



VISUALIZATION OF FOOD SECURITY OFFICE DATA, METRO CITY AGRICULTURE AND FISHERIES

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Abstract

The Metro City Food Security, Agriculture and Fisheries Service is the implementing element of the regional government in the fields of Food Security, Agriculture, Livestock and Fisheries. In its activities, the Metro City Food Security, Agriculture and Livestock Service has an annual agricultural report in the form of a report book. However, it does not yet have a display of agricultural data that is presented concisely and attractively. This research will visualize the development of agricultural production using Agricultural Report in Figures (PDA) data for 2018-2022 using the cloud data studio application as a tool for managing and visualizing data quickly, easily and interestingly, from various sources, capable of analyzing data that produces information as Evaluation materials that are easy to review really help the leadership's role in making decisions that don't go wrong.



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I. INTRODUCTION

The Metro City Food Security, Agriculture and Fisheries Service has the task of assisting the Mayor in carrying out government affairs which fall under regional authority and assistance tasks in the fields of Food Security, Agriculture and Fisheries. The goal to be achieved by the Metro City Food Security, Agriculture and Fisheries Service is to increase the consolidation of food security, as well as increase the added value and competitiveness of fishery products. To realize this goal, an active role is needed from every sector in the Metro City Food Security, Agriculture and Fisheries Service.

The Metro City Food Security, Agriculture and Fisheries Service consists of several sectors, namely: Secretariat Sector, Food Crops, Horticulture and Plantation Sector, Livestock and Animal Health Sector, Fisheries Sector and Extension Sector, Technical Implementation Unit (UPT). Each sector has annual production reporting in the form of a PDA (Agriculture in Figures) report which displays a quantitative picture of agriculture consisting of food crop farming, food security, livestock and fisheries sectors in Metro City. Data has an important role in

various things, including in the agricultural sector, from planning, policy to evaluation. Strengthening food data aims to strengthen data on food crops in the fields of Agriculture, Fisheries and Livestock starting from the sub-district and sub-district levels every year.

In connection with the fact that the human population is visual learners. That visual information is channeled to the brain more quickly. In the process of visualizing the data, the results of the overall data analysis will be displayed and can help readers develop an understanding of increasing production each year. Using the Data Studio application to visualize data, it can be depicted using graphs and maps. Google Data Studio is a cloud-based program designed as an easy-to-use tool for displaying complex data sets packaged in attractive forms and comparing data percentages more clearly. Reports created using Google Data Studio are easier to share with all parties quickly, and can be accessed anywhere, making them very easy effective for communicating information. Apart from being easy and free, Google Data Studio can also provide free access to various data sources.

Agricultural data management is related to data collection, recording and reporting activities. In its activities, the Metro City Food Security, Agriculture and Livestock Service has an annual agricultural report in the form of a report book. However, it does not yet have a display of agricultural data that is presented concisely and attractively.

As a tool to visualize data, it is easy and interesting, and is able to analyze data originating from many sources by using the cloud research studio data application which will visualize the development of agricultural production using Agricultural Report in Figures (PDA) data for 2018-2022. The dashboard system-based data studio is able to produce information that is easy to understand, making decision making easier. In the visual process, the visualization results serve as a tool in analyzing a pattern of data, whether in point, line or bar graphs. The advantage for the Metro City Food Security, Agriculture and Fisheries Department is that the display and speed in data processing activities can facilitate the absorption of information as material for decision making. Information that is conveyed accurately and is easy to understand as a reference basis for planning, monitoring and evaluation makes the Metro City Food Security, Agriculture and Fisheries Service able to avoid incidents that result in policies taken by the government being misdirected.

II. LITERATURE

2.1. Previous Research

Several previous studies have provided literature regarding the function of food safety visualization which has been implemented by several institutions. Adam Mukharil Bachtiar, et al (2017) The visualization built in this research can be useful and help the people of West Java in getting information about food security in West Java. However, a more complete form of open data is still needed to support better, real-time data visualization. Dessy Aryanti, et al (2018) by using the Visual Data Mining (VDM) method and the Exploratory Data Analysis (EDA) method, this research has succeeded in producing a dashboard.

