## **CLEAN WATER AND SANITATION**

A Major Project report submitted to

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

In partial fulfillment of the requirements for the award of the degree of

## **BACHELOR OF TECHNOLOGY**

In

## COMPUTER SCIENCE AND ENGINEERING

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# **CERTIFICATE**

This is to certify that the Major project report entitled "CLEAN WATER AND SANITATIONFOR" is being submitted by S. SNEHA TINGILKAR (19UK5A0502), M. MADHAVA (15UK1A05C9), DONIKELA RAHUL (19UK5A0530), MOHAMMAD YAKUB PASHA (17UK1A05H9) in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science & Engineering to Jawaharlal Nehru Technological University Hyderabad during the academic year 2020-2021.

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## **ABSTRACT**

Over the past 50 years, our planet has been seriously injured by the human race. A prodigious environment moved by forces that are in part still a mystery to us is changing as a result. Some would argue that it's fighting against a threat to its own survival. It is now time to take action to reduce our negative impact on Earth, but in the meantime, we must also provide for the needs of our growing population while it's faced with global changes. Water, and sanitation to sustain ten billion people need to undergo global reengineering. People and organizations ought to organize themselves in a different and cross-linked manner if we wish that the human race can live long and prosper. Luckily enough, technology is taking a relevant role in finding both a cure for our environment and a solution to our problems. And, as developers, we can be the makers of this. Clean Water and Sanitation challenge offers an incredible chance to any developer willing to give his/her contribution to enable new processes in water-poor areas with Cloud solutions and AI software resources. In addition to real-time querying of the data set to find regions in your area with higher moisture levels for identifying possible water sources, time-series forecasting is also possible. For this IBM Cognos is used. IBM Cognos visualize and report on data create powerful visualizations, tell the story of your data and share insights via email, Slack, or the mobile app.

**Keywords**: Data analytics, IBM Cognos, IBM Cloud, IBM Watson.

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## 1.INTRODUCTION

## 1.1 MOTIVATION:

This work deals with the problem of finding solutions for small farmers to recycling showers, technology can make a significant impact on the availability of water and its consumption. This is presented by the representation of availability of water at geo-spacial area using data analytics. This helps to find the percentage of clean water around the globe so that can be used for human survival. The combination of two datasets at IBM Cognos is more likely used for this representation. It visualizes the data and gives the correct representation of the data. In order to provide the most efficient approach, IBM Watson studio is used. IBM cloud develop sophisticated machine learning models using Notebooks and code-free tools to infuse AI throughout. IBM Cognos is used create powerful visualizations, tell the story of your data and share insights via email, Slack, or the mobile app. All this technology is used to perform data analyzation and visualization in order to represent the accurate output.

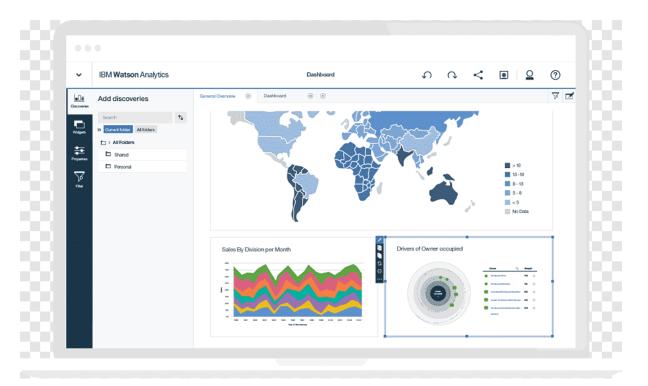


Fig.1: Sample data visualization image

The two datasets are taken. The first dataset contains block type, habitation. And the second dataset contain the state district funds allocated by state and central government, expenditure and percentage. The representation of this data is done using different graphs and different charts. This helps in visualizing the data in an easy manner and represents the data in an accurate way.

This project is purely involves IBM Cognos, Cloud and Watson studio.

