Low Level Design

Crop Production Analysis

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DOCUMENT CONTROL

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0.2	06- Feb - 2023	Juli Kumari	Architecture & Architecture description appended and updated.
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Approval Status:

VERSION	REVIEW DATE	REVIEWED BY		APPROVED BY	COMMENTS

Contents

1. Introduction

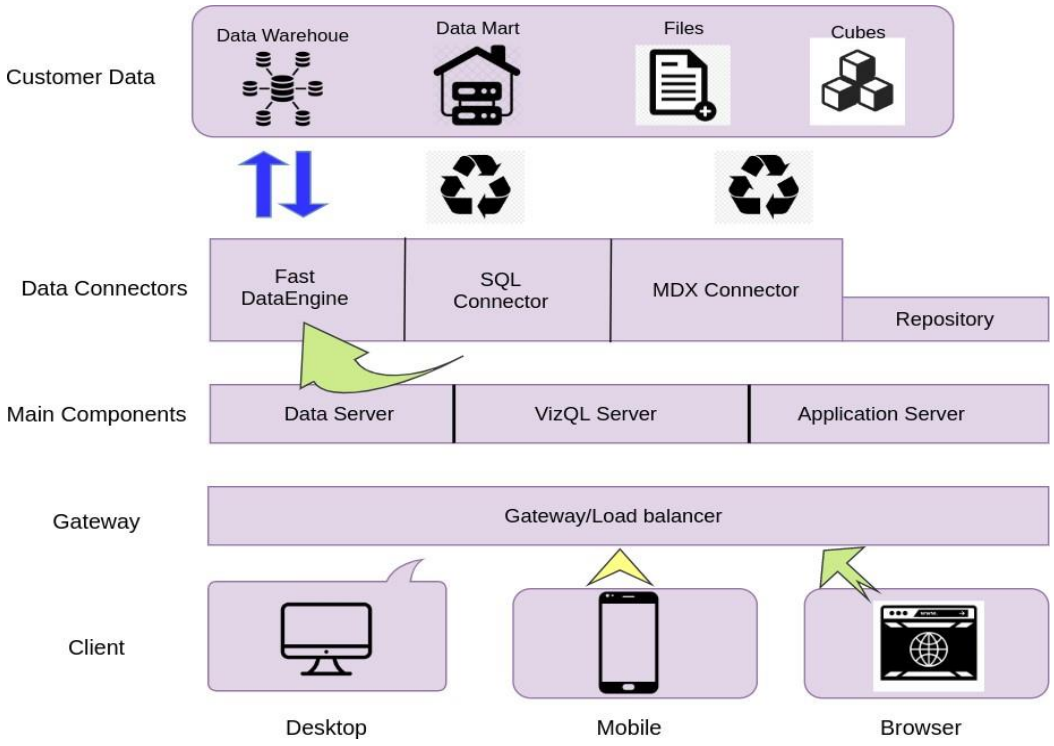
1.1 What is Low-Level design document?

The goal of the LDD or Low-level design document (LLDD) is to give the internal logic design of the actual program code for the House Price Prediction dashboard. LDD describes the class diagrams with the methods and relations between classes and programs specs. It describes the modules so that the programmer can directly code the program from the document.

1.2 Scope

Low-level design (LLD) is a component-level design process that follows a step-by-step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work.

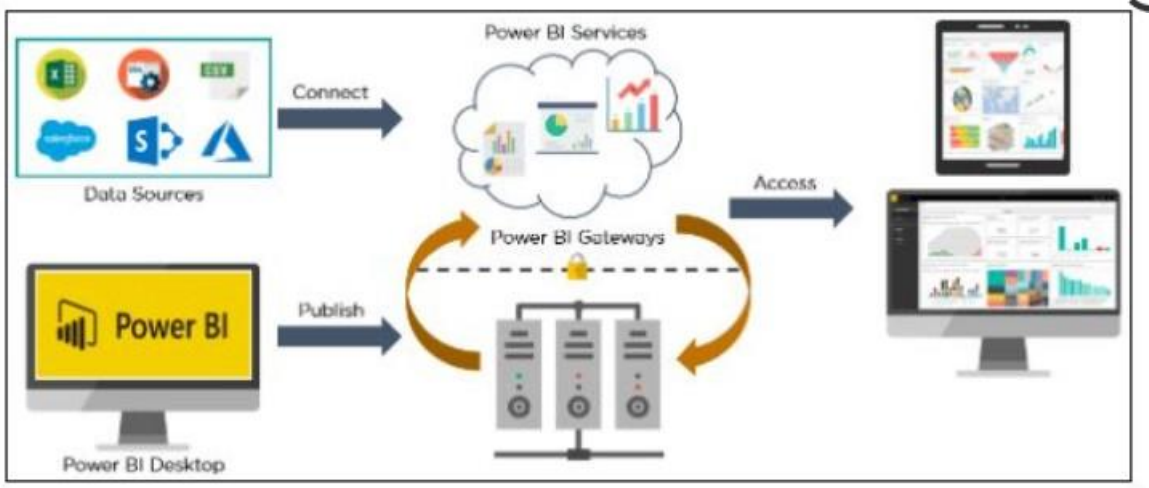
2. Architecture



Power BI Architecture

Power BI architecture is a service built on top of Azure. There are multiple data sources that Power BI can connect to. Power BI Desktop allows you to create reports and data visualizations on the dataset. Power BI gateway is connected to on-premises data sources to get continuous data for reporting and analytics. Power BI services refer to the cloud services that are used to publish Power BI reports and data visualizations. Using Power BI mobile apps, you can stay connected to their data from anywhere.

The following diagram shows Power BI's architecture:



Power BI is internally managed by the multiple server processes.

