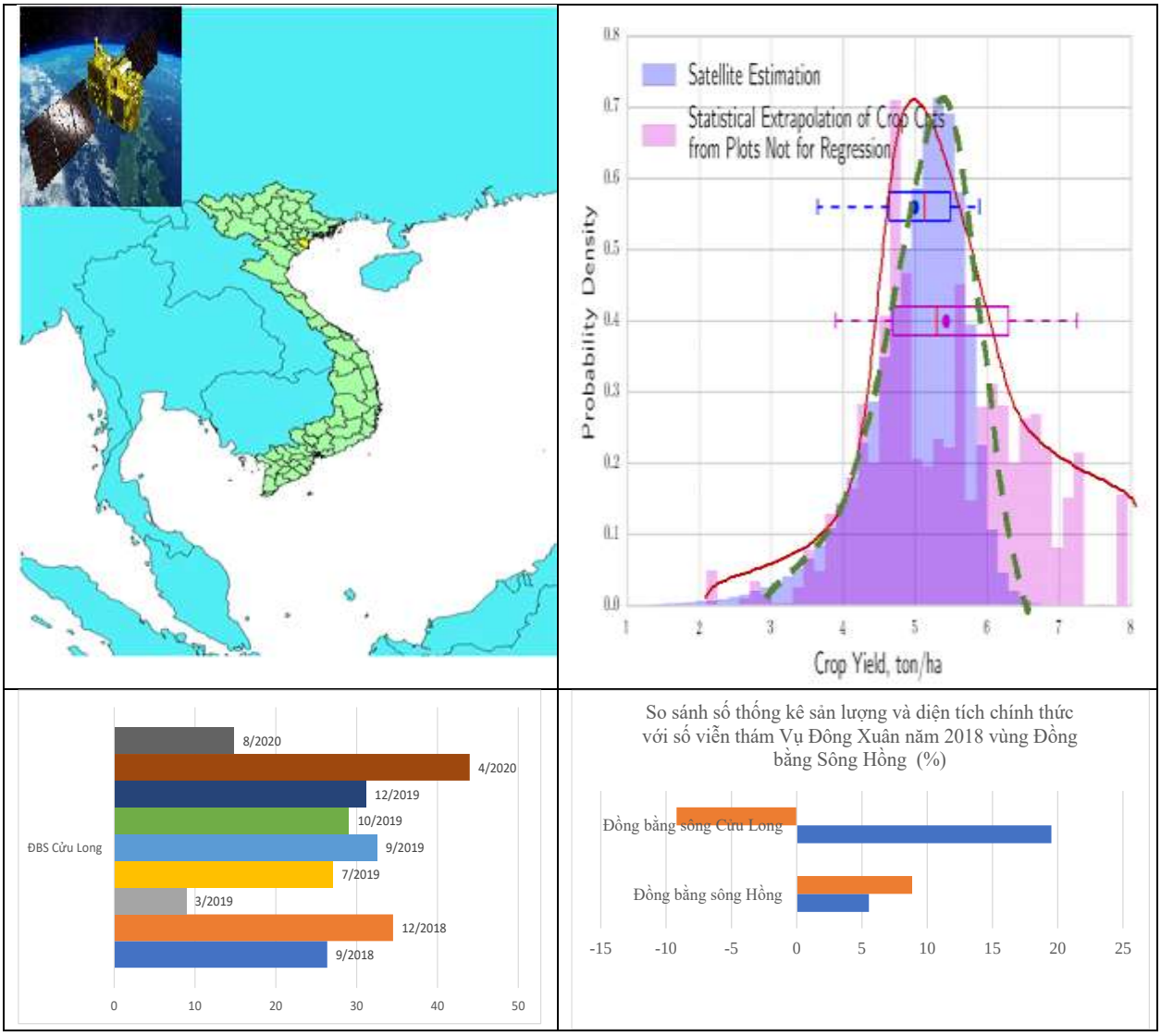
Current status of Vietnam's agricultural administrative statistics system and prospects for application of remote sensing technology



(Reference report)