#### 1.2 PROBLEM DEFINITION:

Our Problem Statement deals with "**Data analytics**". It defines that water is the natural resource that is most threatened by climate change and is a prerequisite for life on earth. According to the World Health Organization, 2.2 billion people around the world do not have safely managed drinking water services, 4.2 billion people do not have safely managed sanitation services, and 3 billion people lack basic handwashing facilities. These services are critical in preventing the spread of COVID-19 and other diseases. Even in areas that have these services, there are vast inequalities in the accessibility, availability, and quality of the services.

IBM Cognos take the data input and visualizes the data and represent the data in pictorial representations like graphs and charts and gives the clear survey about the clean water and sanitation at different areas across the state.

#### **1.3 OBJECTIVE OF THE PROJECT:**

The progress in machine learning and IBM cloud has contributed to unprecedented improvement in computer vision. IBM Cognos import data from csv files and spreadsheets and quickly create compelling, interactive dashboards. Drag and drop data to create auto-generated visualizations. Therefore, in this literature IBM Cognos is used to perform visualization of the data. The main objective of the project is that to represent the data about the amount of water present in the respected geographical areas.

## 1.4 LIMITATIONS OF PROJECT:

limitations are as follows:

- The total Cost of Ownership (TCO) is more significant than other tools at IBM Cognos.
- The forecast capabilities are very minimal at IBM Cognos.
- Investment in Cognos R&D by IBM is declining.
- IBM Cognos doesn't work smoothly with large data sets having many parameters.
- Cross-browser compatibility is often problematic at IBM Cognos.
- Suppressing the aggregated values can slow down performance sometimes.
- Using concurrent query execution might speed up a report, but It is also possible that it could slow it down.
- Cognos will only suppress individual records that are zero.

## 1.5 ORGANIZATION OF DOCUMENTATION:

Representation of Clean water and sanitation helps to improve the quality of water but requires additional resources, particularly for documentation. There are currently no published data on the actual staff costs and financial resources required for such documentation. The aim of this study was to determine the time and resources required to document.

The majority (54%) of documentation was done by experts, 62% of all documentation involved persons. The results of different scenarios for the representation of data, and follow-up of end users.

## 2.LITERATURE SURVEY

## **2.1 INTRODUCTION:**

There are numerous socioeconomic and environmental benefits from improved sanitation, including a lower disease burden, improved nutrition, increased literacy and safety for girls and women, reduced stunting, improved quality of life, healthier living environments, increased job opportunities and wages, and improved regional competitiveness (World Bank 2007). Experts have unanimously emphasized the need to attract attention to the impacts of a lack of sanitation on a nation's gross domestic product (GDP). The idea that a dollar invested in sanitation can yield at least a fivefold return in increased productivity is representative of a larger potential economic impact in the case of countries such as Cambodia, Indonesia, the Philippines, and Viet Nam. In these countries, an estimated annual loss of \$9 billion arising from poor sanitation equates to a 2% loss in GDP (World Bank 2007). A substantial part of these setbacks also arises from the resulting health-related economic impacts, such as was seen with the Ebola crisis in West Africa. Globally, poor sanitation resulted in a loss of about \$222.9 billion in 2015, with Asia and the Pacific suffering the greatest losses at 1.1% of the region's total GDP, typically stemming from India and equaling almost 5.2% of the country's GDP (Lixil, Oxford Economics, Water Aid 2016). While studies on sanitation have focused on regions where it is persistently lacking, the resulting policy recommendations have not been successful in driving governments to prioritize improvements or investment. Globally, sanitation has consistently lagged water supply, but some Asian countries have shown remarkable progress with impressive coverage rates over the years. Specifically, Southeast Asia and East Asia have seen a marginal rise in basic sanitation services. Globally, from 2000 to 2015, basic sanitation increased by an annual incremental average of 0.63%. Southeast and East Asia's 77% coverage rate is significantly higher than Central and South Asia's rate of 50% (WHO, JMP, UNICEF 2017), but it was not always this high. In 1990, only 25% of Southeast Asia had access to improved sanitation, but access incrementally increased to more than 45% by 2012. These developments indicate that sanitation improvements have gained substantial momentum in Southeast Asia and East Asia over the years. As Asia has rapidly progressed and urbanized over the past decade, countries in Southeast and East Asia have been at the helm of economic development.