1. Gateway/Load Balancer

It acts as an Entry gate to the Power Bi Server and also balances the load to the Server if multipleProcesses are configured.

2) Application Server:-

Application Server processes (wgserver.exe) handle browsing and permissions for the Power Bi Server web and mobile interfaces. When a user opens a view in a client device, that user starts a session on Tableau Server. This means that an Application Server thread starts and checks the permissions for that user and that view.

3) Repository:-

Power BI Server Repository is a MYSQL database that stores server data. This data includes information about Tableau Server users, groups and group assignments, permissions, projects, data sources, and extract metadata and refresh information.

4) VIZQL Server:-

Once a view is opened, the client sends a request to the VizQL process (vizqlserver.exe). The VizQL process then sends queries directly to the data source, returning a result set that is rendered as images and presented to the user. Each VizQL Server has its own cache that can be shared across multiple users.

5) Data Engine: -

It Stores data extracts and answers queries.

6) Backgrounder: -

The backgrounder Executes server tasks which includes refreshes scheduled extracts, tasks initiated from tab cmd and manages other background tasks.

7) Data Server: -

Data Server Manages connections to Power BI Server data sources.

It also maintains metadata from Power BI Desktop, such as calculations, definitions, and groups.

3. Architecture Description

3.1. Data Description

The Dataset contains Crop Production of State and District that fall under the categories A,B and C based on production.

1. All India State and District wise crop production
2. All India Yield in Hectare.
3. Crop Year 1997 to 2015.
4. All Crop production depends on crop Seasons in India.
5. All crops grown in India with their seasons.

6. Crop production area in tones.

3.2. Web Scrapping

Web scraping is a technique to automatically extract content and data from websites using bots. It is also known as web data extraction or web harvesting. Web scrapping is made simple now days, many tools are used for web scrapping. Some of python libraries used for web scrapping are Beautiful Soup, Scrapy, Selenium, etc.

3.3. Data Transformation

In the Transformation Process, we will convert our original datasets with other necessary attributes format. And will merge it with the Scrapped dataset.

3.4. Data Insertion into Power bi

a. Database Creation and connection - Create a database with name passed. If the database is already created, open the connection to the database.

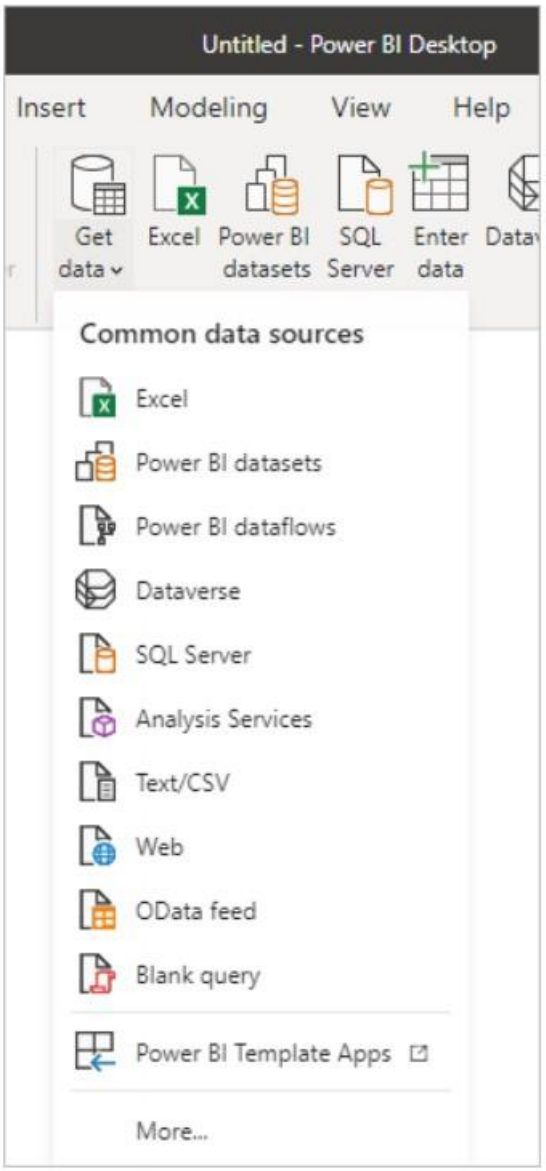
b. Table creation in the database.