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Summary

Currently, there are many shortcomings in the agricultural statistical system such as too many types of numbers, publishing units, investigation units, and data processing units. Furthermore, many types of reports are written based on different types of statistics, and so it is difficult to know what the statements in those reports really mean. The concepts used in statistics are also very difficult to understand and confuse. This system has a very thick frequency and number of indicators, so it is very large, diverse, duplicated and rapidly increasing over time. It is estimated that only in the statistical indicator sets joined by the Ministry of Agriculture, up to 30% of the indicator names are duplicated. Plus, the stats are stored in too many forms and methods. As a result, the agricultural statistical system becomes very complex and data is easily overlapped, difficult to control for quality, difficult to integrate and synthesize. The state statistical system has been and is in the process of being improved. However, the speed of improvement is very slow due to interwoven causes, which are difficult to separate to solve definitively. Currently, there are only a few data sets that are reliable and used with as much frequency as the Import-Export database system and price types. Most of the data are in the category of "divisors" of too many individuals and organizations over a very long period of time, possibly more than 10 years, so with time the consistency of the data decreases and there is a tendency to will increase linearly. Specifically, there is a huge difference in rice area between administrative statistics, field measurement statistics and official statistics and remote sensing data. Based on statistical theory of normal distribution, remote sensing data has more stable and random characteristics because when plotting remote sensing data, it usually has a normal or bell-shaped distribution, ie less distorted by human subjective factors. However, the number of remote sensing has only been applied very limited, mainly with international organizations, almost no practical application, contributing to the policy making process in Vietnam. The application of remote sensing technology for agricultural statistics is becoming easier and easier due to the increasing number of high-resolution and processed images that are freely available, and image interpretation software is increasingly convenient. Benefit users with personal computers that don't need high-priced ones. Therefore, there should be many different forms to promote the application of remote sensing technology more broadly in the agricultural sector, perhaps even at the commune level.

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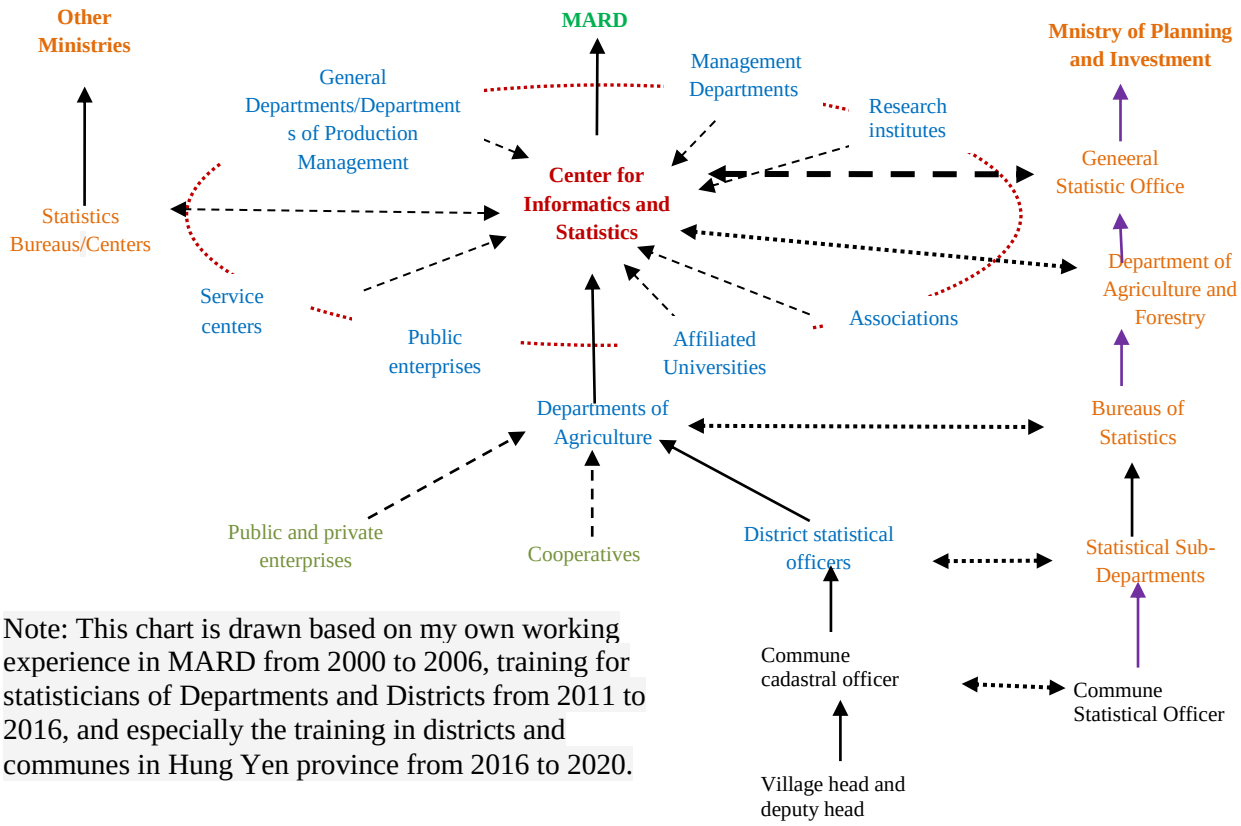
1. State agricultural statistics system