#### **2.2 EXISTING SYSTEM:**

All the systems which are proposed till now only concentrates on improving water quality, wastewater treatment and safe reuse of water, increase water-use efficiency and ensure freshwater supplies, implement integrated water resources management, protect and restore water-related ecosystems, expand water and sanitation support to rural and urban areas. But there are no systems to represent the data regarding the availability of water at urban and rural areas and also the availability of clean water.



Fig.2: Existing project

## 2.3 DISADVANTAGES OF EXISTING SYSTEM:

- May encourage wasteful usage, if metering and realistic pricing are not used.
- Waste water disposal cost cannot be ignored.
- Less control over usage.
- Waste water removal may require additional investment.
- Potential for vandalism exists.
- Possible disputes over tap sharing, especially where service is intermittent.
- Non-payment by a single user may result in service disconnection for other households.

#### **2.4 PROPOSED SYSTEMS:**

## IBM Watson studio (IBM Cognos):

In vision of the problem statement described in the introduction section, an IBM Watson studio platform (IBM Cognos) is used represent the datasets of availability of water present at different states and different regions across the country. The framework is composed of the following important phases:

- Dataset Collection.
- Data Preprocessing.
- Creating folders.
- Visualize the data.
- Representation of the collected data.
- Graphical representations.
- Pictorial representations.

Classifications of the data sets are done on the basis of specific properties possess by the sample variable is capable to classify them. These data samples have the data regarding their particular state wise allocation release of water and quality affected habitations and water contamination. Designed platform is first takes the dataset and the user can represent the data accordingly. IBM Cognos Analytics integrates reporting, modeling, analysis, dashboards, stories, and event management so that you can understand your organization data, and make effective business decisions. After the software is installed and configured, administrators set up security and manage data sources.



**Fig.3:** Cognos sample output.

## 2.5 CONCLUSION:

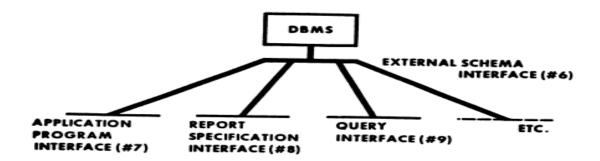
The goal of this work was to detect water sources across the state and to encourage optimal water choices by consumers and local governments and to incentive water sustainability, the proposed devising and implementing of the API water data collection and dissemination was used. It gives geolocations of sustainable water sources and simplify coordination and funding for water construction projects. The main goal of this project is to visualize the data collected and to give sustainable result of availability of water at different states like Punjab, Telangana, Andhra Pradesh, Nagaland, Bihar etc. across India. It also gives the states based on the number of habitations affected, blocks with more habitations faced water contamination and also gives funds allocated and released by central and state government.

## 3.ANALYSIS

#### 3.1 INTRODUCTION:

While selecting the API that gives the accurate output, we gone through a lot of API's which gives the results abruptly accurate and from them we selected only one API for the representation and visualization of data that is IBM Cognos, it assumes that the data to be presented in a way that is easily understandable to everyone. In contrast to a user interface, which connects a computer to a person, an application programming interface connects computers or pieces of software to each other. In building applications, an API (application programming interface) simplifies programming by abstracting the underlying implementation and only exposing objects or actions the developer needs. While a graphical interface for an email client might provide a user with a button that performs all the steps for fetching and highlighting new emails, an API for file input/output might give the developer a function that copies a file from one location to another without requiring that the developer understand the file system operations occurring behind the scenes.