Oscar Miba Wibowo, et al (2021) This research uses food and horticultural price information data available in markets and centers with the same characteristics and information needs. The information obtained is processed into visual form in the form of maps, graphs, tables, text and symbols used for implement existing data. So that the system built can visualize The data information is accurate and can be used directly as recommendations in making policies regarding marketing prices for agricultural products. Using Google Data Studio, reports become detailed, clear and specific so that decision makers can focus on important data that has not been visible until now. Dedy Sugiarto, et al (2021) Decision makers in the field The rice trade and PIBC management need quick and easy summary

information and not just wholesale prices but also price information at retail level at various markets managed by the DKI Jakarta Regional Inflation Control Team (TPID). Therefore, a form of dashboard that can be designed is designed visualize data in an integrated manner at both wholesale and retail levels as well as information regarding the quantity of rice supply and stock. Farida Nur Hayati, et al (2021) this community service activity aims to create a data visualization system that is used to provide an overview/ characteristics of student value data. The data visualization system uses one of the tools, namely Google Data Studio and Google Sheet to create dashboards. This data visualization system was introduced and handed over to SMAN 2 Balikpapan to help high school teachers quickly draw conclusions from student score data.

Diana Nurlaily, et al (2022) In implementing Data Visualization Training activities Using Google Studio to Increase the Effectiveness of Student Grade Input on the New Student Admissions Portal. In the world of education, the use of information technology can take the form of transforming paper report cards into e-reports stored in a dashboard. Dashboards can be created using Google Data Studio. Google Data Studio can simplify data with visualization. Faizhal Arif Santosa (2022) Data visualization helps librarians package data into useful information for making decisions and serving it to users. Data visualization opens up opportunities for libraries to use it as a service based on social inclusion to help the economic growth of its users. The challenge for librarians is limited skills in this technology. Chrisensia Puspa Kesuma Ningrum, et al (2023) Creating Data Visualization using Cloud Application Data Studio, the method is CRISP-DM (Cross Industry Standard Process for Data Mining). Tri Dharma Lecturer at the Education Foundation and Dharma Wacana culture can make it easier to monitor the implementation of Tri Dharma and also make data presented in a display that is easy to understand and the data display will be more attractive. Creating Data Visualization using Cloud Application Data Studio, the method is CRISP-DM (Cross Industry Standard Process for Data Mining).

2.2. Metro City Food Security, Agriculture and Fisheries Service

Metro City Food Security, Agriculture and Fisheries Service as the implementing element of regional government in the fields of Food Security, Agriculture, Livestock and Fisheries. The Metro City Agriculture and Fisheries Food Security Service is led by the Head of the Service who is located below and is responsible to the Mayor through the Regional Secretary. The Department has the task of carrying out regional government affairs based on the principle of autonomy and assistance duties in the fields of Food Security, Agriculture, Livestock and Fisheries. Based on Metro City Regional Regulation Number 24

of 2016 concerning the Formation and Structure of Metro City Regional Apparatus as well as Metro Mayor Regulation Number 31 of 2016 concerning the composition, duties and functions of Metro City Regional Apparatus, the Metro City Food Security, Agriculture and Fisheries Service was formed led by Mr. Hery Wiratno, SP as Head of the Metro City Food Security, Agriculture and Fisheries Service, located at Jl. General Sudirman Number 155 Metro Postal Code 34111. The main duties and functions of the secretariat and areas are as follows:

- a. Secretariat
The Secretariat has the task of carrying out technical and administrative services to all work units.
- b. Food Security Sector
The Food Security Sector has the task of formulating policies, providing assistance as well as monitoring and evaluating in the areas of food availability, distribution and consumption.
- c. Food Crops, Horticulture and Plantation Sectors
The Food Crops, Horticulture and Plantation Sector has the task of carrying out the preparation, implementation of policies, and providing technical guidance, as well as monitoring and evaluation in the food crop, horticulture and plantation sector.
- d. Extension Field
The Extension Division has the main tasks of preparing extension program designs, carrying out guidance and supervision of extension implementation, carrying out institutional development and extension personnel, as well as carrying out information and partnership development in the field of extension.
- e. Fisheries Sector
The Fisheries Sector has the task of carrying out coordination preparation, facilitating the formulation and implementation of policies, evaluating and reporting on the implementation of small business empowerment and fish cultivation.