Before 2006, the General Statistics Office under the Ministry of Planning and Investment was the only state agency with the function of collecting and publishing statistical data in Vietnam, including the agriculture and rural development sector. Ministries and sectors may have their own statistical collection system based on subordinate units in localities. This system is called Administrative Statistics. Statistical officers of ministries and branches often work part-time, which means that statistics is just one of many jobs they undertake. In the Ministry of Agriculture and Rural Development, the statistics team under the Department of Planning is responsible for collecting administrative statistics. These data are usually sent by the Departments of Agriculture and Rural Development via email or fax machine.

In 2006, besides the statistical system of the General Statistics Office, due to the increasing demand for data, ministries and sectors, including the Ministry of Agriculture and Rural Development, began to set up their own statistical systems to collect data. administrative data for specialized purposes. The administrative agricultural statistical system is depicted in Figure 1.



Note: This chart is drawn based on my own working experience in MARD from 2000 to 2006, training for statisticians of Departments and Districts from 2011 to 2016, and especially the training in districts and communes in Hung Yen province from 2016 to 2020.

Figure 1. Agricultural statistics system designed by the Ministry of Agriculture and Rural Development since 2006

Within the system of the Ministry of Agriculture and Rural Development, the Center for Informatics and Statistics is the design, inspection, processing and evaluation agency for all kinds of administrative statistics. The Center for Informatics and Statistics receives, stores and aggregates administrative statistics to provide aggregated data and writes reports to the leaders of the Ministry of Agriculture and Rural Development according to the prescribed frequency. The

Department of Agriculture and Forestry, General Statistics Office, is usually the supporting agency, providing professional advice to the Center for Informatics and Statistics as well as the Statistics division of the Departments under the Ministry of Agriculture and Rural Development.

Several other agencies under the Ministry of Agriculture and Rural Development, for example, the General Department of Forestry and the Department of Livestock Production also have their own statistical administrative systems in the provinces, districts and communes. These statistical systems are also administrative statistical systems but with a narrower scope, serving the management needs of leaders of General Departments and specialized Departments.

In the current Vietnamese statistical system, GSO data are used officially in all government documents. For example, if the Ministry of Agriculture and Rural Development collects data on rice acreage through its administrative system, the data is only used monthly by MARD leaders to manage production. rice production. These administrative figures are not used for official publication. The General Statistics Office is responsible for the official publication on the official website, the reports of the National Assembly and the Government.

2. The main sets of statistical indicators under the Ministry of Agriculture and Rural Development

The Ministry of Agriculture and Rural Development has about 8 different sets of main agricultural statistical indicators. These sets of statistical indicators are presented in Figure 2.

The National Statistical Indicator Set is understood to be used at the national level. Although in practice there is no clear delineation of what is used at the national, regional or provincial or sectoral levels. The easiest interpretation is based on which agency issues or publishes (different from collecting agencies) and on the decision signed by the head of which agency. Therefore, the national set of statistical indicators is understood to be issued by the General Statistics Office and this set of indicators is signed and decided by the Prime Minister. The National Statistical Indicator Set contains more than 200 indicators designed by all ministries and equivalent state organizations, classified into 24 groups, as presented in Annex 11.6, specifically:

- The General Statistics Office is responsible for collecting all 200 indicators.
- The General Statistics Office is responsible for collecting 107 indicators:
- Ministries and equivalents are in charge of collecting 79 indicators:
  - The Ministry of Agriculture and Rural Development is in charge of collecting 6 indicators.
- The agricultural sector has 26 national indicators:
  - The General Statistics Office is in charge of collecting 20 indicators
  - The Ministry of Agriculture and Rural Development is in charge of collecting 6 indicators.

In order to manage and administer production in accordance with specific characteristics, the Ministry of Agriculture and Rural Development issued a set of administrative statistical indicators in 2006 and adjusted from time to time to be close to reality:

- This set of indicators has 186 indicators in 2006 and more than 200 indicators in 2020, grouped into 20 areas, as presented in Appendix 11.3. The Center for Informatics and Statistics is the manager and focal point for collecting these indicators.

- These indicators are provided by the Departments of Agriculture and Rural Development.
- The frequency of administrative statistics collection is as follows:

    - 33 monthly targets.
    - 110 quarterly targets.
    - 27 six-month targets.