c. Insertion of files in the table

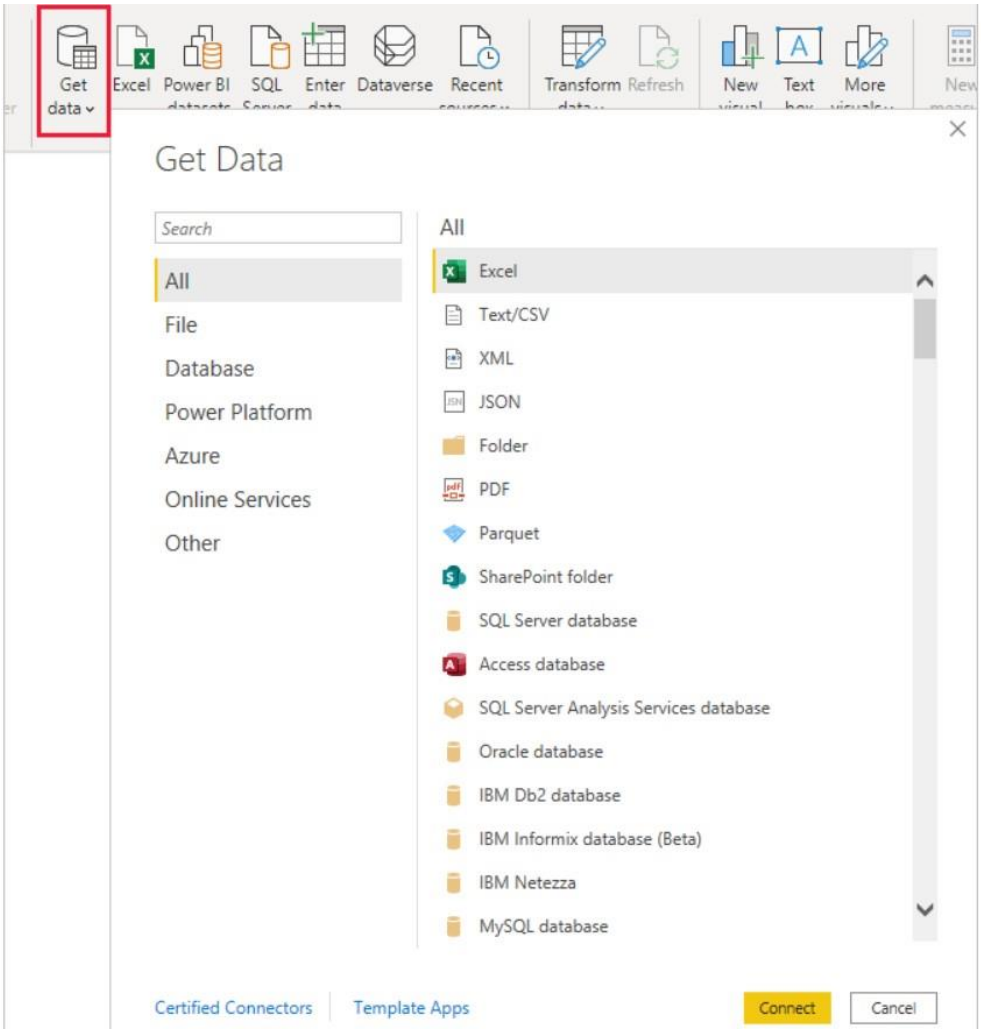
3.5 Make the Power Querry connection and set up the data source.

Step 1: Configuring Power BI

Launch Power Bi on your workstation and select With Power BI Desktop, you can connect to data from many different sources. For a full list of available data sources, see sources. To see available data sources, in the **home** group of the Power BI Desktop ribbon, select the **Get data** button label or down arrow to open the **Common data sources** list. If the data source you want isn't listed under **Common data sources**, select **More** to open the **Get Data** dialog box.



Or, open the **Get Data** dialog box directly by selecting the **Get Data** icon itself.



Data sources: -The Get Data **dialog box organizes data types in the following categories:**

- All
- File
- Database
- Power Platform
- Azure
- Online Services
- Other

The **All** category includes all data connection types from all categories.
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- All
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- Database
- Power Platform
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- Online Services

- Other

The **All** category includes all data connection types from all categories.

File data sources

The File category provides the following data connections:

- Excel Workbook
- Text/CSV
- XML
- JSON
- Folder
- PDF
- Parquet
- SharePoint folder

Database data sources

The Database category provides the following data connections:

SQL Server database

Access database

SQL Server Analysis Services database

Oracle database

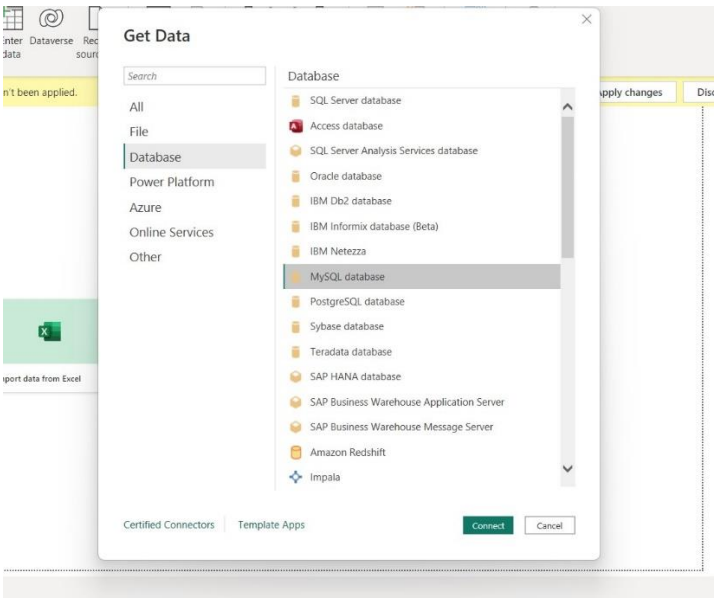
IBM Db2 database

Snowflake

MySQL database

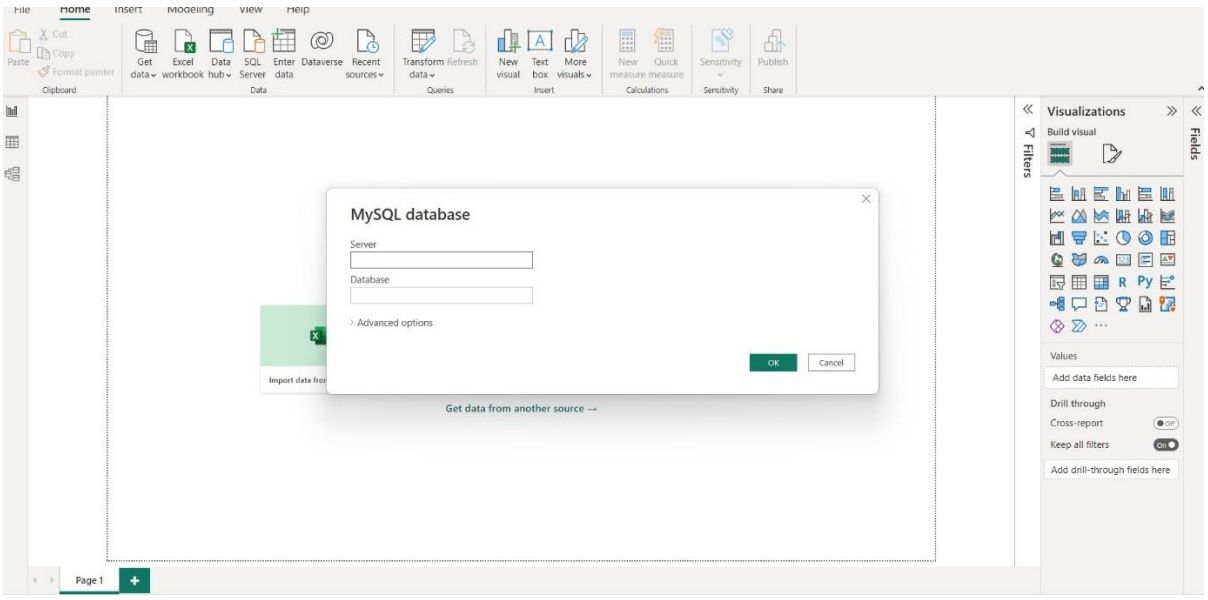
PostgreSQL database

Connect to a data source.



Step 2: Configuring Data Source

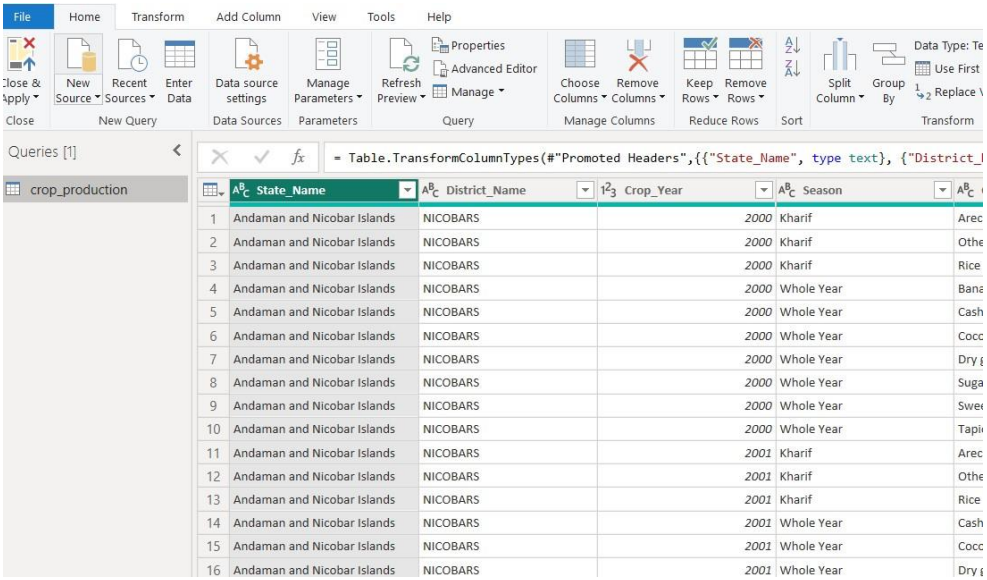
The data source page loads up after configuring the Power Bi connector and successfully signing in. This is how the page looks like:



Select the data source name option and give a unique name to the database you are using. It's considered a good practice to have a unique name as it makes it much easier for users to identify the database from which data is being fetched.

To select the desired schema, you can use the schema drop-down list from the column on the left. You can also perform a text-based search to find the desired option. Now similarly find and select the desired table and drag it onto the canvas.

Depending on the data connection, you might be prompted to provide credentials or other information. After you provide all required information, Power BI Desktop connects to the data source and presents the available data sources in the **Navigator** dialog box.



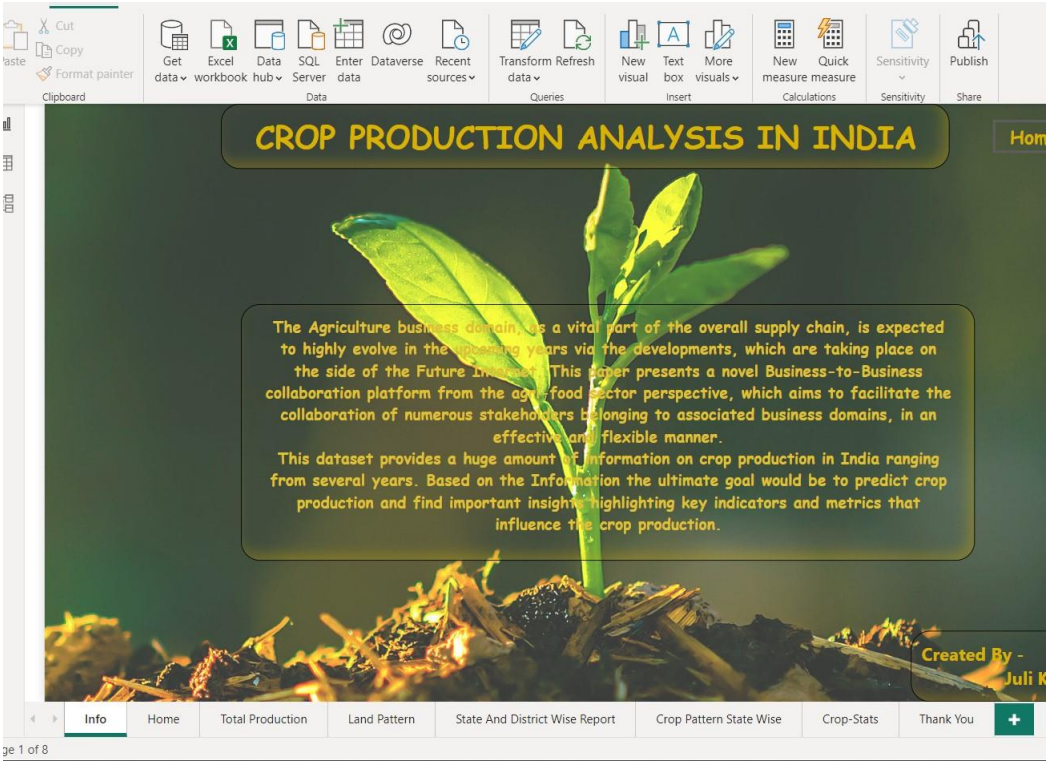
1	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Arecanut	1254	
2	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Other Kharif pulses	2	
3	Andaman and Nicobar Islands	NICOBARS	2000	Kharif	Rice	102	
4	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Banana	176	
5	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Cashewnut	720	
6	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Coconut	18168	
7	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Dry ginger	36	
8	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Sugarcane	1	
9	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Sweet potato	5	
10	Andaman and Nicobar Islands	NICOBARS	2000	Whole Year	Tapioca	40	
11	Andaman and Nicobar Islands	NICOBARS	2001	Kharif	Arecanut	1254	
12	Andaman and Nicobar Islands	NICOBARS	2001	Kharif	Other Kharif pulses	2	
13	Andaman and Nicobar Islands	NICOBARS	2001	Kharif	Rice	83	
14	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Cashewnut	719	
15	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Coconut	18190	
16	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Dry ginger	46	
17	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Sugarcane	1	
18	Andaman and Nicobar Islands	NICOBARS	2001	Whole Year	Sweet potato	11	