2.3. Food Security

Food security is defined as a condition that allows each individual to have sufficient access to nutritious, healthy and safe food so that they can carry out their life activities optimally. Republic of Indonesia Law no. 7 of 1996 concerning Food defines food security as a condition where household food is met, which is reflected in the availability of sufficient food, both in quantity and quality, safe, evenly distributed and affordable. Even though they have differences, especially in the subject, the two definitions above show how broad the dimensions of food security are.

2.4. Agriculture

Agriculture is the activity of utilizing biological resources carried out by humans to produce food , industrial raw materials , or energy sources , as well

as to manage their environment . People usually understand the activities of utilizing biological resources which are included in agriculture as cultivating plants or growing crops and raising livestock.

2.5. Fisheries

Quoted directly from Article 1 paragraph (1) of Law Number 45 of 2009 concerning Amendments to Law Number 31 of 2004 concerning Fisheries, "Fisheries are all activities related to the management and utilization of fish resources and their environment starting from pre-production, production, processing up to marketing carried out in a fisheries business system.

2.6. Data

Data is reality that describes an event and is a form that is still raw and cannot tell much so it needs to be processed further through a model to produce information.

2.7. Data Visualization

Visualization is a learning technique that can make a material concept visible with the sense of sight in a real way. Meanwhile, data visualization means art and science. Data visualization is a layman's word that describes any attempt to help people understand the significance of data by placing data in a visual context. The current data saving value has changed. Data drives business acceleration, using data allows organizations to make smarter decisions, approaching " real time ". Using data, organizations can have the ability to see trends from Big data stores.

2.8. Cloud

The cloud is a digital storage unit that can store all files, the difference is that if on a storage unit the user must be physically present to access the files, on the cloud the user can access them from any device as long as the device has a connection to the internet. The cloud isn't all virtual, and even though files aren't saved directly to a computer, they still need to be associated with some hardware located somewhere in the world. When uploading to a cloud , via a service like Dropbox, the file will be sent via the internet to a real, tangible server . Cloud service providers have hundreds and thousands of physical servers, which are collectively referred to as " server farms " located in data centers around the world.

2.9. Google Drive

Google Drive is a cloud storage service that allows its users to store files outside the confines of a hard drive . You can use this Google file storage service for free without having to pay any fees. However, Google Drive also provides paid services for its users to enjoy wider features. If you use the free Google Drive service , you can store files with a maximum capacity of 15 GB. Meanwhile, paid

services can upgrade the storage to 100 GB, 200 GB, even up to 2 TB. The 15 GB storage capacity is actually enough for most people to store files on Google Drive . Google Drive itself is a file and file storage service from Google which was launched on April 24 2012. Automatically, Google Drive will be synchronized with other Google services such as Gmail, Hangouts , Google Photos , and so on.

Google data studio is a data visualization program designed as an easy-to-use tool for representing complex data sets in an attractive and clear way. Data visualization is a general term that describes any attempt to help people understand the significance of data by placing the data in a visual context. It was launched in May 2016 as part of the paid Analytics 360 Suite and in August 2016 Google made the program free to the public. The goal of Google Data Studio is to help users create dynamic, visually appealing reports by funneling external data sources into an easy-to-navigate platform that shares data-driven reports.

Google Sheets is part of the Google Docs suite of productivity applications. Google Sheets makes it possible to create and format spreadsheets online, as well as share them with others. Looker Studio's Google Sheets Connector makes it possible to access data stored in Google Sheets worksheets.

2.10. Big Data

Big Data is very large amounts of data that are collected, stored, processed and analyzed to produce useful information to be used as a basis for decision or policy making. Big data provides benefits after analyzing the data. Big data has 3V characteristics:

Volume (very large) Volume in 3v big data is defined as the quantity or amount of data generated from many transactions as well as the volume of data stored.

