (2023, August). Agile Software Development Handbook Scrum, Kanban, and Other

  Methodologies Explained. Retrieved from FreeCodeCamp.org:

  https://www.freecodecamp.org/news/agile-software-development-handbook/
- Penn, I. A., & Pennix, G. B. (2017). Records Management Handbook. Routledge.
- Pfeuffer, B. M.-K. (2021). Machine learning in information systems a bibliographic review and open research issues. *Electronic Markets*. doi:10.1007/s12525-021-00459-2
- Rivera, J., & Cruz, M. (2019). The role of digital tools in agrarian reform projects. *Journal of Agricultural Development*, 15(2), 45-58.
- Samhsa.gov. (2020, May 22). Retrieved from 2019 Uniform Reporting System (URS) Output Tables: https://www.samhsa.gov/data/report/2019-uniform-reporting-system-urs-output-tables
- Santos, A., Garcia, B., & Reyes, C. (2020). Leveraging technology in agrarian reform: A review of web-based systems. *Journal of Agricultural Governance and Development*, 15(2), 45-62.
- Schewe, K., & Thalheim, B. (2019). *Design and development of web information systems*.

  Heidelberg: Springer.
- Sen, P., Hajra, M., & Ghosh, M. (2019). Supervised Classification Algorithms in Machine Learning:

  A Survey. Emerging Technology in Modelling and Graphics, Advances in Intelligent Systems and Computing.
- Smith, J. a. (2019). Retrieved from https://jest.com.pk/index.php/jest/article/download/163/155/437
- Staff, C. (2024). What Is Data Analysis? (With Examples). Retrieved from https://www.coursera.org/articles/what-is-data-analysis-with-examples

- Sun Junwei, W. Y. (2020). Survival Risk Prediction of Esophageal Cancer Based on Self-Organizing

  Maps Clustering and Support Vector Machine Ensembles. *Journals & Magazines*, 131449 131460. DOI:10.1109/ACCESS.2020.3007785
- Valsalan, P., Baomar, T. A., & Baabood, A. H. (2020). *IOT BASED HEALTH MONITORING*SYSTEM. DOI:10.31838/jcr.07.04.137
- Walker, C. (2018). The PT Website Secrets System: Get the Secret Formula To Win More Patients & Make More Profit from Your PT Website.
- World Bank. (2021, October 18). World Bank Group sanctions system promotes accountabilit and transparency.https://www.worldbank.org/en/news/press-release/2021/10/18/world-bank-group-sanctions-system-promotes-accountability-and-transparency-in-combatting corruption-in-fiscal-year-2021
- Zhang, E. (2023, May 5). What is Role-Based Access Control (RBAC)? Examples, Benefits, and More. *Digital Guardian*. Retrieved from https://www.digitalguardian.com/blog/what-role-based-access-control-rbac-examples-benefits-and-more

#### **APPENDIX A**

#### LETTER TO CLIENT



Republic of the Philippines
EASTERN VISAYAS STATE UNIVERSITY
Tacloban City

COLLEGE OF ENGINEERING



June 21, 2024

Ronalyn A. Acol ARPO II Department of Agrarian Reform Region VIII Tacloban City

Dear Ma'am,

We are writing to formally request permission from the school office to conduct a survey among administrator, visitors, faculty and staff of Department of Agrarian Reform (DAR as part of our capstone project titled "DAR: Unified Data Reporting System with Data Analysis" The purpose of this survey is to gather valuable feedback and insights that will aid us in the development and improvement of our project.

Our capstone project aims to enhance the efficiency and accuracy of data reporting within the DAR by providing a comprehensive, unified system. Below are the key features of our project:

- To create a tool or database to effectively monitor the reach of Agrarian Reform Beneficiaries (ARBs).
- To address the late submission of accurate and consistent reports
- To improve the utilization of Farm machineries provided to Agrarian Reform Beneficiaries Organizations (ARBOs)

We believe that the insights gathered from the survey will significantly contribute to the development of our project, ensuring that it meets the needs and preferences of its users effectively. The survey will cover various aspects such as user experience, system requirements, and specific needs related to data reporting and analysis.