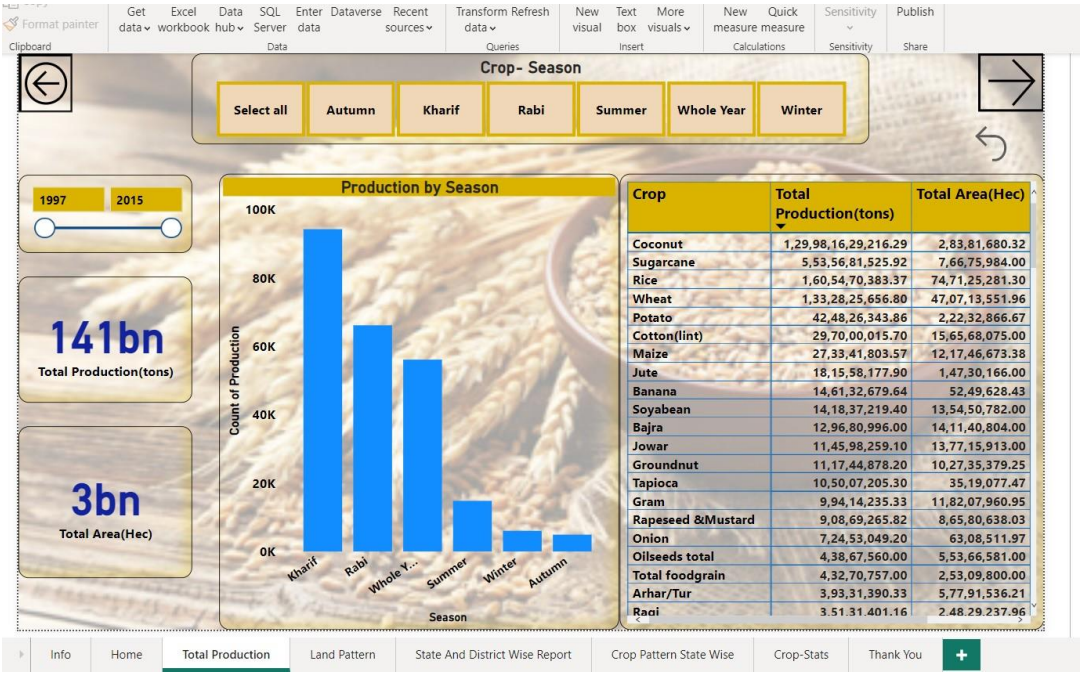
This is how you can connect Power Querry with power bi. Now click on the transform data to analysis.

