A

Project

Report On

AMRIT SAROVAR, KURUKSHETRA

Submitted in the Partial Fulfillment of the Requirement

for the Award of Degree of

Master of Computer Applications

(Session: 2022-2024)

Supervised By :   **Submitted By :**

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2023

CANDIDATE DECLARATION

I Paras, a student of Master of Computer Applications (MCA), 03rd Semester in the Department of Computer Science & Applications, Kurukshetra University, Kurukshetra, under **Class Roll No: 55 & University Roll No.: 2022007880** for the Session 2022-2024, hereby declare that the project entitled **"Amrit Sarovar, Kurukshetra".** In case of any plagiarism if found in this project. I shall be solely responsible in this department and the department will not be held responsible for the same.

Date: **(PARAS)**

Department of Computer Science & Applications

Kurukshetra University, Kurukshetra

Dr. Rakesh Kumar

Professor & Chairman   **Date:**

CERTIFICATE

It is certified that Mr. Paras is a bonafide student of Master of Computer Applications (MCA), under Class **Roll No.: 55 & University Roll No.: 2022007880.** He has undertaken the project entitled **Amrit Sarovar, Kurukshetra** under the supervision of Dr. Chander Kant.

I wish him all success in his all endeavors.

(Dr. Rakesh Kumar)

Department of Computer Science & Applications

Kurukshetra University, Kurukshetra

DR. CHANDER KANT

(Associate Professor)   **Date :**

CERTIFICATE

It is certified that Mr. Paras, a student of Master of Computer Applications (MCA), under **Class Roll No.: 55 & University Roll No.: 2022007880** for the session 2022-2024, has completed the project entitled **"Amrit Sarovar, Kurukshetra"** undertaken at under my supervision. He has attended the Department of Computer Science & Applications, Kurukshetra University, Kurukshetra.

I wish him all success in his all endeavors.

 (DR. CHANDER KANT)

ACKNOWLEDGEMENT

TRAINING CERTIFICATE

National Informatics Centre
GOVERNMENT OF INDIA

NIC

Ref. NIC-HRSC-KRK/2023/051   Date: 10th August, 2023

TO WHOM IT MAY CONCERN

This is certified that **Mr. Paras** S/o Sh. Anil Kumar, Roll No. 2022007880 a student of MCA 3rd Sem. Kurukshetra University, Kurukshetra has done his training in **Power BI** from 26th June, 2023 to 10th August, 2023. As a trainee he worked on the project "**Amrit Sarovar, Kurukshetra**".

During his training period, we found he is completely involved in his work with full enthusiasm and willingness to learn.

We wish his success in all his future.

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Name of the Organization : National Informatics Centre (NIC)

Branch : Kurukshetra

Overview :

The National Informatics Centre (NIC) is a government agency that operates under the Ministry of Electronics and Information Technology (MeitY) in India. It was established in 1976 and serves as the premier information technology organization of the Indian government. NIC's primary objective is to provide technology solutions for various e-governance initiatives and projects at both the central and state levels.

Mandate :

  i.)   Technology partner of the Government
  ii.)   Design and Develop IT Systems for the Government
  iii.) Provide ICT Infrastructure to the Government
  iv.)   Explore & Advise on use of Emerging Technologies

Services :

NIC is closely associated with the government in different aspects of governance by establishing a nationwide state-of-the-art ICT infrastructure and services for Central Government, State Governments, UT Administrations, Districts and other Government bodies. It offers a wide range of services which includes multi gigabit nationwide networks NICNET, NKN, National Data Centre, National Cloud, pan India VC infrastructure, Command and Control Centre, multi-layered GIS based platform, Domain Registration and Webcast. This plays a significant role in delivering citizen centric e-services.

Functions & Responsibilities :

i.) E-Governance Services: NIC is responsible for developing and implementing e-governance projects and solutions to enhance the efficiency, transparency, and accessibility of government services. It assists various government departments in designing and deploying digital platforms and applications.

ii.) Digital Infrastructure: NIC plays a vital role in establishing and maintaining the digital infrastructure required for government operations. This includes data Centre, networking facilities, and cyber security measures to ensure the safe storage and exchange of information.

iii.) Software Development: NIC develops and maintains a wide range of software applications tailored to the specific needs of different government departments. These applications cover areas such as healthcare, education, agriculture, finance, and more.

iv.) Web Services: NIC is responsible for hosting and maintaining websites for various government departments, ministries, and public sector organizations. These websites serve as platforms for disseminating information and interacting with citizens.

v.) Digital Initiatives: NIC has been involved in implementing various transformative initiatives, such as Digital India, which aims to ensure the digital empowerment of citizens and improve digital infrastructure across the country.

vi.) Data Management: NIC assists in the collection, management, and analysis of government data, enabling evidence-based decision-making and policy formulation.

vii.) Capacity Building: NIC conducts training programs, workshops, and seminars to enhance the digital skills and capabilities of government officials. This helps in effectively utilizing technology for governance purposes.

viii.) Standardization: NIC plays a role in developing and promoting technology standards, guidelines, and best practices for various government projects to ensure consistency and interoperability.

ix.) International Cooperation: NIC collaborates with international organizations and foreign governments to share knowledge, experiences, and expertise in the field of information technology and e-governance.

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About Client :

NAME	Nandan Londhe	
POST	Chief Minister Good Governance Associate (CMGGA)	
LOCATION	Kurukshetra	

What is Chief Minister's Good Governance Associates (CMGGA) Program ?

The CMGGA Program is a strategic collaboration between the Government of Haryana and Ashoka University to improve governance in the state and driving a mass impact on ground. Running since 2016, the program provides a platform to 25 young individuals, to work closely with the Chief Minister's Office for bringing transparency, accountability and efficiency in public service delivery in the state. The CMGGAs are recruited through

a competitive process with the selection ratio of -1:100. The associates are trained and oriented about government functioning and structure through a 15 day boot camp at Ashoka University and are then posted across 22 districts to work in tandem with the district administration for the duration of the program.

During the duration of the program, CMGGAs ensure streamlined implementation of the state government's flagship program in the field of education, women's safety, health and sanitation, higher education and e-governance. CMGGAs drive convergence between various government stakeholders and departments within the administration to re-engineer processes and de-bottleneck implementation challenges. CMGGAs also work on an innovative pilot project for addressing an issue pertinent to their district. If a pilot project is found successful, it gets scaled up at the state level.

The six batches of CMGGAs have been instrumental in driving stories of change in Haryana, resulting in palpable and visible impact on ground.

Project Name : Amrit Sarovar, Kurukshetra

Aim of the Project : We need to develop an interactive dashboard using Power BI that demonstrates the current status of the Amrit Sarovar Project in the Kurukshetra District.

Amrit Sarovar Mission :

Mission Amrit Sarovar was launched on April 24, 2022, to conserve water for the future. The mission aims to rejuvenate and develop 75 water bodies in each country's district to celebrate Azadi ka Amrit Mahotsav. The mission encourages the mobilization of non-government and citizen resources to supplement these efforts. The state governments identify different sites for constructing Amrit Sarovar in the country.

It is working across states and regions, focusing on various schemes such as XV Finance Commission Grants, Mahatma Gandhi Rural Employment Guarantee Scheme, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) sub-schemes such as Har Ghar ko Pani, watershed Development Component in addition to the States' schemes.

It can be stated that the mission encourages the mobilization of resources from citizens and non-governmental organizations to supplement these efforts.

Ministries Involved in the Mission :

The Amrit Sarovar Mission has been initiated with a comprehensive approach involving six Ministries/Departments, which are as follows:

i.) Department of Rural Development

ii.) Department of land resources

iii.) Department of Drinking Water and Sanitation

iv.) Department of Water resources

v.) Ministry of Panchayati Raj

vi.) Ministry of Forest, Environment and Climate Changes

Technical Partner of the Mission :

Bhaskaracharya National Institute for Space Application and Geo-informatics (BISAG-N) has been appointed as the technical partner for the Mission.

Target of the Mission :

i.) An estimated 50,000 Amrit Sarovars are planned to be constructed across the country.

ii.) Each of these Amrit Sarovar will cover an approximate area of 1 acre and have a water holding capacity of 10,000 cubic meters.

iii.) Active involvement and participation of the people is the key focus of the Mission.

iv.) Local freedom fighters, their families, the families of martyrs, Padma Awardees, and citizens from the local area where an Amrit Sarovar is to be constructed will be engaged at every stage of the project.

v.) On every 15th August, National Flag hoisting ceremonies will be organized at each Amrit Sarovar site.