Variety (the data is very diverse) Data can be called big data if it has various characteristics and is not homogeneous, but has many variables and is very diverse, including various types of data, both data that has been structured in a database and data that is not organized in a database . Analysis of unstructured data will require slightly different algorithms, such as text, image, sound and video data. For such data, it will take more time to process it, because it is possible that in the unstructured data there is still other data or new data that can be extracted.

Velocity (having adequate data access speed) Data can be accessed at a very fast speed so that it can be used immediately at that second (more real time) . One piece of evidence includes the existence of an online operating system based on Microsoft Silverlight, web- based office applications such as Office365, cloud storage such as Dropbox and GDrive.

III. RESEARCH METHODS

There are 2 methods of data collection used, namely as follows:

Interviews are one technique that can be used to collect research data. In collecting data by direct interviews with the heads of each sector at the Metro City Food Security, Agriculture and Fisheries Service.

Literature study is the process of conducting a general review of previously published literature related to various topics. Data were collected using the 2018-2022 Agriculture in Figures (PDA) report book as well as the literature reviewed and studied referring to non-fiction scientific papers.

IV. RESULTS

Below is the Home view of the data visualisation of the Metro City Food Security, Agriculture and Fisheries Office. For this Home page presents data from all fields in the Metro City Food Security, Agriculture and Fisheries Service. On the left side, there is a list of pages from the data visualisation that has been made, there is a Home page, an Agriculture page, a Farming page, a Fishing page, a Farming Group page. The Home page contains activities at the Metro City Food Security, Agriculture and Advertising Office.

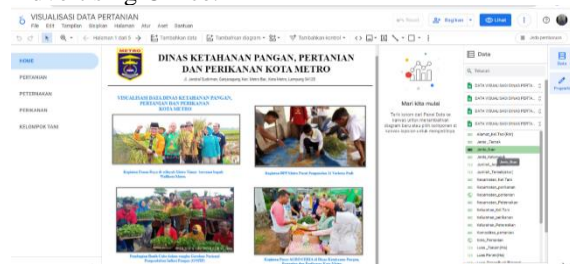


Figure 2. HOME Dashboard Display

4.1. Agriculture

The second page is Agriculture, at the top there is a drop down report for year, sub-district and commodity. There is a table of agricultural production development, with the amount of planting area, harvest area, fruit harvest area, productivity, production, a graph of agricultural production development, and a map of agricultural production development, which contains the total production development for each year.

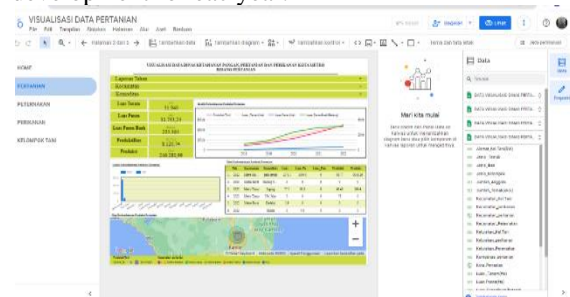


Figure 3. Agricultural Dashboard Display

To get quick and detailed information with data visualisation, you can use this drop down. You can do this by selecting the year of the report you want to see detailed data for, then select only the right side of the report for the year you want to see detailed data for.

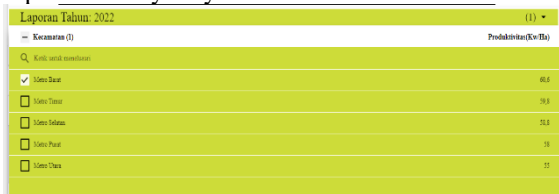


Figure 4. District Drop Down Only Display

The results displayed are as shown below. The data displayed is only the 2022 report data in West Metro sub-district with the corn commodity selected in the drop down as shown in the drop down display.