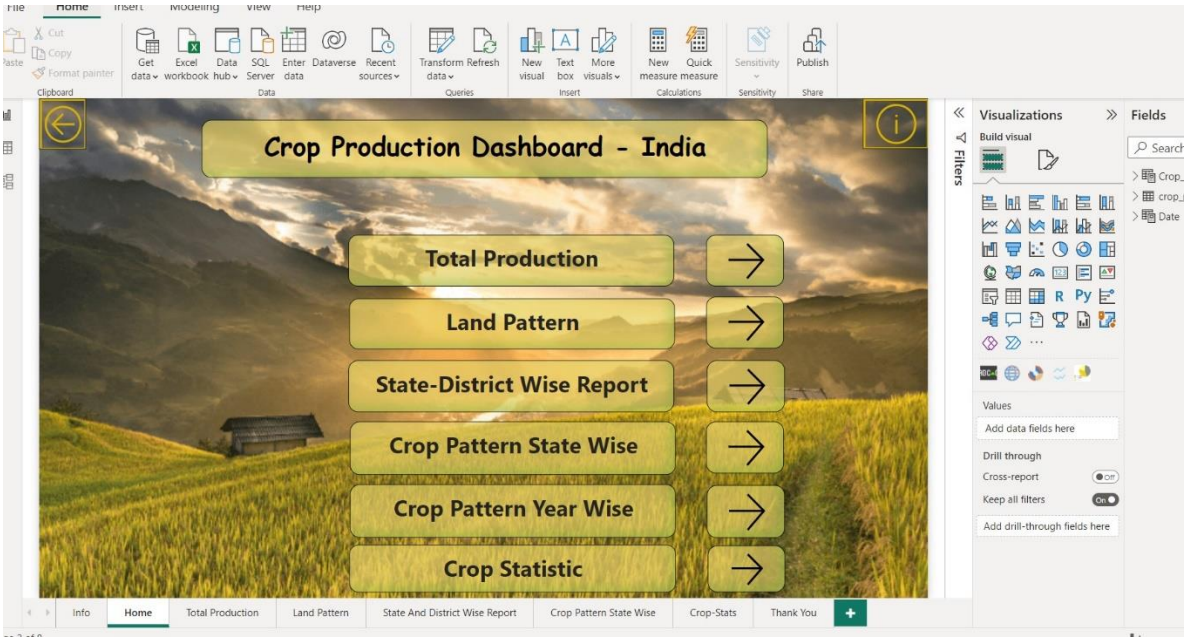
3.5. Export Data from Power querry

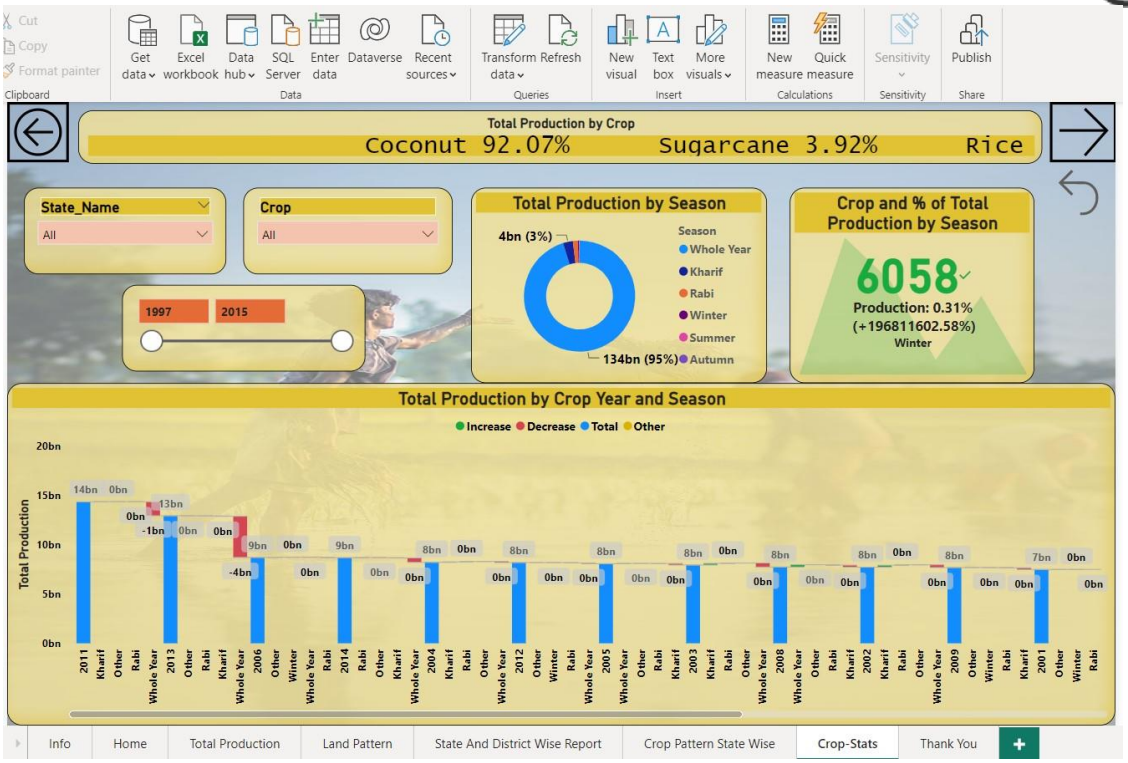
Data Export from power Querry editor - The data in a stored database is exported as a Xlxs file to be used forData Pre-processing.

After data analysis we created reports




Crop- Season
Select all
Autumn
Kharif
Rabi
Summer
Whole Year
Winter
1997
2015
141bn
Total Production(tons)
3bn
Total Area(Hec)
Production by Season
Count of Production
Season
Kharif
Rabi
Whole Y...
Summer
Winter
Autumn
Crop
Total Production(tons)
Total Area(Hec)
Coconut 1,29,98,16,29,216.29 2,83,81,680.32
Sugarcane 5,53,56,81,525.92 7,66,75,984.00
Rice 1,60,54,70,383.37 74,71,25,281.30
Wheat 1,33,28,25,656.80 47,07,13,551.96
Potato 42,48,26,343.86 2,22,32,866.67
Cotton(lint) 29,70,00,015.70 15,65,68,075.00
Maize 27,33,41,803.57 12,17,46,673.38
Jute 18,15,58,177.90 1,47,30,166.00
Banana 14,61,32,679.64 52,49,628.43
Soyabean 14,18,37,219.40 13,54,50,782.00
Bajra 12,96,80,996.00 14,11,40,804.00
Jowar 11,45,98,259.10 13,77,15,913.00
Groundnut 11,17,44,878.20 10,27,35,379.25
Tapioca 10,50,07,205.30 35,19,077.47
Gram 9,94,14,235.33 11,82,07,960.95
Rapeseed &Mustard 9,08,69,265.82 8,65,80,638.03
Onion 7,24,53,049.20 63,08,511.97
Oilseeds total 4,38,67,560.00 5,53,66,581.00
Total foodgrain 4,32,70,757.00 2,53,09,800.00
Arhar/Tur 3,93,31,390.33 5,77,91,536.21
Ragi 3,51,31,401.16 2,48,29,237.96
Info
Home
Total Production
Land Pattern
State And District Wise Report
Crop Pattern State Wise
Crop-Stats
Thank You