Features of the Mission :

i.) It is based on the whole-government approach with the participation of different ministries.

ii.) Every district will construct or rejuvenate Amrit Sarovars under the mission.

iii.) Every Amrit Sarovar will be surrounded by trees.

iv.) It will generate livelihoods by using sarovars water for different purposes such as duckery, fishery, water tourism, etc.

v.) It will also work as a social gathering point for the local people.

vi.) The states and districts will work with convergence from various other schemes.

vii.) This mission focuses on water conservation, proper utilization of soil excavated from the water bodies, and promoting people's participation to boost the project.

viii.) Different ministries engaged in infrastructure development, such as the Ministry of Railways, Road Transport & Highways, and others, are also engaged in this mission. These ministries are asked to utilize the soil excavated from the water bodies.

Input :

We have been provided with a dataset in the form of an Excel sheet, which contains rows and columns comprising the data related to Amrit Sarovar Project of District Kurukshetra.

Output :

We are required to construct an interactive dashboard utilizing the provided dataset. The format of output file is .pbix.

Chapter 3 : Initial Study And Feasibility Analysis

Initial Study:

An initial study refers to the preliminary investigation and assessment conducted at the outset of a project. It involves gathering essential information, defining project objectives, scoping out requirements, and identifying key stakeholders. The primary purpose of the initial study is to lay the groundwork for the project by clarifying its purpose, scope, and potential challenges.

- **Problem**: The Amrit Sarovar Project is a large and complex project that involves the construction of multiple reservoirs across district Kurukshetra. There is a need for a tool that can help to manage and track the progress of the project (i.e. the status of the activities involved in the project like dewatering, de-siliting, Embankment, Solar Lights, Cattle Ghats, etc.) as well as provide insights into its impact.

- **Solution**: Power BI is a business intelligence (BI) tool that can be used to visualize and analyze data. It can be used to create dashboards and reports that track the progress of the Amrit Sarovar Project, as well as identify trends and patterns in the data.

- **Benefits:** Using Power BI for the Amrit Sarovar Project would have several benefits, including:

  i.) Improved visibility and transparency: Power BI would provide a central repository for data on the project, making it easier to track progress and identify problems.

  ii.) Enhanced decision-making: Power BI would allow users to create interactive dashboards and reports that can be used to make informed decisions about the project.

  iii.) Increased efficiency: Power BI can automate many of the tasks involved in data analysis, freeing up time for users to focus on other aspects of the project.

iv.) Data Visualization: Power BI enables users to create interactive and visually appealing data visualizations such as charts, graphs, maps, and tables. This makes it easier to understand complex data and identify patterns or trends.

v.) Ease of Use: Power BI features a user-friendly interface with drag-and-drop functionality, making it accessible to both technical and non-technical users. No extensive programming skills are required to create insightful dashboards.

vi.) Data Integration: Power BI can connect to a wide range of data sources, including databases, cloud services, spreadsheets, and more. This allows users to consolidate data from various sources into a single dashboard.

vii.) Real-time Data: Power BI supports real-time data streaming and updating, ensuring that users can access the most up-to-date information for their analysis and decision-making.

viii.) Customizable Dashboards: Users can design customized dashboards tailored to their specific needs. This allows different teams or individuals to focus on the metrics that matter most to them.

ix.) Natural Language Query: The Q&A feature in Power BI enables users to ask questions in natural language and receive instant visual responses. This bridges the gap between data analysis and non-technical users.

x.) Mobile Compatibility: Power BI offers mobile apps for iOS and Android devices, allowing users to access their dashboards and reports on the go. This promotes flexibility and remote access to data insights.

xi.) Sharing and Collaboration: Power BI facilitates sharing dashboards and reports with colleagues, clients, or stakeholders. This promotes collaborative decision-making and ensures that everyone is working with the same data.

xii.) Security and Governance: Power BI offers robust security features, including role-based access controls and integration with Microsoft's

security infrastructure. Organizations can control who has access to what data.

xiii.) Scalability: Power BI can handle small to large datasets, making it suitable for organizations of various sizes. It also integrates well with other Microsoft tools and platforms.

xiv.) Cost-effectiveness: Power BI offers various pricing options, including a free version with limited features. This makes it accessible to businesses with varying budgets.

xv.) Data Transformation and Modeling: Power BI provides tools for data transformation, cleansing, and modeling. Users can reshape data to suit their analysis needs without relying on external tools.

xvi.) AI-Powered Insights: Power BI integrates with Azure AI, enabling users to access AI-powered insights and analytics to uncover deeper insights from their data.

xvii.) Custom Visualizations: Beyond the built-in visualizations, Power BI supports custom visuals created by the community or tailored to specific needs.

Feasibility Analysis :

Feasibility analysis involves evaluating the practicality and viability of a proposed project or solution. It assesses various aspects such as technical, operational, financial, and market considerations to determine if the project can be successfully executed to achieve its intended goals. The outcome of a feasibility analysis guides decision-makers in determining whether to proceed with the project, alter its scope, or abandon it based on the identified benefits, risks, and resource requirements.

Feasibility analysis typically results in a comprehensive report that outlines the findings of the assessment, identifies potential challenges and risks, and provides recommendations for decision-makers. The report helps stakeholders decide whether to proceed with the project as planned, make modifications, or abandon it if the analysis indicates that the project is not feasible.

Overall, feasibility analysis plays a crucial role in minimizing risks, avoiding costly mistakes, and ensuring that resources are allocated to projects with a high likelihood of success.

Power BI is a relatively affordable and easy-to-use tool. It is also scalable, so it can be used to manage even the largest projects.

- Technical feasibility: Power BI is a cloud-based tool, so it can be accessed from anywhere with an internet connection. This makes it a feasible solution for the Amrit Sarovar Project, which is a large and complex project that will involve multiple stakeholders from across India.

- Cost feasibility: Power BI is a relatively affordable tool. The subscription fees are based on the number of users and the features that are needed. This makes it a feasible solution for the Amrit Sarovar Project, which is a government-funded project.

- Operational feasibility: Power BI is a user-friendly tool that can be easily learned and used by people with varying levels of technical expertise. This makes it a feasible solution for the Amrit Sarovar Project, which will involve a large number of users from different organizations.

- Timeline feasibility: Power BI can be deployed and used quickly and easily. This makes it a feasible solution for the Amrit Sarovar Project, which is a time-sensitive project.

- Security feasibility: Power BI offers a variety of security features to protect data. This makes it a feasible solution for the Amrit Sarovar Project, which will handle sensitive data.

- The availability of data: The Amrit Sarovar Project will generate a large amount of data. This data must be available in a format that can be easily imported into Power BI. The data can be collected from a variety of sources, such as sensors, water samples, and weather data. The data must be clean and organized so that it can be easily analyzed.

- The skills of the users: The users of Power BI must have the skills necessary to use the tool. This may require training or on boarding. The training should be tailored to the specific needs of the users. The training should cover the basics of Power BI, as well as the specific features that will be used for the Amrit Sarovar Project.

- The support from the stakeholders: The stakeholders in the Amrit Sarovar Project must be supportive of using Power BI. This will ensure that the tool is used effectively and that the data is used to make informed decisions. The stakeholders should be involved in the planning and implementation of the Power BI solution. They should also be given regular updates on the progress of the project.

Chapter 4 :System Requirements

System requirements refer to the detailed specifications and conditions that a software application, hardware device, or IT system must meet in order to function effectively, efficiently, and reliably. These requirements are defined to ensure that the system operates as intended and provides the desired level of performance while considering factors such as compatibility, resources, security, and user experience.

Technologies Used (Hardware & Software) :

Power BI projects require a combination of hardware and software to design, develop, deploy, and interact with the Power BI solutions effectively. Here's a breakdown of the typical hardware and software components used in Power BI projects:

Hardware:

i.) Computer: A computer with sufficient processing power and memory is essential for developing and working with Power BI solutions.

ii.) Display: A high-resolution display helps designers and developers create visually appealing reports and dashboards.

iii.) Mobile Devices: Power BI supports mobile devices, so having access to smart phones and tablets for testing and viewing mobile-friendly reports is beneficial.

Software:

i.) Power BI Desktop: This is the primary software for creating and designing Power BI reports and dashboards. It's a Windows application used to connect to data sources, build data models, design visualizations, and create reports.

ii.) Power BI Service (Power BI Online): The cloud-based platform where Power BI reports and dashboards can be published, shared, and accessed. It allows collaboration, sharing, and managing data refresh schedules.

iii.) Power BI Mobile: The mobile app versions for iOS and Android that enable users to access and interact with Power BI reports on the go.

iv.) Data Sources:

- Relational Databases: Software like SQL Server, MySQL, Oracle, etc., are used as data sources for Power BI.
- Excel: Excel spreadsheets can be used as data sources.
- Web Services and APIs: APIs can be used to fetch data from various web services.

v.) ETL Tools:

Power Query: Part of Power BI Desktop, it's used for data transformation and cleansing.

vi.) Programming Languages (Optional):

- DAX (Data Analysis Expressions): A formula language for creating custom calculations in Power BI.
- M Language: Used in Power Query for data transformation.

vii.) Security Tools (if applicable):

For ensuring data security during data integration and sharing.

viii.) Web Browsers:

Modern web browsers are used to access and interact with Power BI Service.