We assure you that the survey will be conducted with the utmost professionalism and adherence to ethical standards. All data collected will be handled confidentially and used solely for the purpose of our capstone project.

We kindly request your approval to distribute the survey questionnaire among the DAR community members and seek their participation in providing valuable feedback. Your support in this matter would be greatly appreciated.

Thank you for considering our request. Should you have any questions or require further information, please do not hesitate to contact us at 0967-466-9433 or christian.caysido@evsu.edu.ph.

Sincerely,

BSIT 3rd Year Students:

CHRISTIAN B. CAYSIDO

DIANA VANE C. ENERO

REGINE R. VILLENA

Noted:

WIT EXCELSIOR T. PAÑA
Capstone Project 1 Adviser

JESSIE R. PARAGAS, DIT
Head, Information Technology Department

"Building Globally Competitive Professionals"

ARCHBISHOP LINO R. GONZAGA AVENUE, TACLOBAN CITY, 6500 PHILIPPINES Email: ramon.lim@evsu.edu.ph| website: www.evsu.edu.ph

Scarispanitivith

Scanned with Can



#### Republic of the Philippines EASTERN VISAYAS STATE UNIVERSITY Tacloban City



COLLEGE OF ENGINEERING

#### CERTIFICATE OF ACCEPTANCE

THIS IS TO CERTIFY that the thesis entitled, "DAR: UNIFIED DATA REPORTING SYSTEM WITH DATA ANALYSIS" a web-based system developed by Christian B. Caysido, Diana Jane C. Enero, and Regine R. Villena, 4th year BS Information Technology students, has been tested, evaluated, and examined and therefore accepted by Ms. Ronalyn A. Acol.

Approved by:

MS. RONALYN A. ACO



### **APPENDIX B**

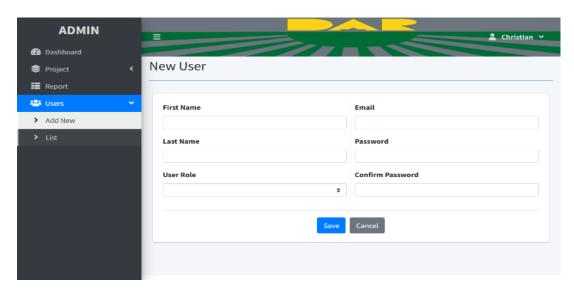
### **USER GUIDE/MANUAL**

# I. Login



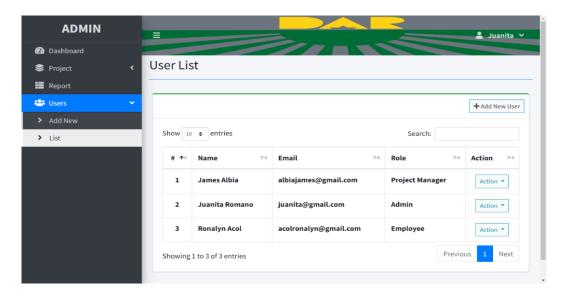
This was the Login Form that had to be accessed first by the administrator in order to create an account. The system already had a system account that needed to be accessed by the administrator. After logging in, the administrator was able to assign roles to each user.

# **II. Creating Account**



In this creation form, the administrator needed to choose specific permissions or roles within the system. These selections determined the actions that users were authorized to perform within the system and the data they were allowed to access.

### III. User List



After logging in, the ADMIN was responsible for creating every user within the organization. Here, the ADMIN could view the list of users in the organization and had the ability to edit or delete the accounts they had created.

### **APPENDIX C**

# SAMPLE INPUT/OUTPUT/REPORTS

#### I. ADMIN