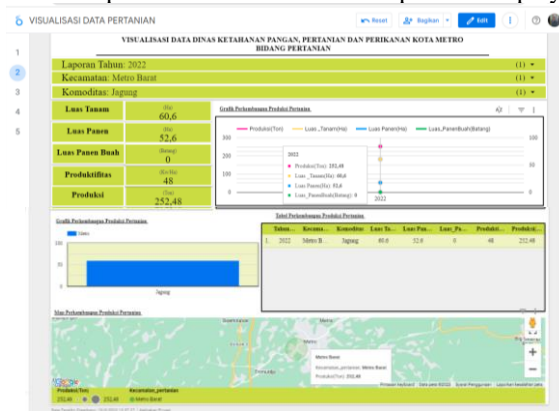


Figure 5. Drop Down Display Results

On the top left are the Total Planted Area, Harvested Area, Fruit Harvested Area, Productivity, Production by report year and sub-district and commodity in each year. In the agricultural production development table, the annual report contains the variables Year, Sub-district, Commodity, Planted Area, Harvested Area, Productivity, Production. It details the amount of agricultural production in each sub-district in a year.

In the section a diagram of the total development of agricultural production, there is a graph of the development of agricultural production in each sub-district per year. Described on the graph about the amount of agricultural commodity production. Each sub-district has a different colour, the aim is to be able to easily distinguish year by year and make the display more interesting to see. In this section of the agricultural production development map is the place where the address of the agricultural production sub-districts.

4.2. Farming

The third page is livestock, on the top left there is a drop down report for year, sub-district and type of livestock. There is a table of livestock population development, with details of Year, Sub-district, Village Reports based on Livestock Type and Number of Livestock, a graph of livestock population

development, and a map of livestock population development, which contains the total population development for each year.

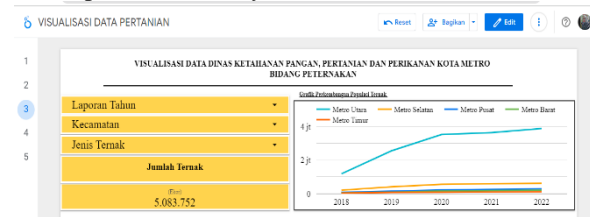


Figure 6. Farm Page View



Figure 7. Farm Page View

To get quick and detailed information with data visualisation, you can use this drop down. The trick is to select the Report Year that you want to see detailed data, then select only the right part of the report year for then you want to see detailed data.

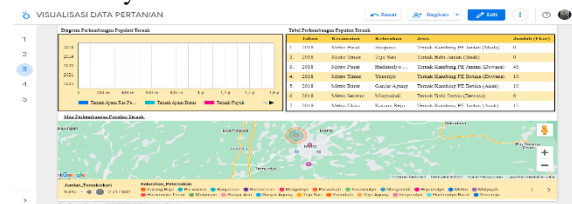


Figure 8. District Drop Down Only Display

The results displayed are as shown below. The data displayed is only in the form of 2022 report data in the North Metro sub-district with the type of Male Cut Goat (Adult) selected in the drop down as shown in the drop down display image.

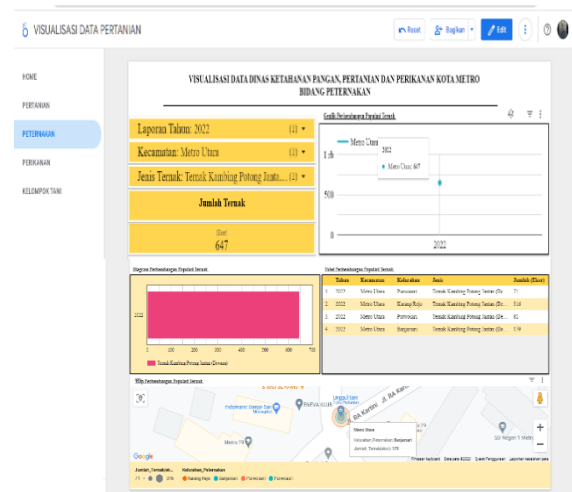


Figure 9. Display of Livestock Population Development Numbers

On the top left is the number of livestock by report year and sub-district as well as the type of livestock in each year. In the livestock population development table, the annual report shows the variables Year, Sub-district, Village, Type, Number. Details of the number in each sub-district and village in a year. There is a diagram of the development of the livestock population for each sub-district and village per year. Described on the graph about the number, type of livestock. Each sub-district has a different colour, the aim is to easily distinguish year by year and make the display more attractive to look at. In this section of the livestock population development map is a place where the sub-districts and villages of the livestock population are located.