Software Requirements :

The computer system is required to have Power BI installed on it.

Minimum System Requirements to install Power BI **:**

- Windows 8.1 or Windows Server 2012 R2 or later.
- .NET 4.6.2 or later.
- Microsoft Edge browser (Internet Explorer is no longer supported)
- Memory (RAM): At least 2 GB available, 4 GB or more recommended.
- Display: At least 1440x900 or 1600x900 (16:9) required. Lower resolutions such as 1024x768 or 1280x800 aren't supported because some controls (such as closing the startup screens) display beyond those resolutions.
- Windows display settings: If you set your display to change the size of text, apps, and other items to more than 100%, you won't see some dialogs that you must interact with to continue using Power BI Desktop. If you encounter this issue,

check your display settings in Windows by going to Settings > System > Display, and use the slider to return display settings to 100%.

- CPU: 1 gigahertz (GHz) 64-bit (x64) processor or better recommended.

- WebView2: If WebView2 wasn't automatically installed with Power BI Desktop or if it was uninstalled, download and run the installer for WebView2.

Chapter 5 : Software Requirement Specification

A Software Requirements Specification (SRS), also known as a software requirement specification or system requirements specification, is a formal document that outlines the detailed requirements for a software application or system. It serves as a comprehensive guide for developers, designers, testers, and other stakeholders involved in the software development process. The SRS document helps ensure a common understanding of the project's scope, features, functionalities, and constraints.

Creating a well-structured and detailed SRS is essential for a successful software development project. It facilitates effective communication among stakeholders, helps developers understand project expectations, and provides a reference point for verifying that the final product meets the specified requirements.

Introduction:

The Amrit Sarovar Project is a large and complex project that involves the construction of thousands of reservoirs across India. The project will generate a large amount of data, which will need to be managed and analyzed. Power BI is a business intelligence (BI) tool that can be used to visualize and analyze data. It can be used to create dashboards and reports that track the progress of the project, as well as identify trends and patterns in the data.

Functional Requirements:

- Import data from a variety of sources: The software must be able to import data from a variety of sources, including databases, spreadsheets, and files. This will allow the software to be used to track data from a variety of sources, such as construction progress, water quality, and project impact.
- Create dashboards and reports that track the progress of the project: The software must be able to create dashboards and reports that track the progress of the project. These dashboards and reports should be easy to understand and should provide insights into the project's progress.

- Allow users to customize dashboards and reports to their specific needs: The software must allow users to customize dashboards and reports to their specific needs. This will allow users to create dashboards and reports that are tailored to their specific roles and responsibilities.

- Share dashboards and reports with other users: The software must allow users to share dashboards and reports with other users. This will allow users to collaborate on the project and to share information with each other.

- Data visualization: The software must be able to visualize data in a variety of ways, such as charts, graphs, and maps. This will allow users to easily understand and interpret the data.

- Data analysis: The software must be able to analyze data and identify trends and patterns. This will allow users to make informed decisions about the project.

- Reporting: The dashboard must be able to generate reports that summarize the data. These reports can be used to track the progress of the project and to communicate with stakeholders.

- Collaboration: The dashboard must allow users to collaborate on the data. This can be done by sharing dashboards and reports, or by commenting on data.

Non-Functional Requirements:

- Scalable to handle the large amount of data that will be generated by the project: The software must be scalable to handle the large amount of data that will be generated by the project. This is because the project will generate a large amount of data, which will need to be stored and analyzed.

- Secure to protect the confidentiality of the data: The software must be secure to protect the confidentiality of the data. This is because the data that will be stored in the software will be sensitive, and it is important to protect it from unauthorized access.

- Easy to use by users with varying levels of technical expertise: The software must be easy to use by users with varying levels of technical expertise. This is because the software will be used by a variety of users, including those with limited technical skills.

- Performance: The software must be able to perform well even when processing large amounts of data. This is because the project will generate a large amount of data, which will need to be stored and analyzed.

- Scalability: The software must be able to scale to handle the increasing amount of data that will be generated by the project. This is because the project is expected to continue for many years, and the amount of data will only increase over time.

- Security: The software must be secure to protect the confidentiality of the data. This is because the data that will be stored in the software will be sensitive, and it is important to protect it from unauthorized access.

- Availability: The software(dashboard) must be available 24/7 so that users can access it whenever they need to. This is because the project is important and the data must be accessible to users at all times.

- Usability: The dashboard must be easy to use by users with varying levels of technical expertise. This is because the software will be used by a variety of users, including those with limited technical skills.

- Maintainability: The dashboard must be easy to maintain. This is because the software will be used for many years, and it is important to be able to fix bugs and add new features as needed.

- Reliability: The s must be reliable. This means that it must be able to work properly without crashing or experiencing other problems.

- Documentation: The dashboard must be well-documented. This will make it easier for users to learn how to use the software and to troubleshoot problems.

- Support: The dashboard must be supported by a team of developers who will be available to answer questions and fix problems.

Deployment:

The dashboard will be deployed on a cloud-based platform: The dashboard will be deployed on a cloud-based platform. This will allow users to access the software from anywhere with an internet connection.

Maintenance:

The dashboard will be maintained by a team of developers who will be responsible for fixing bugs and adding new features: The dashboard will be maintained by a team of developers who will be responsible for fixing bugs and adding new features. This will ensure that the software is always up-to-date and that it meets the needs of the users.

System design is a crucial phase in the software development life cycle where the requirements identified in earlier stages are transformed into a detailed blueprint for constructing the software system. It involves creating a comprehensive plan for how the software components will be structured, organized, and integrated to meet the desired objectives and functionalities.

Key benefits of System Design :

- It ensures that the system is well-structured and efficient: A well-designed system will be easier to develop, maintain, and troubleshoot.

- It helps to identify and mitigate risks: The system design process can help to identify and mitigate risks associated with the system, such as security risks and performance risks.

- It improves communication and collaboration: The system design process can help to improve communication and collaboration between the different stakeholders involved in the system development project.

- It facilitates change management: The system design process can help to facilitate change management by providing a blueprint for how the system can be changed in the future.

The system design phase for the Amrit Sarovar Project using Power BI would involve the following steps:

i.) Define the system requirements: The first step is to define the system requirements. This includes the functional requirements, such as what the system should do, and the non-functional requirements, such as the performance, scalability, and security requirements.

ii.) Design the data model: The next step is to design the data model. This involves defining the data entities, such as the tables and columns, and the relationships between them.

iii.) Design the architecture: The architecture of the system defines how the different components of the system will interact with each other. The architecture for the Amrit Sarovar Project using Power BI would likely be a three-tier architecture, with a data layer, an application layer, and a presentation layer.

The system will be divided into three layers:

- Data layer: This layer will store the data that is collected from the project. The data will be stored in a database, which can be accessed by the other layers.

- Application layer: This layer will process the data and generate reports and dashboards. The application layer will be implemented using Power BI.

- Presentation layer: This layer will display the reports and dashboards to the users. The presentation layer can be implemented using a web browser or a mobile app.

The data layer will be hosted on a cloud server. This will allow the data to be accessed by users from anywhere in the world. The application layer will also be hosted on a cloud server. This will allow the application to be scalable and reliable. The presentation layer can be hosted on a cloud server or on a local server.

iv.) Design the user interface: The user interface is how users will interact with the system. The user interface for the Amrit Sarovar Project using Power BI would likely be a web-based interface.

v.) Create the system prototype: A prototype is a working model of the system that can be used to test the design. The prototype for the Amrit Sarovar Project using Power BI would likely be a web-based application that can be used to visualize the data.

vi.) The needs of the users: The system design must meet the needs of the users. This includes the functional requirements, such as what the system should do, and the non-functional requirements, such as the performance, scalability, and security requirements.

vii.) The available resources: The system design must be feasible with the available resources. This includes the budget, the time, and the skills of the team.

viii.)   The risks: The system design must mitigate the risks associated with the project. This includes the risks of failure, the risks of security breaches, and the risks of data loss.

The system design phase is an important phase in the SDLC. By carefully designing the system in this phase, the project can be more likely to be successful.

Along with this, the system will use a variety of security measures to protect the data. These measures will include:

- Authentication: Users will be required to authenticate themselves before they can access the data.
- Authorization: Users will only be able to access the data that they are authorized to access.
- Encryption: The data will be encrypted before it is stored in the database.
- Access control: Access to the database will be restricted to authorized users.