# Figure 5 Application Programmer Interface



An alternative which has several advantages is to make the API sufficiently rich to enable programs to be written in support of query, report generation, etc. (Figure 6).

Figure 6
Enriched Application Programmer Interface

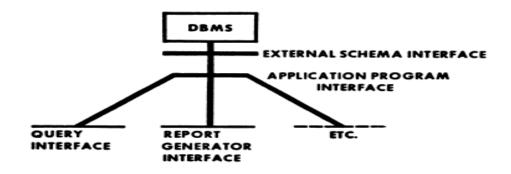


Fig.4: Application interface proposed model.

## 3.2 SOFTWARE REQUIREMENT SPECIFICATION:

The software requirements specification document lists sufficient and necessary requirements for the project development. To derive the requirements, the developer needs to have clear and thorough understanding of the products under development. This is achieved through detailed and continuous communications with the project team and customer throughout the software development process.

Software requirements specification is a rigorous assessment of requirements before the more specific system design stages, and its goal is to reduce later redesign. It should also provide a realistic basis for estimating product costs, risks, and schedules. Used appropriately, software requirements specifications can help prevent software project failure.

## 3.2.1 User requirement:

Representation of data for the survey of availability of water among different states in the country. The built API helps to represent the data and hence reduce wasting water and to proper use of water for farming and for other uses. The dataset contains different states water availability both in urban and rural areas. All the data is collected in excel sheets and presented.

## 3.2.2 Software Requirement:

- IBM Watson studio Environment.
- IBM Cognos.

We developed this API at IBM Cognos. Firstly, we had collected the dataset in the excel sheets format then that data is visualized at IBM Cognos, IBM Watson studio. Then the data is represented using bar graphs, Pie charts any many more representations. It does not require any other independent libraries or any other extra frame works to access the output.

## 3.2.3 Hardware Requirement:

• System: 64-bit windows 10

• RAM:4GB

Processor:2.3GHz

## 3.3 CONTENT DIAGRAM OF PROJECT:

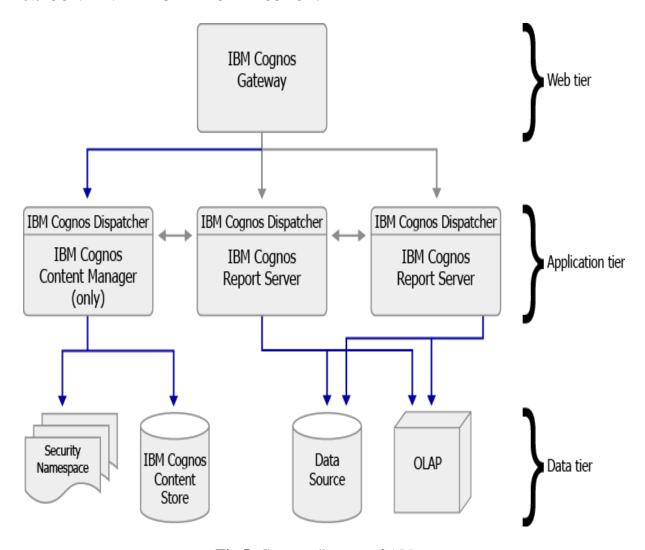
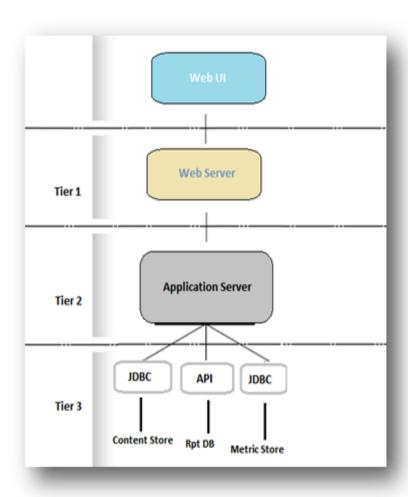