4.3. Fisheries

The fourth page is Fishing, on the top left there is a drop down Report Year, District and Type of Fish. There is a fish population development table, with details of Year, Sub-district, Village Reports based on Fish Type, Total Fish Production, fish population development graph, fish population development diagram and fish population development map, which contains the total population development for each year.

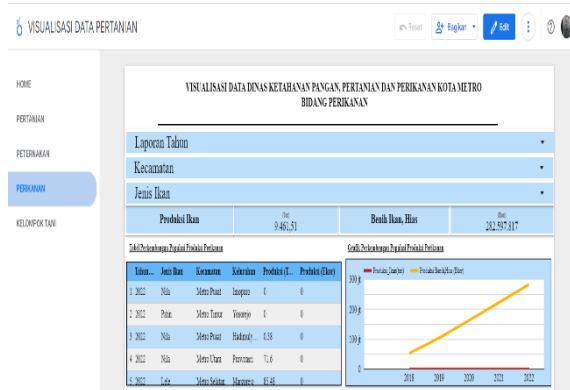


Figure 10. Fisheries Page View

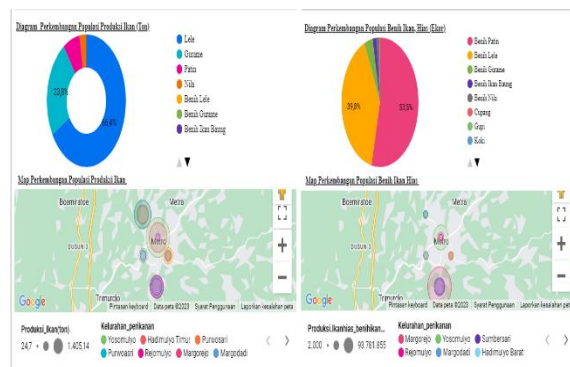


Figure 11. Fisheries Page View

To get quick and detailed information with data visualisation, you can use this drop down. You can do this by selecting the year of the report you want to see detailed data for, then select only the right side of the report for the year you want to see detailed data for.

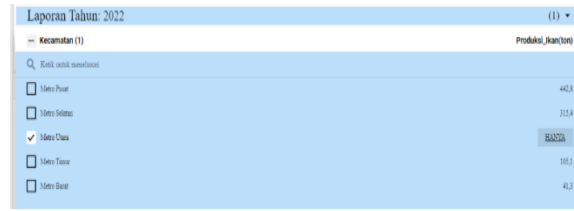


Figure 12. District Drop Down Only Display

The results displayed are as shown below. The data displayed is only in the form of data reports for 2022 in North Metro District with the type of carp selected in the drop down as shown in the drop down display.

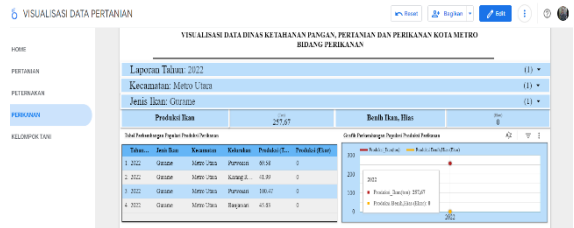


Figure 13. Drop Down Display Results



Figure 14. Drop Down Display Results

On the top left is the total fish production (tonnes) and fish seed, ornamental (tails) by report year and sub-district as well as the type of fish in each year. In the fisheries production development table, the annual report contains the variables Year, Type of Fish, Subdistrict, Village, Production. It details the amount of production in each sub-district and village in a year. The graph shows the development of fish production population (tonnes) and production of fish fry, ornamental for each sub-district and village in each year. Described on the graph about the number, type of fish. Each sub-district has a different colour, the aim is to be able to easily distinguish year by year and make the display more interesting to see. In this section of the fish production population development map is where the sub-districts and villages of the fish production population are located. In this section of the ornamental fish seed population development map, this is where the sub-districts and villages of the ornamental fish seed production population are located.