Chapter 7 : Data Flow Diagrams

A Data Flow Diagram (DFD) is a visual representation of how data flows within a system or a process. It's a graphical technique used for modeling and documenting the flow of data through different components of a system. DFDs are commonly used in software development, system analysis, and process engineering to represent the interactions between various parts of a system.
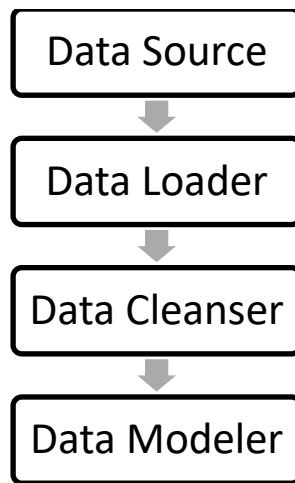
This is just a basic data flow diagram, and the specific components and steps involved in an Amrit Sarovar Project using Power BI.

Here are some additional details about each of the components:

- Data Source: The data source could be a database, a file, or an API. The data source must be accessible to Power BI in order to load the data. The data source provided is Excel Worksheet.

- Data Loader: The data loader is the component that loads the data into Power BI. The data loader can be configured to load data from a variety of sources, including databases, files, and APIs. Power BI and Power Query Editor are used to load the data.

- Data Cleanser: The data cleanser is the component that cleans the data, removing errors and inconsistencies. The data cleanser can be configured to remove duplicate rows, fix types, and other data quality issues. Here, Power Query Editor is used for cleansing the data.

- Data Modeler: The data modeler is the component that creates the data model, which is a representation of the data in a way that is easy to understand and use. The data modeler can be used to create relationships between tables, create calculated columns, and other data modeling tasks. Here, Power BI is used as the Data Modeler.

- Power BI Report: The Power BI report is the component that generates the reports, which are visualizations of the data. The Power BI report can be used to create charts, tables, and other visualizations to help users understand the data.

Model View

In Power BI, the "Model View" refers to the section of the Power BI Desktop application where you design and build the data model for your report. The data model is the foundation of your Power BI report, and it involves importing, transforming, and shaping your data so that it's ready for visualization.

The model view in Power BI Amrit Sarovar project is a representation of the data in the project. It shows all of the tables, columns, and relationships in the model. The model view can be used to understand the data, troubleshoot problems, and make changes to the model.

To access the model view in Power BI, open the project and select the Model icon on the left side of the screen. The model view will open in a new window.

The model view is divided into two panes: the Tables pane and the Relationships pane.

i.) The Tables pane shows all of the tables in the model. Each table has a name, a description, and a list of columns.

ii.) The Relationships pane shows the relationships between the tables in the model. A relationship is a connection between two tables that allows you to join the data from the two tables.

iii.) The model view is a powerful tool that can be used to understand and manage the data in the Power BI Amrit Sarovar project. By understanding the model view, you can make better decisions about how to use the data and how to create visualizations that are accurate and insightful.
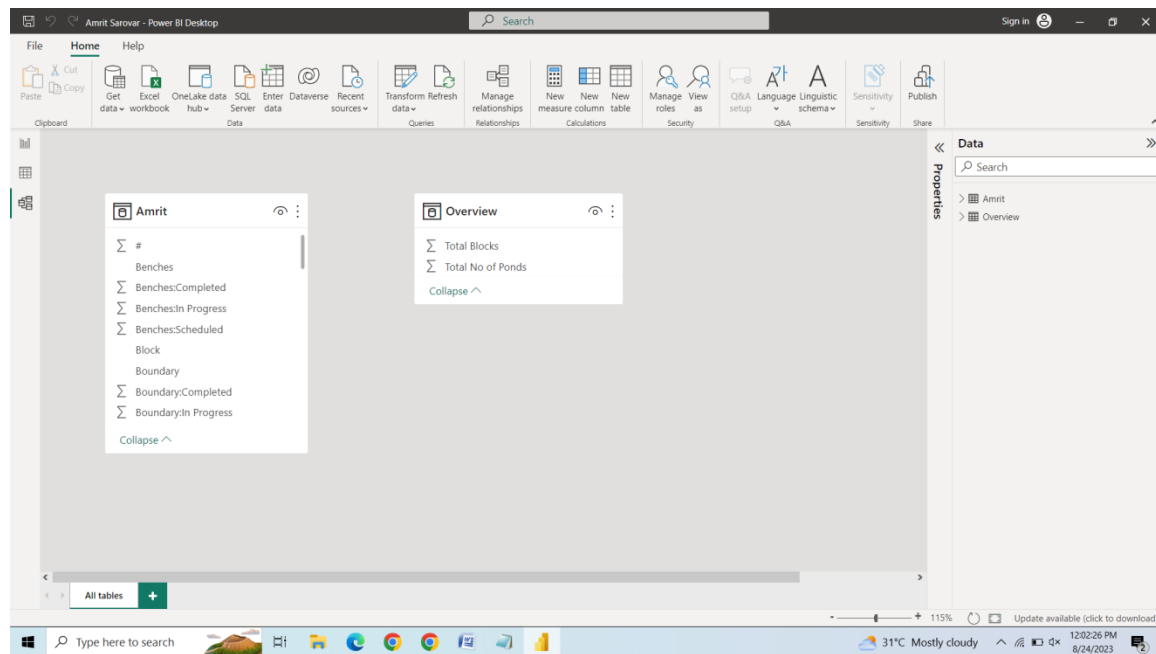
Figure 7.2 : Model view of the Project

Additional Benefits of the Model View :

- Explore the data: You can use the model view to explore the data in your project. You can see the names of the tables, the columns in each table, and the relationships between the tables.

- Troubleshoot problems: If you are having problems with your Power BI Amrit Sarovar project, you can use the model view to troubleshoot the problem. You can see if there are any errors in the data or if there are any problems with the relationships between the tables.

- Make changes to the model: You can use the model view to make changes to the model. You can add or remove tables, columns, or relationships. You can also change the data types of the columns.

- Create efficient queries: The model view can be used to create efficient queries by understanding the relationships between the tables. This can help to reduce the amount of data that needs to be loaded and processed, which can improve the performance of the reports.

- Improve the readability and understandability of the model: The model view can be used to improve the readability and understandability of the model by adding comments and documentation. This can help other users to understand the model and to make changes to it as needed.

- Share the model with others: The model view can be shared with others by exporting it to a file or by publishing it to a Power BI workspace. This can help to collaborate with others on the model and to get feedback on it.

Chapter 8 : Languages Used

Power BI is a powerful business analytics tool developed by Microsoft. It supports various languages and scripting capabilities for data manipulation, transformation, and visualization. Here are the key languages used in Power BI:

- DAX (Data Analysis Expressions): DAX is a formula language used in Power BI to create custom calculations for data modeling and analysis. It's used to create measures, calculated columns, and calculated tables. DAX is similar to Excel formulas but is designed to work with relational data and support more complex calculations.

- DAX Studio: While not a standalone language, DAX Studio is an external tool used for advanced DAX querying, performance analysis, and optimization. It provides a more interactive environment for working with DAX queries and functions.

- Power Query Formula Language: In addition to M, Power Query also has its own formula language that's used to transform and manipulate data during the data loading process. This language is often referred to as the "M formula language."

- R and Python: Power BI allows you to integrate R and Python scripts directly into your reports. You can use these scripts for advanced data analysis, statistical modeling, and machine learning, and then visualize the results in your Power BI reports.

Languages used in Amrit Sarovar Project :

i.)   DAX (Data Analysis Expressions)
ii.)   Power Query Formula Language

Chapter 9 : Project Implementation

Project Name : Amrit Sarovar, Kurukshetra

Aim of the Project : We need to develop an interactive dashboard using Power BI that demonstrates the current status of the Amrit Sarovar Project in the Kurukshetra District.