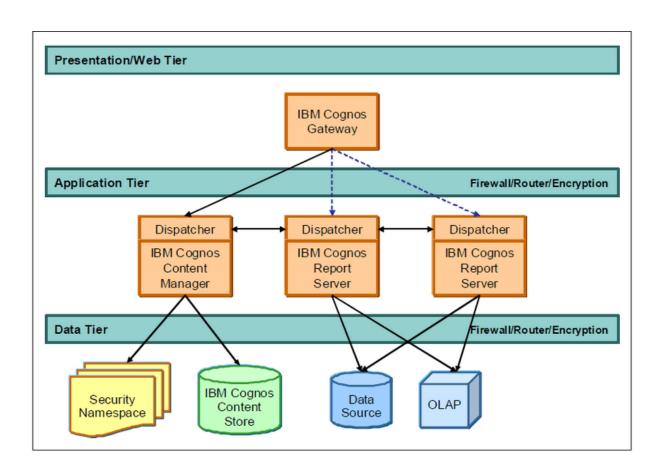
Fig.5: Content diagram of API.

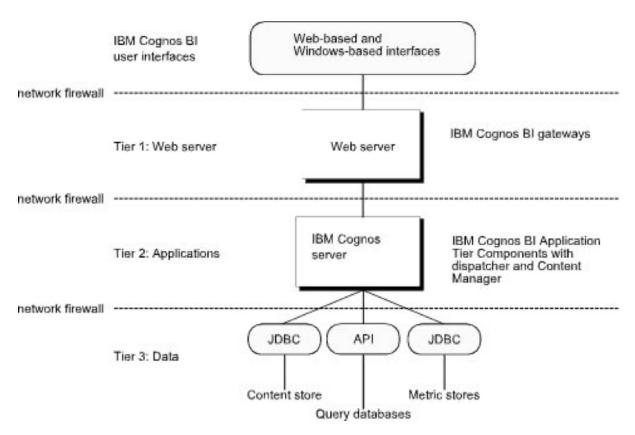
## 3.4 ALGORITHMS ANDFLOWCHARTS:

In this paper, IBM Cognos is used to represent the data. Data is visualized and represented. IBM Cognos platform is used to represent the data in an accurate manner. There is no special algorithm is used in this project.

## **Flowcharts:**







## 3.5 CONCLUSION:

Making use of the prior computer technology we have successfully found a platform that can actually visualize the given dataset correctly in order to make use of the platform correctly and also to know the accurate amount of water present across the country and its usage.

## **4.DESIGN**

## • IBM Cognos Architecture:

IBM Cognos Business Intelligence has a multitiered architecture. For description purposes, it can be separated into three tiers: Web server, applications, and data. The tiers are based on business function, and are typically separated by network firewalls. IBM Cognos BI user interfaces sit above the tiers. Let's go step by step through all these tiers.

#### • User Interfaces

IBM Cognos BI is configured using IBM Cognos Configuration. You also use IBM Cognos Configuration to start and stop IBM Cognos services.

## • Tier 1. Web Server: IBM Cognos BI Gateways

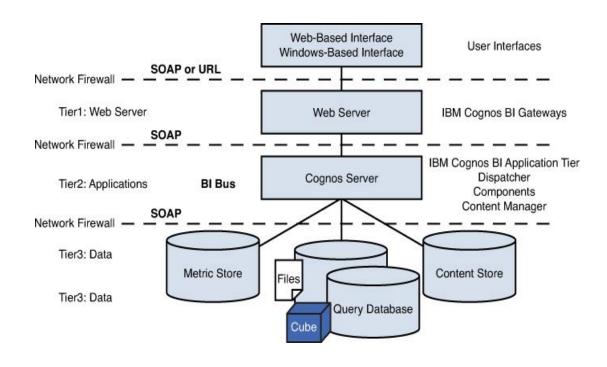
The IBM Cognos BI Web server tier contains one or more IBM Cognos BI gateways.