- The sources of administrative data collection are as follows:
    - 108 indicators from the Agriculture and Rural Development sector.
    - 66 indicators from the General Statistics Office.
    - 4 indicators from the Ministry of Natural Resources and Environment Management.
    - 3 targets from the Ministry of Planning and Investment.
    - 4 monthly import and export targets of the Ministry of Finance - General Department of Customs:

        - ✓ These data are most used by the leaders of the Ministry of Agriculture and Rural Development for various purposes, mainly to make policies and actions to promote agricultural exports.

    - Several other sources.

The new rural statistical indicator set belongs to the National Target Program on New Rural areas and has 19 groups of indicators (Appendix 11.1). These indicators are used by political leaders to the highest levels of Vietnam, including the leadership of the Ministry of Agriculture and Rural Development to monitor and evaluate the development of the rural communities in both countries How evolved over time. National target program is build one system from the central to the local (commune) specializes charge collecting statistical indicators of new countryside. New Rural Committee under the Ministry of Agriculture and Rural Development is the agency in charge of managing the highest level in the system (not the lead agency).

The set of statistical indicators for sustainable poverty reduction under the National Target Program has 10 target groups (Appendix 11.5). These indicators are used by Vietnam's highest-ranking political leaders, including those from the Ministry of Agriculture and Rural Development, to monitor and assess how poverty has improved throughout the country. like over time. The main management board belongs to the Ministry of Labour, Invalids and Social Affairs. The Ministry of Agriculture and Rural Development is the coordinating agency with the Department of Economic Cooperation as the focal point.

The set of agricultural restructuring statistics is part of the Agricultural Restructuring Program issued by the Ministry of Agriculture and Rural Development with 15 groups of indicators (Appendix 11.2). This set of indicators is used by the leadership of the Ministry of Agriculture and Rural Development to see how the quality of agricultural products has changed over time. The Department of Planning is the unit that manages these indicators. The budget is partially financed by the Ministry of Agriculture and Rural Development and partly by a loan from the World Bank (about 200 million USD).

The set of sustainable development goals is a set of indicators at the international level. This set of international indicators has 232 indicators. In Vietnam, this set of indicators has 158 indicators, of which 8 are on agriculture. Within the Ministry of Agriculture and Rural Development, it is not clear which unit of the Ministry will be the agency to collect/store/manage these indicators. It is likely that the Department of Cooperative Economics is in charge of the Department of Cooperative Economics, which is acting as the focal point in charge of the National Target Program on Sustainable Poverty Reduction.