Software Used : Micrsoft Power BI

Implementation :

1) We have received the dataset for Project: Amrit Sarovar in District Kurukshetra. This dataset is in the form of an Excel Worksheet and has been provided to us by the Chief Minister Good Governance Associate (CMGGA) of District Kurukshetra. This dataset comprises of multiple columns listed as follows:

Sr.No	Column Name	Purpose or Value
i.)	#	Represents Serial Number (Contains numbers)
ii.)	Block	Represents Blocks (Blocks Name)
iii.)	Village	Represents Villages (Village Name)
iv.)	Unique Identification Number	Represents Unique Identification Number of Ponds (Unique)
v.)	Source of Water	Represent Source of Water (Sewage Water / Canal or Borewell)
vi.)	Type	Represent the Type (Construction / Renovation)
vii.)	Status (on PDMS Portal)	Represents Status on PDMS Portal (Completed/Not Started/In Progress)
viii.)	Step 1 Dewatering	Represents Status of Dewatering (Completed/In Progress/Scheduled)
ix.)	Step 2 Desilting	Represents Status of Desilting (Completed/In Progress/Scheduled)
x.)	Step 3 Embankment	Represents Status of Embankment (Completed/In Progress/Scheduled)
xi.)	Walkway	Represents Status of Walkway (Completed/In Progress/Scheduled)
xii.)	Plantation	Represents Status of Plantation (Completed/In Progress/Scheduled)
xiii.)	Benches	Represents Status of Benches (Completed/In Progress/Scheduled)
xiv.)	Solar Lights	Represents Status of Solar Lights (Completed/In Progress/Scheduled)
xv.)	Greywater Management / Wetland	Represents Status of Greywater (Completed/In Progress/Scheduled)
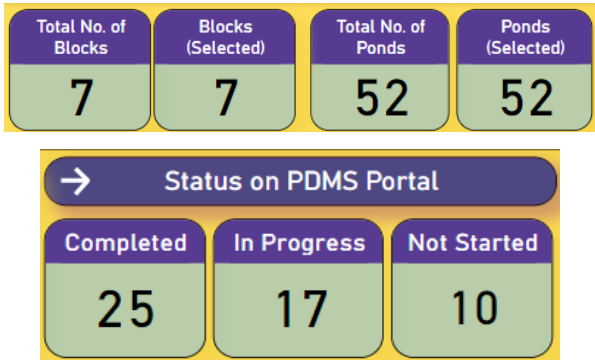
xvi.)	Boundary	Represents Status of Boundary (Completed/In Progress/Scheduled)
xvii.)	Cattle Ghats	Represents Status of Cattle Ghats (Completed/In Progress/Scheduled)

2) Firstly, we import the data into Power BI by selecting the 'Get Data' option and choosing 'Excel Worksheet.' Subsequently, we utilize the Power Query Editor to process the data. We eliminate unnecessary rows and empty columns from the dataset. Additionally, we employ conditional statements to calculate row counts based on their respective values.

We used Graphical User Interface (GUI) to transform the data. The actual code behind all the transformations is in DAX language & Power Query Formula language.

3) After applying all the transformations using Power Query Editor to the data set, the new or modified table consists of 49 columns.

4) Load and apply the data in Power BI. The new columns will be visible under the 'Data' tab on the right side of the window.

5) Utilize visuals as needed and populate them with the relevant values or columns.

6) The visuals used in this project are listed as follows:
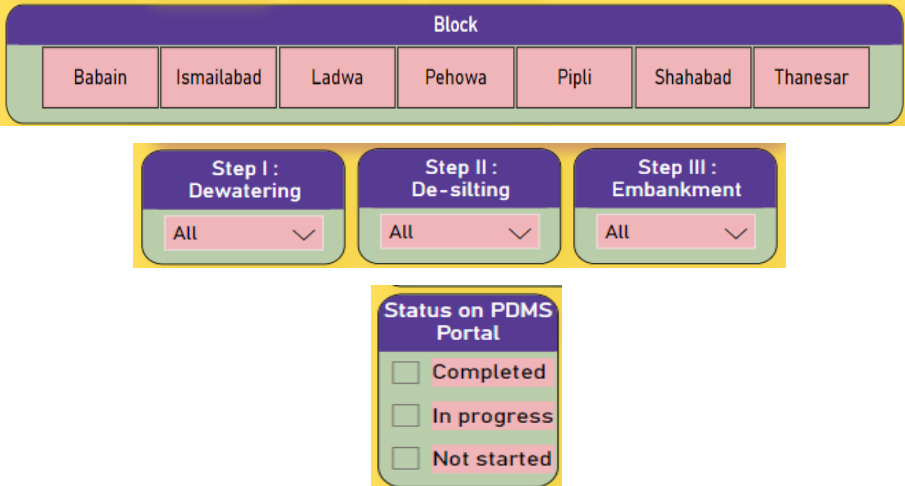
Sr. No.	Visual Name, Details & Examples

1.	**Visual Name :** Card
	
	Definition : A card in Power BI is a visual that displays a single number or metric value. It is a simple and effective way to communicate key information to your audience. Cards can be used to display a variety of data, including sales figures, revenue goals, customer satisfaction scores, and more.
	
	Steps to create : To create a card in Power BI, you can follow these steps:
	
	  i.) In the Power BI report editor, click on the "Insert" tab.
	  ii.) In the "Visualizations" pane, select the "Card" icon.
	  iii.) Drag and drop the card onto the report canvas.

iv.) In the "Data" pane, select the field that you want to display in the card.

v.) Format the card to your liking.

Use of Cards : Use of cards to define the following :

- Total no of villages
- Total no of villages (Selected)
- Total no of ponds
- Total no of ponds (Selected)
- Used to represent – Completed, In Progress & Not started Status on PDMS Portal
- Used to represent the count of Completed, In Progress & Scheduled of Amrit Activities [Dewatering, De-silting & Embankment]
- Used to represent the actual status of the selected village - Completed, In Progress & Scheduled of Amrit Activities [Dewatering, De-silting & Embankment].
- Used to represent the actual status of the selected village - Completed, In Progress & Scheduled of Amrit + [Sustainability] Activities which includes of Mandatory Activities [Walkway, Plantation, Solar Lights & Benches] and Additional Activities [Wetland, Boundary & Cattle Ghats]

Examples :

Total No. of Blocks	Blocks (Selected)	Total No. of Ponds	Ponds (Selected)
7	7	52	52

→ **Status on PDMS Portal**

Completed	In Progress	Not Started
25	17	10

2.	**Visual Name :** Mutlirow card

Definition : A multirow card in Power BI is a visual that displays multiple values in a single card. It is a good way to display related data in a compact and easy-to-read format. Multirow cards can be used to display a variety of data, such as sales figures, revenue goals, customer satisfaction scores, and more.

Steps to create : To create a multirow card in Power BI, you can follow these steps:

i.) In the Power BI report editor, click on the "Insert" tab.

ii.) In the "Visualizations" pane, select the "Multirow Card" icon.

iii.) Drag and drop the multirow card onto the report canvas.

iv.) In the "Data" pane, select the fields that you want to display in the multirow card.

v.) Format the multirow card to your liking by customizing background color, Text size, Text color, border, border radius and with a numerous features which is provided by the software Power BI.

	Use of Multi-row Cards : Use of Multi-Row cards to define the following : • Used to represent the count of Completed, In Progress & Scheduled of Amrit + [Sustainability] Activities which includes of Mandatory Activities [Walkway, Plantation, Solar Lights & Benches] and Additional Activities [Wetland, Boundary & Cattle Ghats]
	Examples : Mandatory **Walkway** — All 0 Completed 0 In Progress 52 Scheduled **Plantation** — All 0 Completed 0 In Progress 52 Scheduled **Benches** — All 0 Completed 0 In Progress 52 Scheduled **Solar Lights** — All 0 Completed 0 In Progress 52 Scheduled
3.	**Visual Name :** Slicer **Definition :** A slicer in Power BI is a visual that allows users to filter data on a report. Slicers are a great way to let users explore data and find the insights they are looking for. **Steps to create :** To create a slicer in Power BI, you can follow these steps: i.) In the Power BI report editor, click on the "Insert" tab. ii.) In the "Visualizations" pane, select the "Slicer" icon. iii.) Drag and drop the slicer onto the report canvas. iv.) In the "Data" pane, select the field that you want to filter by **Use of Slicers :** Use of slicers for the selection of the following : • Blocks • Status on PDMS Portal (Completed, In Progress & Not started) • Amrit Activities [Dewatering, De-silting & Embankment] –

(Completed, In Progress, Scheduled)

- Amrit + [Sustainability] Activities which includes of Mandatory Activities [Walkway, Plantation, Solar Lights & Benches] and Additional Activities [Wetland, Boundary & Cattle Ghats] – (Completed, In Progress, Scheduled)
- List of Ponds along with their Unique Identification Number.