## • Tier 2. Applications: IBM Cognos BI Servers

The IBM Cognos BI applications tier contains one or more IBM Cognos BI servers. An IBM Cognos BI server runs requests, such as reports, analyses, and queries, that are forwarded by a gateway. An IBM Cognos BI server also renders the IBM Cognos Connection and Metric Studio interfaces.

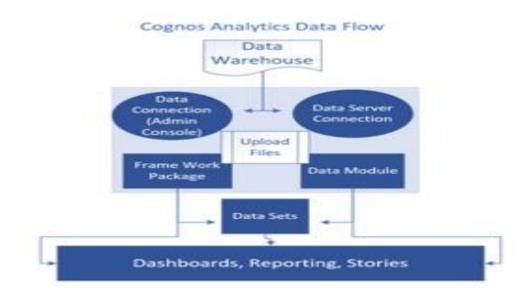
## • Tier 3. Data: Content Providers

The IBM Cognos Business Intelligence data sets.



**Fig.6:** Fine architecture of IBM Cognos.

#### **4.2 DFD DIAGRAM:**



## **4.3 ORGANIZATION OF DATA:**

In this project the datasets are taken in excel sheets. And then they are visualized at IBM Cognos dashboard.

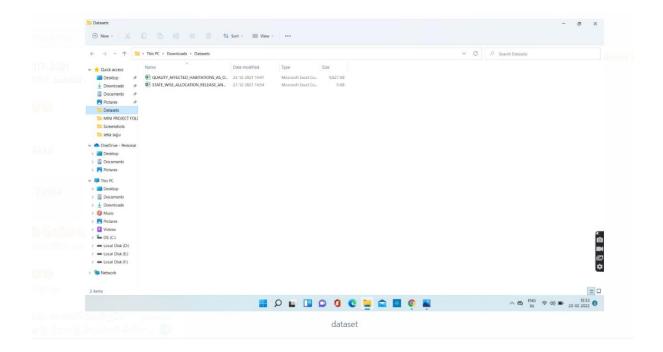


Fig.7: model folders

## **4.4 CONCLUSION:**

The dashboard of IBM Cognos is used to visualize the data that is present in the datasets and gives the accurate output.

## 5. IMPLEMENTATION AND RESULTS

#### **5.1 INTRODUCTION:**

In this paper various platform dashboards are used for the implementation of the dataset but the most suitable platform is IBM Cognos. To get the most from IBM® Cognos® Business Intelligence, you must implement it effectively. This means installing and configuring IBM Cognos BI so that it integrates with your information technology infrastructure and meets your reporting requirements.

To plan an effective IBM Cognos implementation, do the following:

• Familiarize yourself with the IBM Cognos BI architecture.

For more information, see the architecture section of this document. It will help you understand the components that make up IBM Cognos BI, their functions, and the ways in which they interact with each other, your infrastructure, and your authors and users.

• Decide how to install and configure IBM Cognos BI.

Know what your options are for installing and configuring IBM Cognos BI, and decide which best meet your needs. For more information, see installation options.

• Decide how to maximize IBM Cognos BI performance in your environment.

Understand the factors that can affect IBM Cognos BI performance, and plan to ensure and maintain Options. Adequate capacity, scalability, and availability for IBM Cognos BI in your environment. For more information, see performance Planning.

• Decide how to configure IBM Cognos BI multilingual capabilities.

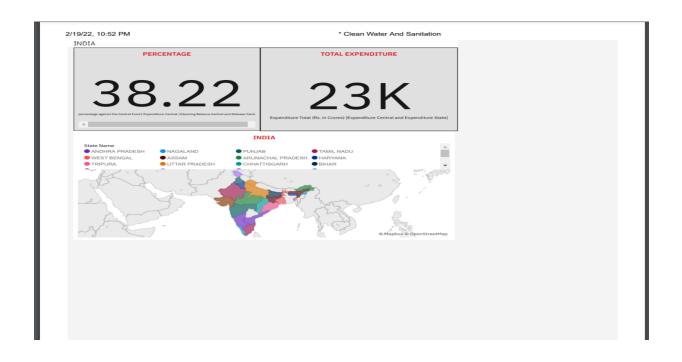
If you will use IBM Cognos BI in a global environment, decide how to configure IBM Cognos BI so that interface elements and report contents appear in the languages that users need. For more information, see globalization considerations.