Crop Production Dashboard - India
Total Production
Land Pattern
State-District Wise Report
Crop Pattern State Wise
Crop Pattern Year Wise
Crop Statistic
Visualizations
Fields
Filters
Info
Home
Total Production
Land Pattern
State And District Wise Report
Crop Pattern State Wise
Crop-Stats
Thank You



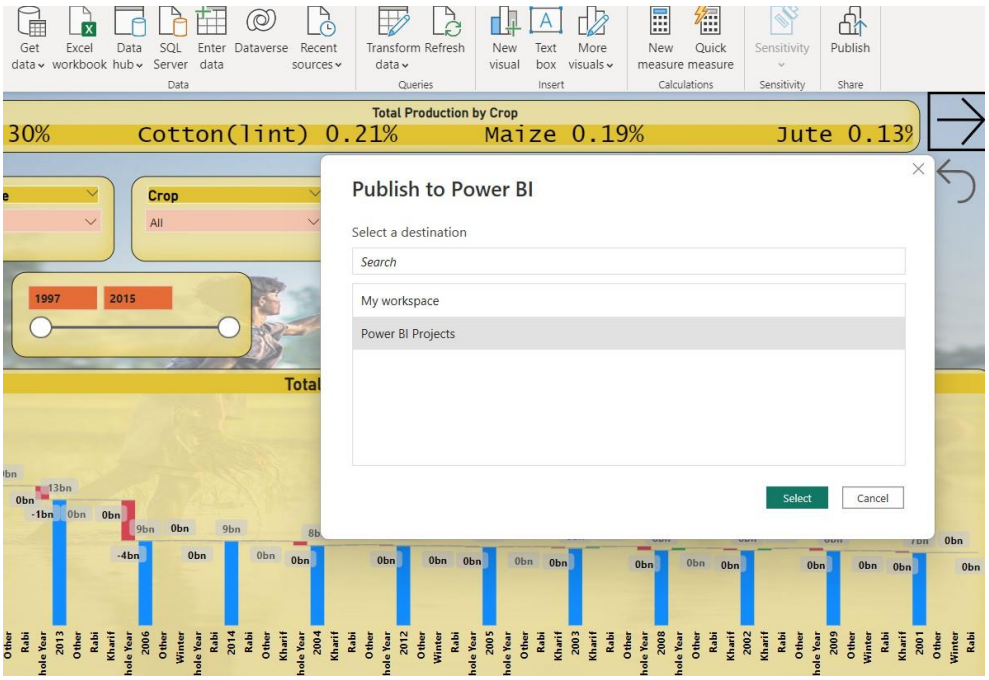
3.6 Deployment.

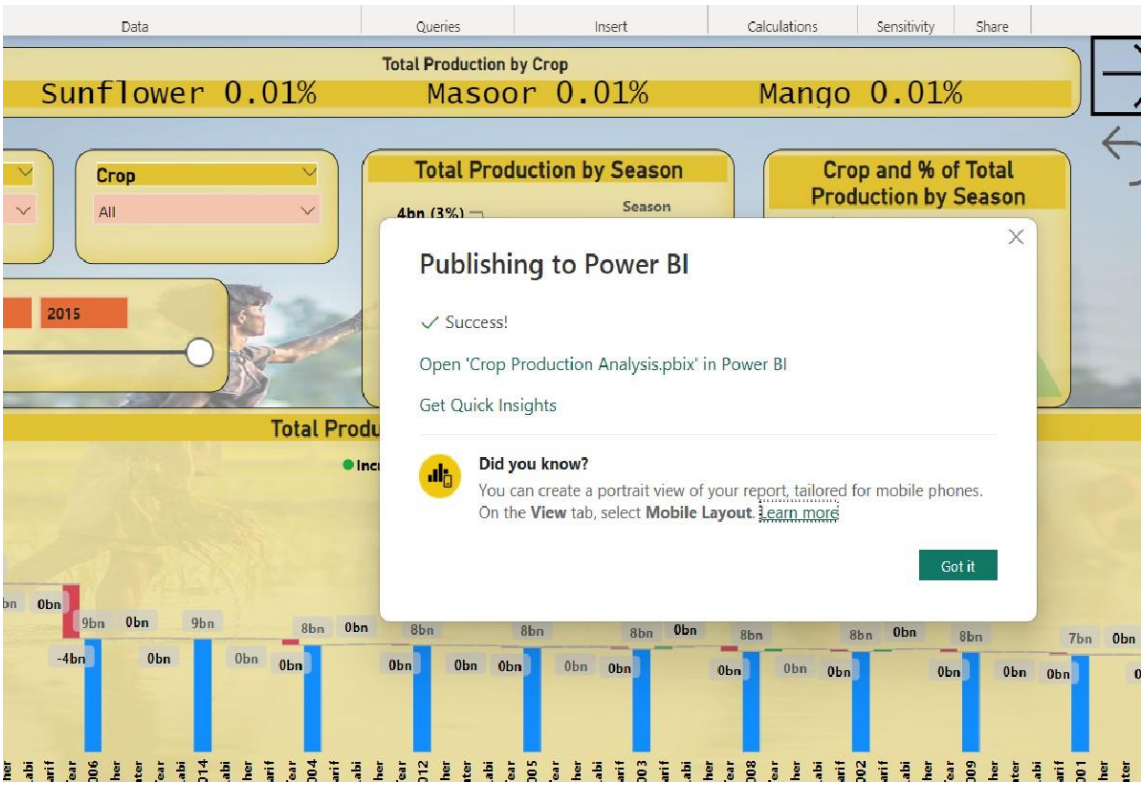
Using Publish from Power BI Desktop is similar using Get Data in Power BI, in terms of initially importing your file data from a local drive or connecting to it on OneDrive. However, there are differences: if you upload from a local drive, you'll want to refresh that data frequently to ensure the online and local copies of the data are current with each other.