Examples :

| 4. | **Visual Name :** Table

Definition : A table in Power BI is a visual that displays data in a tabular format. It is a good way to display large amounts of data in a clear and concise way. Tables can be used to display a variety of data, such as sales figures, customer demographics, and product inventory.
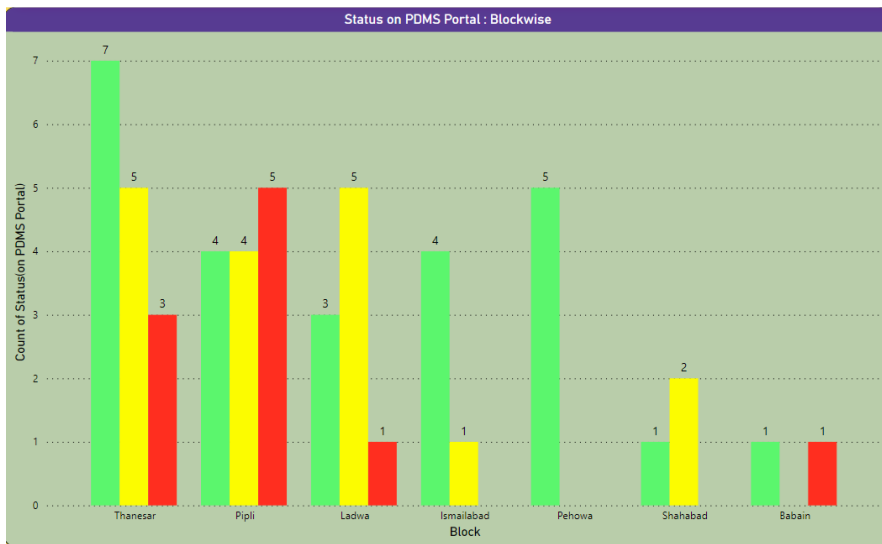
Steps to create : To create a table in Power BI, you can follow these steps:
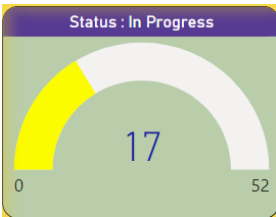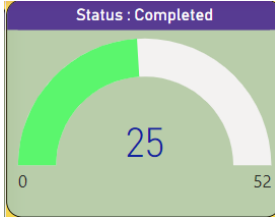
  i.) In the Power BI report editor, click on the "Insert" tab.

  ii.) In the "Visualizations" pane, select the "Table" icon.

  iii.) Drag and drop the table onto the report canvas.

  iv.) In the "Data" pane, select the fields that you want to display in the table.

  v.) Format the table to your liking.

Use of Table : Use of tables to display the :

- Village List which includes the columns which represents the

		name of Block, Villages and their Unique Identification Number (UIN).
		Example :
5.		**Visual Name :** Waterfall Chart **Definition :** A waterfall chart in Power BI is a visual that shows how a total value changes over time as a result of a series of positive and negative changes. The initial value is shown as a baseline, and subsequent changes are displayed as bars above or below the baseline. The bars are usually color-coded to indicate whether the change is positive or negative. Waterfall charts are a good way to visualize how a series of changes affects an overall value. They are often used to track financial performance, such as revenue or profit, or to show the impact of different marketing campaigns. **Steps to Create :** To create a waterfall chart in Power BI, you can follow these steps: • In the Power BI report editor, click on the "Insert" tab. • In the "Visualizations" pane, select the "Waterfall Chart" icon. • Drag and drop the waterfall chart onto the report canvas. • In the "Data" pane, select the fields that you want to use for the waterfall chart. • Format the waterfall chart to your liking. **Use of Table :** Use of Waterfall Chart to display the : • Status on PDMS Portal (in the form of waterfall)
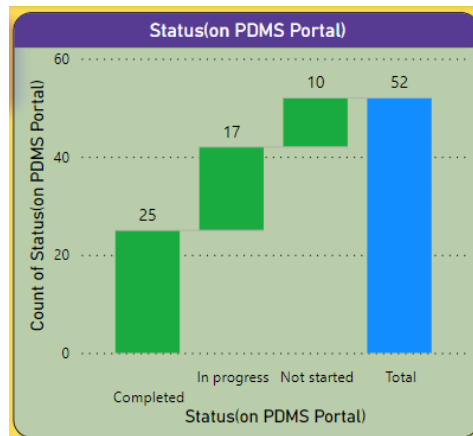
	Example :
6.	**Visual Name :** Donut Chart **Definition :** A donut chart in Power BI is a circular chart that is divided into segments, similar to a pie chart. However, the donut chart has a hole in the Centre, which can be used to display a different value or to highlight a specific segment. Donut charts are a good way to visualize proportions or percentages. They are often used to show market share, sales by product category. **Steps to Create :** To create a donut chart in Power BI, you can follow these steps: i.) In the Power BI report editor, click on the "Insert" tab. ii.) In the "Visualizations" pane, select the "Donut Chart" icon. iii.) Drag and drop the donut chart onto the report canvas. iv.) In the "Data" pane, select the fields that you want to use for the donut chart. v.) Format the donut chart to your liking**.** **Use of Donut Chart :** Use of Donut Chart to display : • The status of Amrit Activities [Dewatering, De-silting & Embankment] – (Completed, In Progress, Scheduled) in form of donut in which the different status is represented by different color along with the total value and percentage. • The status of Amrit + [Sustainability] Activities which includes of Mandatory Activities [Walkway, Plantation, Solar Lights &
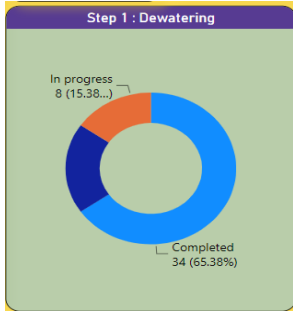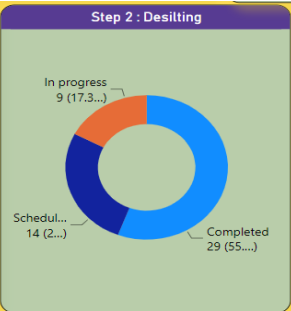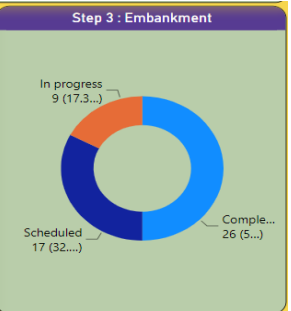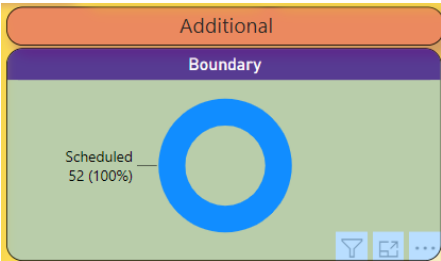
Benches] and Additional Activities [Wetland, Boundary & Cattle Ghats] – (Completed, In Progress, Scheduled) in form of donut in which the different status is represented by different color along with the total value and percentage.

	Examples :
7.	**Visual Name :** Clustered Column Chart **Definition :** A clustered column chart in Power BI is a visual that displays multiple series of data as columns. The columns are grouped together based on a common dimension, such as product category or region. This makes it easy to compare the values of different series within each group. **Steps to Create :** To create a clustered column chart in Power BI, you can follow these steps: i.) In the Power BI report editor, click on the "Insert" tab. ii.) In the "Visualizations" pane, select the "Clustered Column Chart" icon. iii.) Drag and drop the clustered column chart onto the report canvas. iv.) In the "Data" pane, select the fields that you want to use for the clustered column chart.

	v.) Format the clustered column chart to your liking. **Use of Clustered Column Chart :** Use of Clustered Column chart to display : • The status of PDMS Portal (Completed, In Progress, Not Started) by the blocks with the help of bar chart (Column wise).
	Example : Status on PDMS Portal : Blockwise Count of Status(on PDMS Portal) Thanesar 7 5 3 · Pipli 4 4 5 · Ladwa 3 5 1 · Ismailabad 4 1 · Pehowa 5 · Shahabad 1 2 · Babain 1 1 Block

8.	**Visual Name :** Gauze Chart
	
	Definition : A gauge chart in Power BI is a visual that shows the progress of a single value towards a goal or target. The gauge chart has a circular arc and the value is displayed as a needle that moves along the arc. The needle can be colored to indicate whether the value is above or below the target.
	
	Steps to Create : To create a gauge chart in Power BI, you can follow these steps:
	
	  i.) In the Power BI report editor, click on the "Insert" tab.
	  ii.) In the "Visualizations" pane, select the "Gauge Chart" icon.
	  iii.) Drag and drop the gauge chart onto the report canvas.
	  iv.) In the "Data" pane, select the field that you want to use for the gauge chart.
	  v.) Format the gauge chart to your liking.
	
	Use of Gauze Chart : Use of Gauze Chart to define the following ;

	• Count of Ponds on which the Status of tasks is Completed on the PDMS Portal to of the Total No. of Tasks. • Count of Ponds on which the Status of tasks is In Progress on the PDMS Portal to of the Total No. of Tasks. • Count of Ponds on which the Status of tasks is Not Completed on the PDMS Portal to of the Total No. of Tasks
9.	**Examples :** Status : In Progress 17 0 52 Status : Completed 25 0 52

7. By customizing the visuals within the dashboard, we can enhance its appearance. Additionally, we have the option to incorporate buttons to facilitate navigation between different pages.