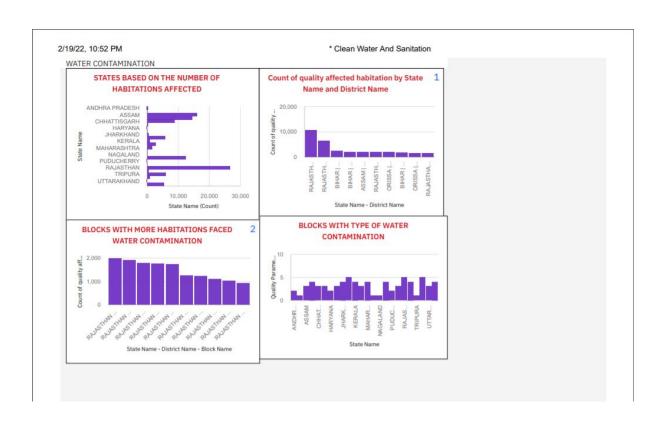
#### **5.2 EXPLANATION OF KEY FUNCTIONS:**

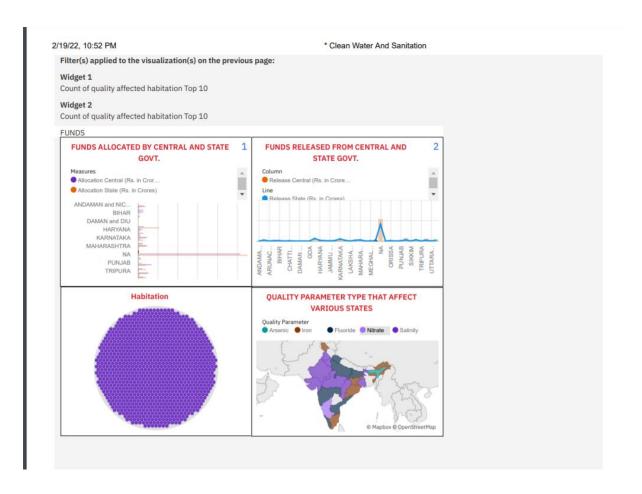
The main key function which is used in this project is visualization of the data.

- Implementation of data.
- Visualization.
- Output.

## **5.3 OUTPUT SCREENS:**







2/19/22, 10:52 PM \* Clean Water And Sanitation

Filter(s) applied to the visualization(s) on the previous page:

Widget 1

State Includes: MIZORAM

Widget 2

State Includes: MIZORAM

## **5.3.1 RESULT ANALYSIS:**

The result screens above shows the different amounts of water present in different states across the country. It also represents the data about the funds sanctioned and released by the government to different states and how habituate is affected by contaminated water.

## **5.4 CONCLUSION:**

The main aim of this project is to know the accurate amount of water percentage over the country and how it can be used for better purposes.

## **6.CONCLUSION**

This paper proposes a platform for the visualization of data and representation of data. The analysis of the results signifies the percentage of water present in any of the states and how they can be utilized for other purposes like farming. Further research in this field should be carried out for the better performance of the better dataset visualization. A dashboard for better representation of data helps and assist people to know the importance of water. The proposed system greatly reduces the effort of people improves the quality of work by visualizing the data in a better way within a short time.

#### **Future Enhancement:**

The future work will focus on exploring more of the dataset values and yielding more interesting outcomes. This study can help in making more effective and reliable data presentations. In further study, we will try to conduct experiments on larger data sets or try to tune the data so as to achieve even more better performance of the API and a great UI support system.