Here's the quick how to, but you can see Publish from Power BI Desktop to learn more

In Power BI Desktop, click **File** > **Publish** > **Publish to Power BI**, or click **Publish** on the ribbon.

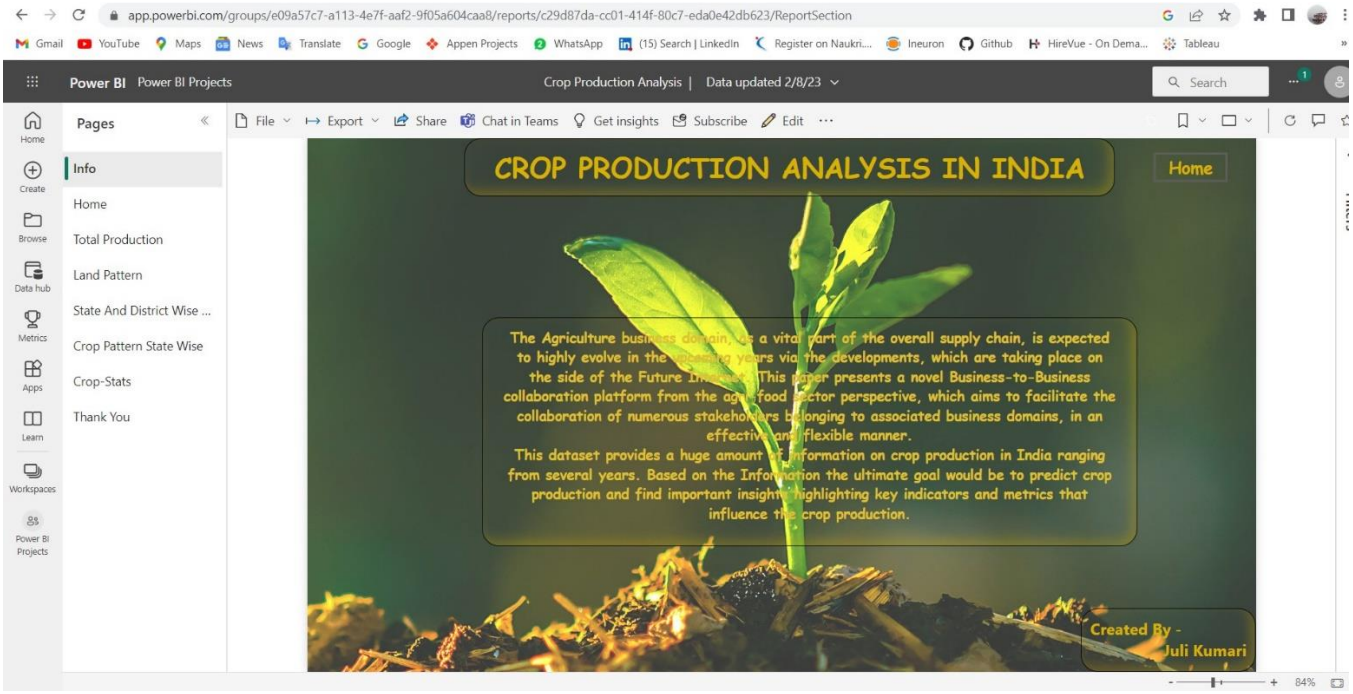
Sign into Power BI. You'll only need to do this the first time.
When complete, you'll get a link to open your report in your Power BI site.


Get data
Excel workbook
Data hub
SQL Server
Enter data
Dataverse
Recent sources
Data
Transform data
Refresh
Queries
New visual
Text box
More visuals
Insert
New measure
Quick measure
Calculations
Sensitivity
Publish
Share
Total Production by Crop
30%
Cotton(lint) 0.21%
Maize 0.19%
Jute 0.13%
Crop
All
1997
2015
Publish to Power BI
Select a destination
Search
My workspace
Power BI Projects
Select
Cancel


Data
Queries
Insert
Calculations
Sensitivity
Share
Total Production by Crop
Sunflower 0.01%
Masoor 0.01%
Mango 0.01%
Crop
All
2015
Total Production by Season
Crop and % of Total Production by Season
Publishing to Power BI
Success!
Open 'Crop Production Analysis.pbix' in Power BI
Get Quick Insights
Did you know?
You can create a portrait view of your report, tailored for mobile phones.
On the View tab, select Mobile Layout. Learn more
Got it

Explore your data - Once you get data and reports from your file into Power BI, it's time to explore. If your file already has reports in it, they'll appear in the navigator pane in **Reports**. If your file just had data, you could create new reports; just right-click the new dataset and then click **Explore**.

Refresh external data sources - If your Power BI Desktop file connects to external data sources, you can set up scheduled refresh to make sure your dataset is always up to date. In most cases, setting up scheduled refresh is easy to do, but going into the details is outside the scope of this article. See Data refresh in Power BI to learn more.



4. Unit Test Cases

TEST CASE DESCRIPTION	EXPECTED RESULTS
Crop parameter slicer	When clicked on the slicer, a dropdown should occur which has various parameters of the Seasons.
Crop Year Parameter	When clicked on the slicer, a dropdown should occur which describes the parameters of the Crop Year.
Relation Between Area and Crop Production	Here a time series graph is shown of Relation Between Area and Crop Production data.
Relation Between Area and Crop Production across the states	Various states category is shown and a visualization is created which shows the state Category and Avg. Relation Between Area and Crop Production
Relation Between Area and Crop Production across the District	The visual should show a District Category and Avg. Relation Between Area and Crop Production and land pattern.
Top 5 states and district crop production details	This is an important visual in bar-graph which shows the total production by seasons and year wise production and yield prediction of states and districts.