Chapter 10 : System Testing And Implementation

System testing and implementation are crucial phases in the development and deployment of any software or technology solution. These phases ensure that the developed system is ready for use, meets the specified requirements, and functions as intended. Let's take a closer look at each of these phases:

System Testing:

System testing involves evaluating the entire system's functionality, performance, and compatibility. It verifies that all individual components and modules work together seamlessly and meet the defined requirements. Various types of tests are conducted during the testing phase of the Project Amrit Sarovar :

i.) Data validation: The data in the data sources is valid and accurate.

ii.) Functionality testing: The functionality of the reports, such as filtering, sorting, is tested and found to be OK.

iii.) Performance testing: The performance of the reports, such as loading time and responsiveness is tested and found to be OK.

iv.) Security testing: The reports are secure and that only authorized to the users that access them.

Implementation :

Implementation is the process of deploying the tested and finalized system into its operational environment. This phase involves several key steps:

- Installation: Installing the Power BI to visualize the dashboard created on the client side.

- Data Migration: Transferring of .pbix files easily through any medium.

- Configuration: Setting up the system based on the specific requirements of the organization.

- Training: Providing training to users and stakeholders who will interact with the system.

- Rollout Strategy: Planning how the new system will be introduced to users and how any potential disruptions will be managed.
- Monitoring: Setting up monitoring tools to track the system's performance and identify any post-implementation issues.

Overall, the dashboard created fulfills the requirements of the organization according to the client needs. It is tested and deployed to the client side successfully.
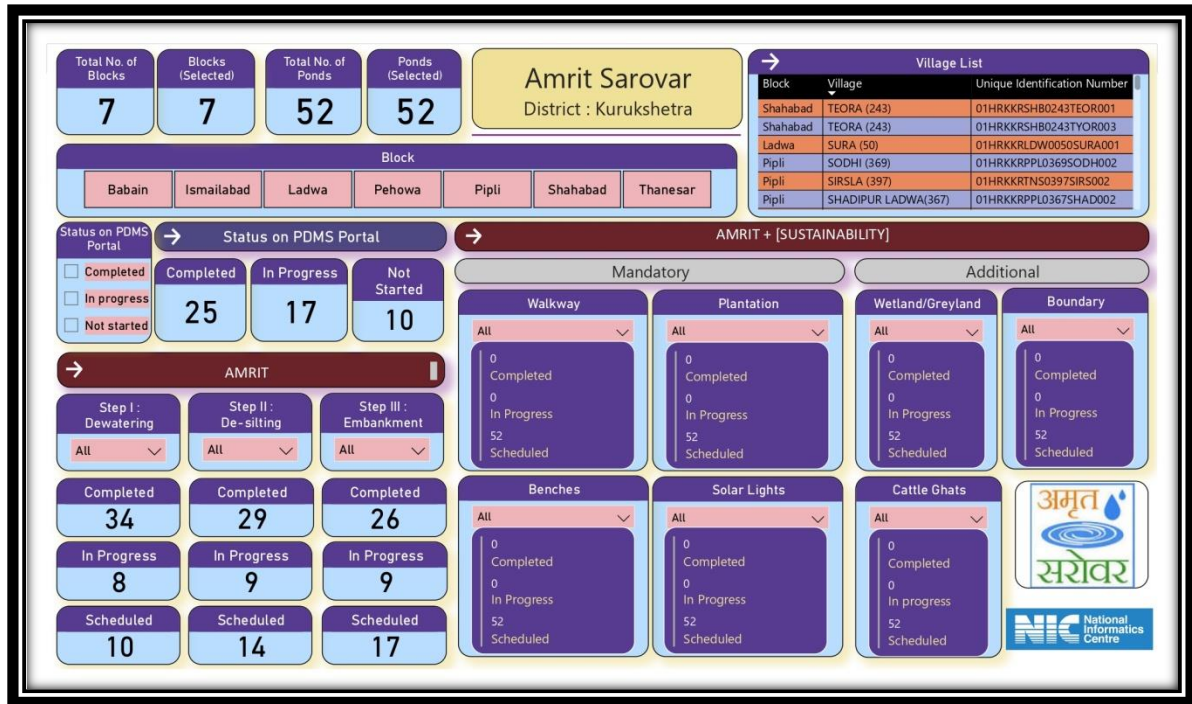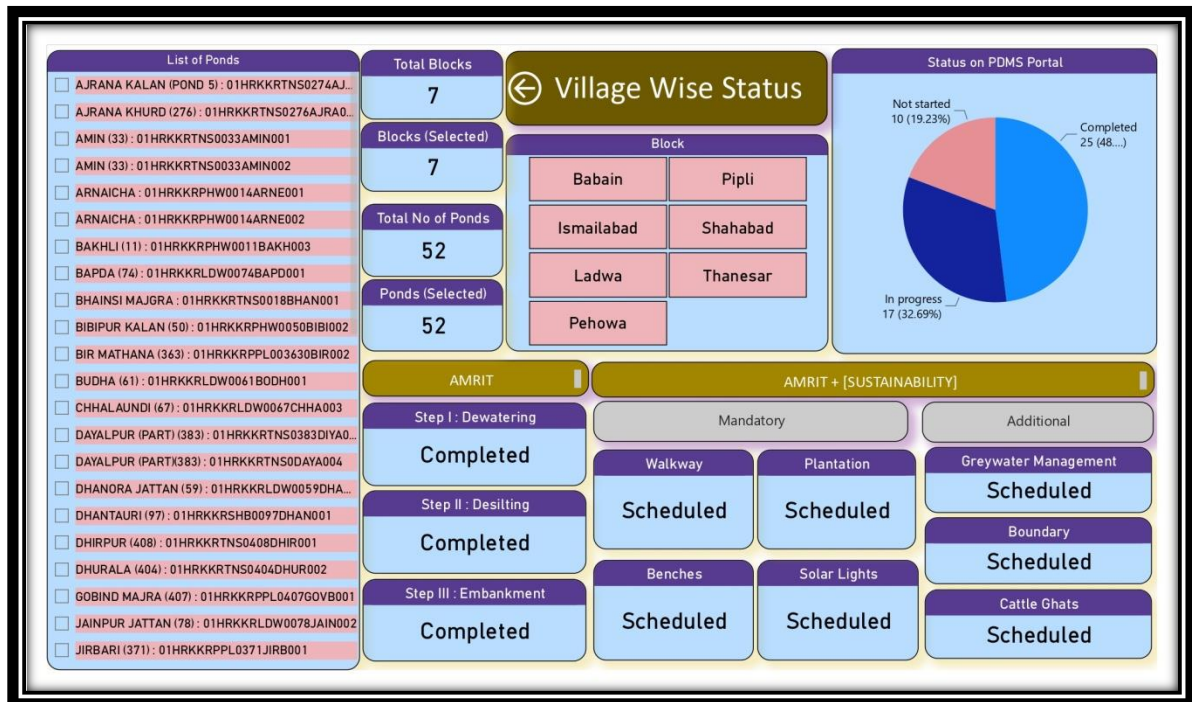
Figure 11.1 : Main Dashboard Home Page