4.4. Farmer Group

The fifth page is farmer groups, on the top left there is a drop down report for year, sub-district and group type. There is a table of farmer group development, with details of the Year Report, Subdistrict, Village based on Group Type, Gapoktan Name, Register No, Year Established, Chairperson and Number. farmer group development graph, farmer group development diagram and farmer group development map, which contains the total development of the number of farmer groups for each year.

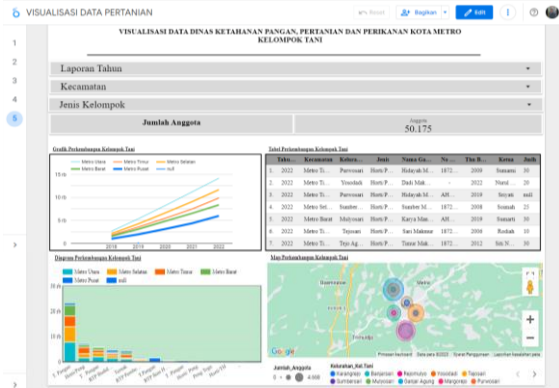


Figure 15. Farmer Group Page View

To get quick and detailed information with data visualisation, you can use this drop down. The trick is to select the Report Year that you want to see detailed data, then select only the right part of the report year for which you want to see detailed data.

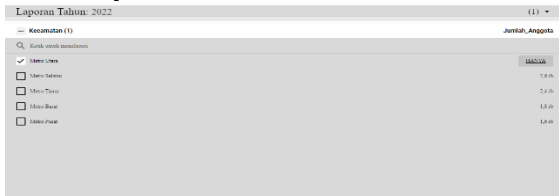


Figure 16. District Drop Down Only Display

The results displayed are as shown below. The data displayed is only in the form of 2022 report data in the North Metro sub-district with the type of Holti / Peng Group selected in the drop down as shown in the drop down display image.

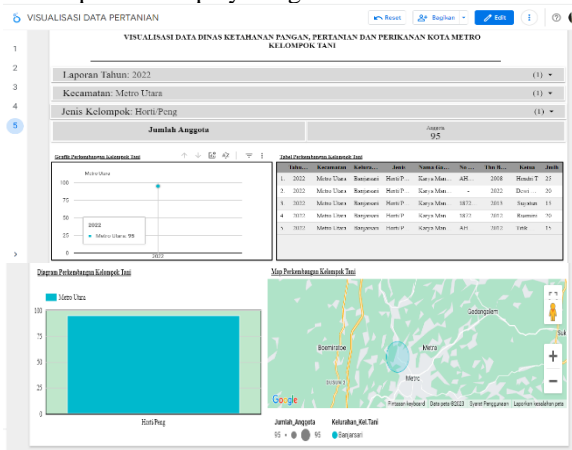


Figure 17. Drop Down Display Results

At the top is the number of farmer group members by reporting year and sub-district as well as the type of group in each year. In the table of fishery production development, the annual report contains variables of Year, Sub-district, Village, Group Type, Register No, Year of Establishment, Chairman and Number of Members. Detailed numbers in each sub-district and village in a year. In the graph a diagram of the development of farmer group members for each sub-district and village in each year. Described on the graph about the number, type of group, and number of members. Each sub-district has a different colour, the aim is to be able to easily distinguish year by year and make the display more interesting to see. This section is a percentage diagram of the development of farmer group members. In this section of the farmer group development folder is a place where the sub-districts and villages of farmer group members are located.

Data visualization is the process of taking and transforming raw data into graphs, diagrams, maps that can explain a series of numbers. Data sources can be processed into digital gold assets to produce higher information which is very useful for the benefit of the Food Security Service in terms of decision making, agriculture and fisheries in Metro City. DataStudio

Used to represent complex data sets packaged in an attractive form and compare percentages of data more clearly. Reports created using Google Data Studio are easier to share with all parties quickly, and can be accessed anywhere so they are very effective for communicating information. displays the results of overall data analysis and can help readers build an understanding about increasing production in each sub-district area in the metro city every year.

V. CONCLUSION

The conclusions from this research that have been carried out are as follows using the cloud data studio application to manage and visualize data quickly with accurate information capture that is easier to achieve with a more attractive appearance. Using the Google Data Studio application can build a more detailed and specific understanding of production developments at the Metro City Food Security, Agriculture and Fisheries Service each year. By using Google Data Studio, it produces information as evaluation material that is easier to review to help leadership decision making.

Suggestions from researchers that have been carried out are as follows this research can be cited by future researchers to obtain more updated and complex data. Maximization using cloud application data studio in annual Agriculture in Figures (PDA) reports.

REFERENCES

[1] Service Resilience Food , Agriculture and Fisheries Metro City, (2018-2022), Metro City, AGRICULTURE REPORT IN

- [2] NUMBERS (PDA), Department Resilience Food , Agriculture and Fisheries Metro City. Nawassyarif , Sumbawa, Julkarnain , M, Ananda, Kiki Rizki (2020), WEB-BASED ANIMAL PRODUCTION AND HEALTH TECHNICAL IMPLEMENTATION UNIT FOR ANIMAL DATA PROCESSING INFORMATION SYSTEM, JINTEKS Journal Vol.2 No.1.
- [3] Muharni Sita;KOM , S.TI, M;Candra W Apri;KOM , S.TI, M (2022), DATA VISUALIZATION USING DATA STUDIO. CV. Literasi Nusantara Abadi
- [4] Muharni Sita , Saputri Tri Aristi , Perdana Andreas, Sulistiyanto (2021). Using Google Data Studio for Data Visualization For Head UD Salim Abadi Warehouse . Journal Center Devotion To Society) Vol 2, No 2, pp. 67 – 72.
- [5] Nurlailly Diana, Silfiani Mega, Puspita Sari Surya, Taufik Amrullah Akbar, (2022), Training Data Visualization Using Google Data Studio, <https://jurnal.jomparnd.com/index.php/jpabdi>.
- [6] Sugiarto Dedy, Mardianto Is, Najih Muhammad, Adrian Daniel, Adi Pratama Dimas (2021), Dashboard Design for Visualization price And supply rice at the market Parent Rice Cipinang . Journal Technology Industry Agriculture 31 (1): <https://doi.org/10.24961/j.tek.ind.pert.2021.31.1.12>
- [7] Ariandi , Muhamad, Puteri , Suci Rahma (2022), Analysis District Data Visualization Kertapati using Tableau Public, Palembang City, Jupiter Journal , Vol. 14 No. 2.
- [8] Maryanto , Budi (2017), 14 BIG DATA AND ITS USE IN VARIOUS SECTORS, College of Management Informatics And LIKMI Computers Jl. Ir. H. Juanda 96 Bandung 40132, Media Informatics Vol.16 No.2 .
- [9] Wibowo , Oscar Miba . Finandhita , Alif (2021) , VISUALIZATION OF FOOD PRICE INFORMATION PORTAL DATA ON THE WEBSITE OF THE DEPARTMENT OF AGRICULTURE OF FOOD CROPS, WEST JAVA PROVINCE, Bandung, Studocu.id.
- [10] Bachtiar , Adam Mukharil et al. (2017). “ Scientific Computers And Resilience Open Data Visualization Food Province West Java science Dan's computer .” 6(1).
- [11] Pratiwi Rani Afri (2021). Visualization report in help taking decision based on business process monitoring at PT. Son of Bukit Barisan. <https://widuri.raharja.info/index.php?title=S11814499948> .
- [12] Hayati Farida Nur , Silfiani Mega, Nurlailly Diana (2021) , Utilizing Google Data Studio for visualization of E-RAPOR students at SMAN2 Balikpapan, Vol. 2 No. 2(2021): PIKA: Journal Devotion To Society .
- [13] Puspa Kesumaningrum Chrisensia , Muharni Sita (2023), Visualization teaching , research And devotion To public foundation education And Dharma Wacana culture , Journal information And Computer Vol: 11 No:1.