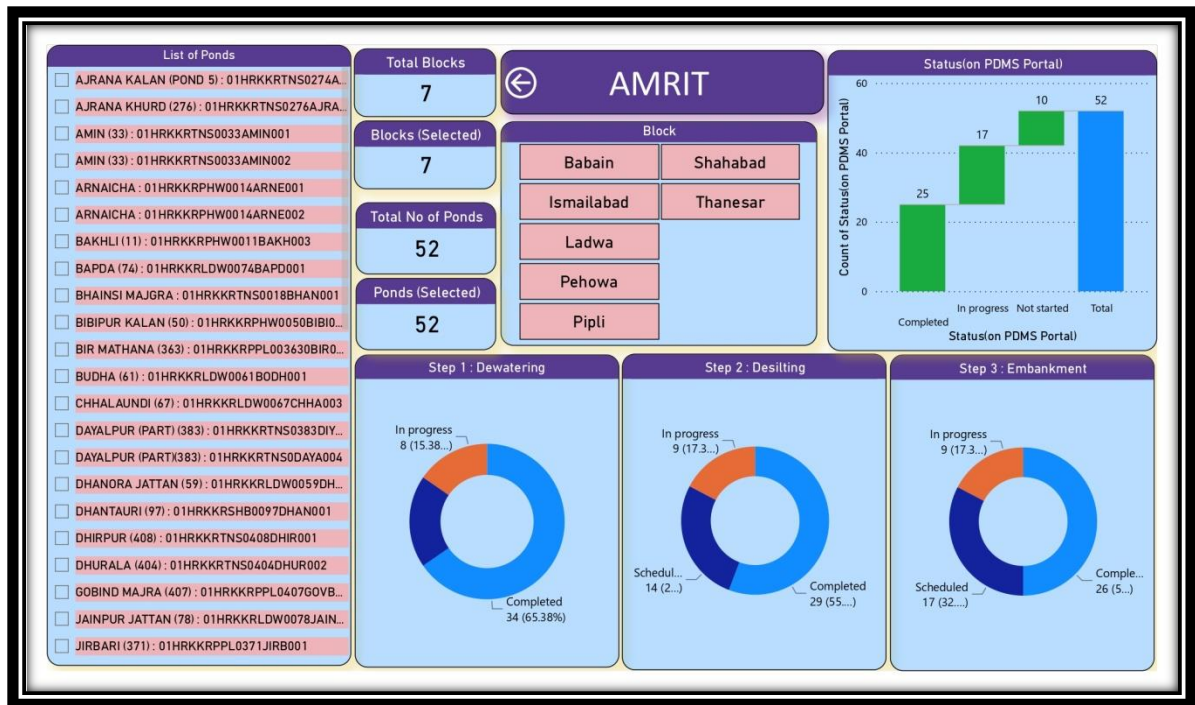Figure 11. 1 : Village wise Dashboard Page
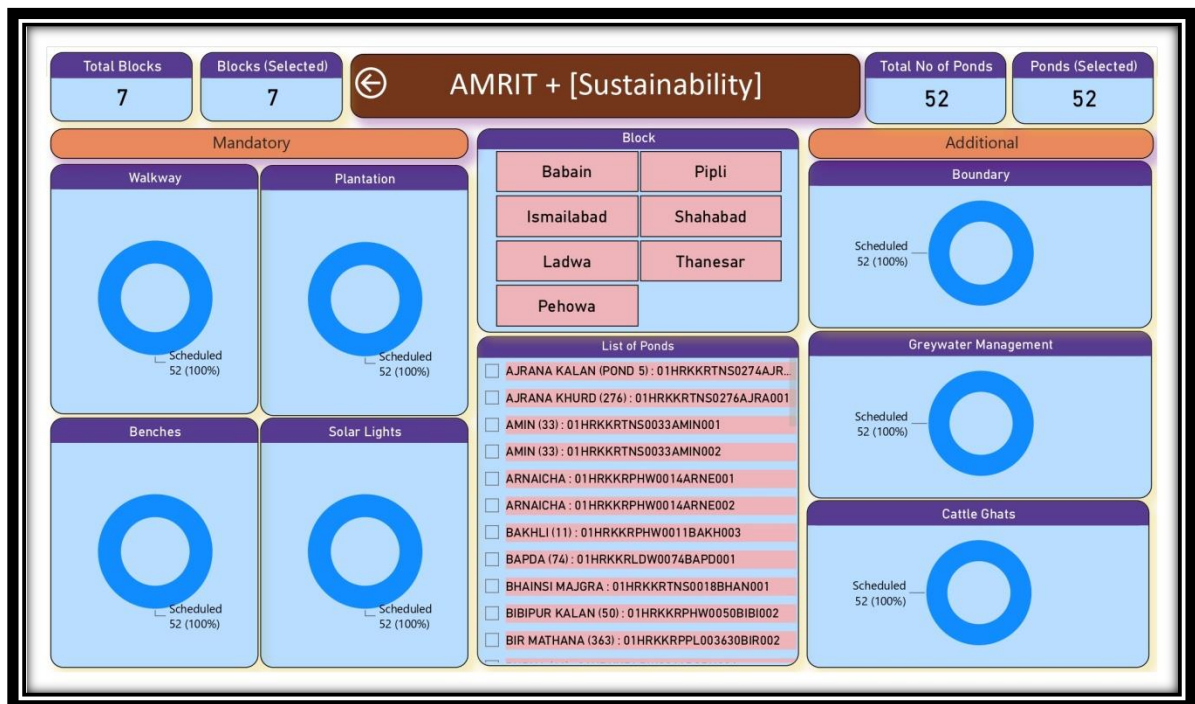
Figure 11.2 : Amrit Status Page

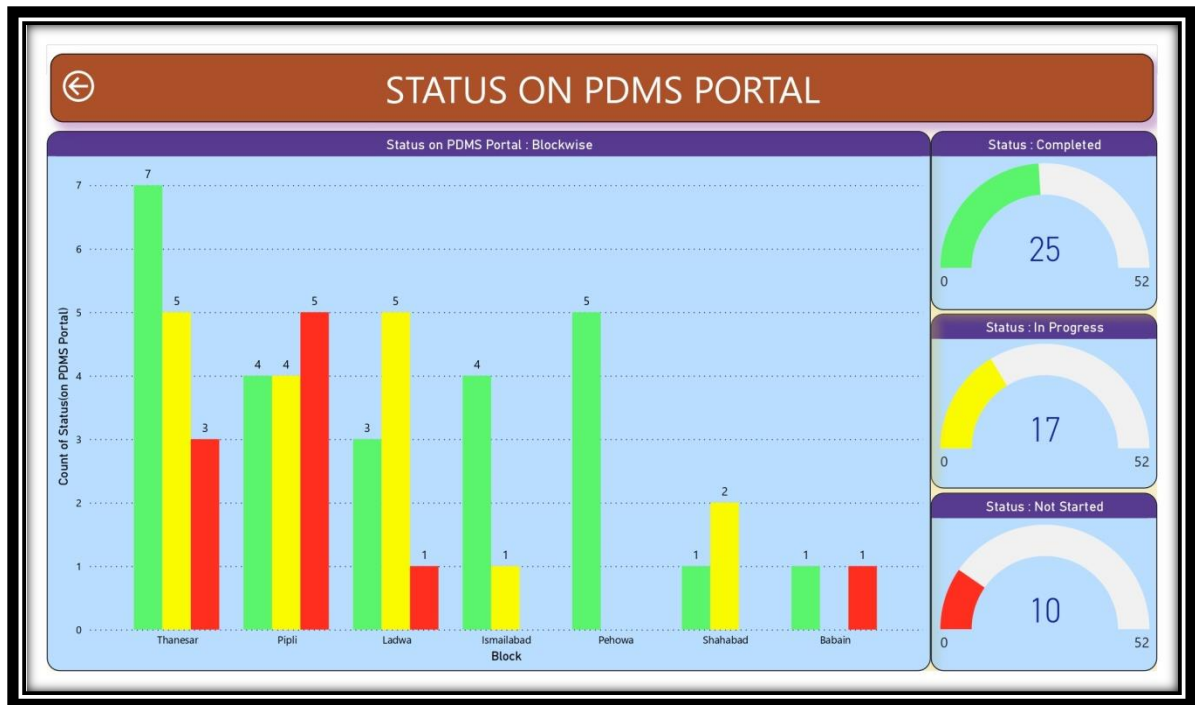**Figure 11.3 : Amrit+ Status Page**

Figure 11.4 : PDMS Portal Status Page

Chapter 12 : Conclusion

The Amrit Sarovar Project is a multi-purpose project that aims at developing and rejuvenating 75 water bodies in each district of the country as a part of celebration of Azadi ka Amrit Mahotsav. The mission encourages the mobilization of non-government and citizen resources to supplement these efforts. The state governments identify different sites for constructing Amrit Sarovar in the country. The project includes the construction or rejuvenating of ponds in the Kurukshetra District of State Haryana.

The project has been implemented using Power BI, a business intelligence tool that allows users to visualize and analyze data. Analysis and visualization make the scenario easier to understand. Power BI has been used to create dashboards and reports that provide insights into the project's progress, benefits and other information.

The conclusion of developing the dashboard for the 'Amrit Sarovar' project using Microsoft Power BI is that it facilitates the tracking of activity statuses in both the 'Amrit' section (comprising Dewatering, De-silting, Embankment) and the 'Amrit + [Sustainability]' section (including mandatory features like Walkway, Plantation, Benches, Solar Lights, and additional elements like Greyland Management, Boundary, Cattle Ghats). This tracking indicates whether activities are Completed, In Progress, or Scheduled.The use of Power BI has been instrumental in the success of the Amrit Sarovar Project. Power BI has allowed the project's stakeholders to visualize and analyze data in real time, which has helped them to make better decisions about the project.

Here are some of the benefits of using Power BI for the Amrit Sarovar Project:

- Improved visibility: Power BI has allowed the project's stakeholders to have a better understanding of the project's progress. They can now easily track the project's costs, water levels, and other key metrics.
- Faster decision-making: Power BI has helped the project's stakeholders to make better decisions faster. They can now easily access and analyze data, which allows them to identify and address problems quickly.

- Increased collaboration: Power BI has made it easier for the project's stakeholders to collaborate. They can now share data and insights with each other in real time.

- Improved communication: Power BI has helped the project's stakeholders to communicate more effectively with each other. They can now use Power BI dashboards and reports to share information about the project with stakeholders who are not familiar with Power BI.

Overall, the use of Power BI has been a success for the Amrit Sarovar Project. Power BI has helped the project's stakeholders to visualize and analyze data, make better decisions, collaborate more effectively, and communicate more effectively

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