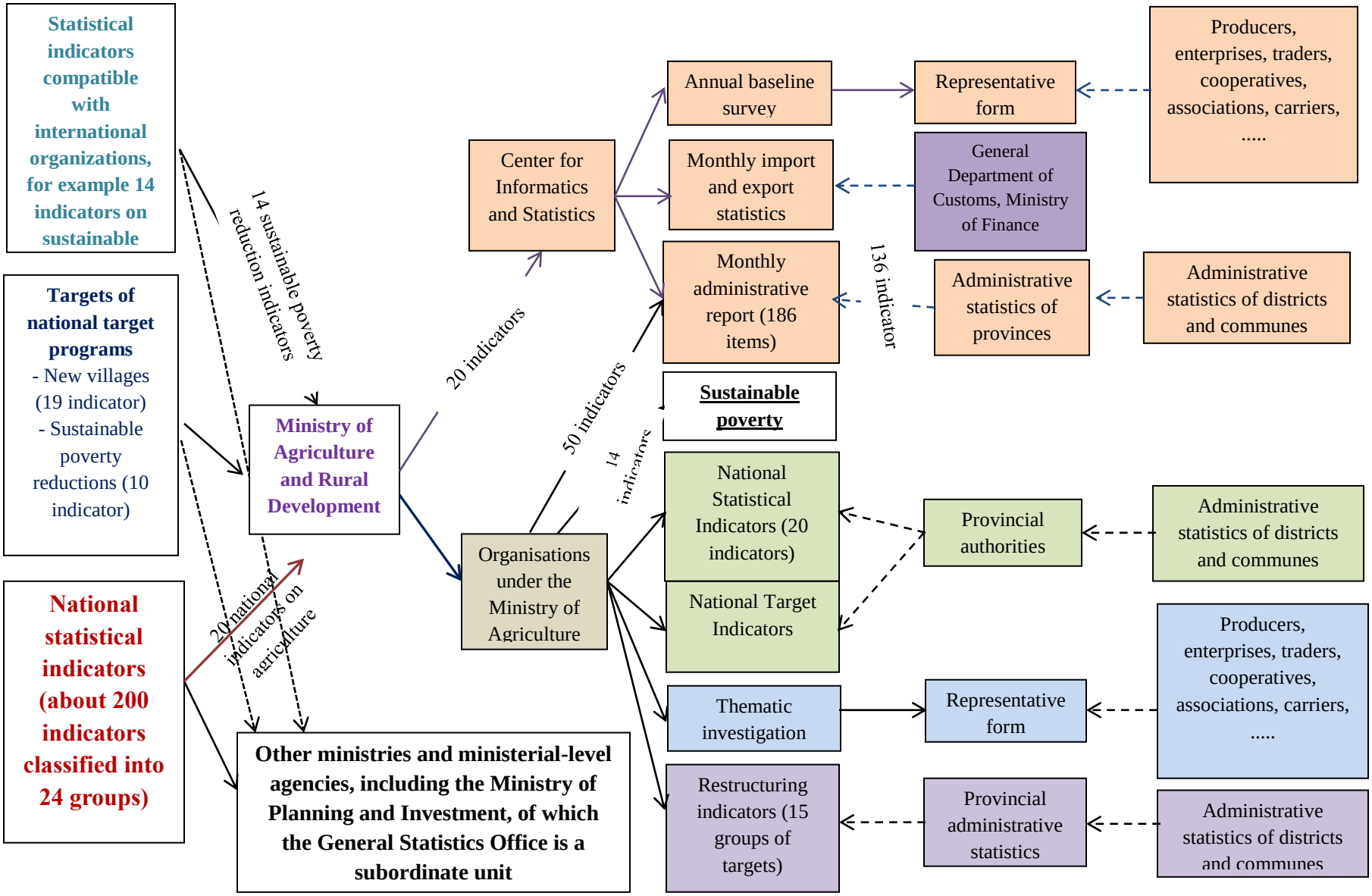


Figure 2. Number of statistical indicators and their delivery managed by the Ministry of Agriculture

In addition to the above main sets of statistical indicators, the Ministry of Agriculture and Rural Development also has two statistical survey systems. The first system is a system of basic survey programs usually managed and monitored by the Department of Planning. The Center for Informatics and Statistics designs, reviews, enters, processes data, and writes statistical reports. Institutes under the Ministry implement investigation programs. The second system is thematic survey programs, which are usually implemented by General Departments/Departments, and non-business units within the Ministry as shown in Figure 2. Survey programs under the Ministry of Agriculture are often deployed on the principle of "nesting", that is, 1 investigation team will conduct more than 1 investigation in the same time period.

These survey programs are all representative sampling surveys, that is, survey only a small part of the population. The design of these survey programs requires the mandatory consultation of the General Statistics Office, which is the highest specialized state agency in statistics. The aggregated data from these survey programs are generalized to the whole, then the descriptive statistical reports and statistical data are sent to the leaders of the Ministries, General Departments and specialized agencies to serve the management. management and administration. In many cases, these survey data are sent to research institutions.

3. Types of statistics and publication units

3.1. Theoretical summary of what is good or reliable statistics

In statistical theory, data obtained from all observations or from a population has some of the following characteristics:

- ✓ Is a sequence of numbers from small to large, with a very dense number of numbers per unit of measurement.
- ✓ The distance between a number and the number before and after is always equal, even though the distance is very small, approaching 0.

Therefore, when disaggregating or grouping populations according to any consistency criterion, aggregated data from censuses typically have the following characteristics:

- ✓ The mean values will vary between groups.
- ✓ The distance between the mean values of the adjacent groups will be equal.
- ✓ Variance values are equal between different groups.
- ✓ The variance of the Population is equal to the sum of the variances of all the groups.
- ✓ The mean of the residuals (ε) of the groups is zero.
- ✓ The standard variance of Y (all observations in the population) or Yi (all observations in group i) is equal to the standard variance ε or εi.
- ✓ The sum of the total residuals ε or the group residuals εi is zero.
- ✓ The values of ε or εi range evenly to either side of the mean Y or Yi.

However, surveying or collecting all the data of a population is not possible in practice, most implementations in practice are sampling surveys with different large and small sample sizes. A "large enough" or "enough number of observations" sample drawn from a population usually has the following characteristics:

- The mean and variance of the sample are close to the mean and variance of the population.
- The sample mean is normally distributed, with the variance being the sample variance divided by the square root of n.

- As n is larger, the closer the sample mean is to the population mean, the variance of the sample mean is approximately zero.
- Means and variances of subgroups in the sample differ significantly from those of the population as a whole.
- Calculations for ε in the sample all sum to zero by group and the whole sample is the same as in the population, but not equally distributed in each group as in the population.

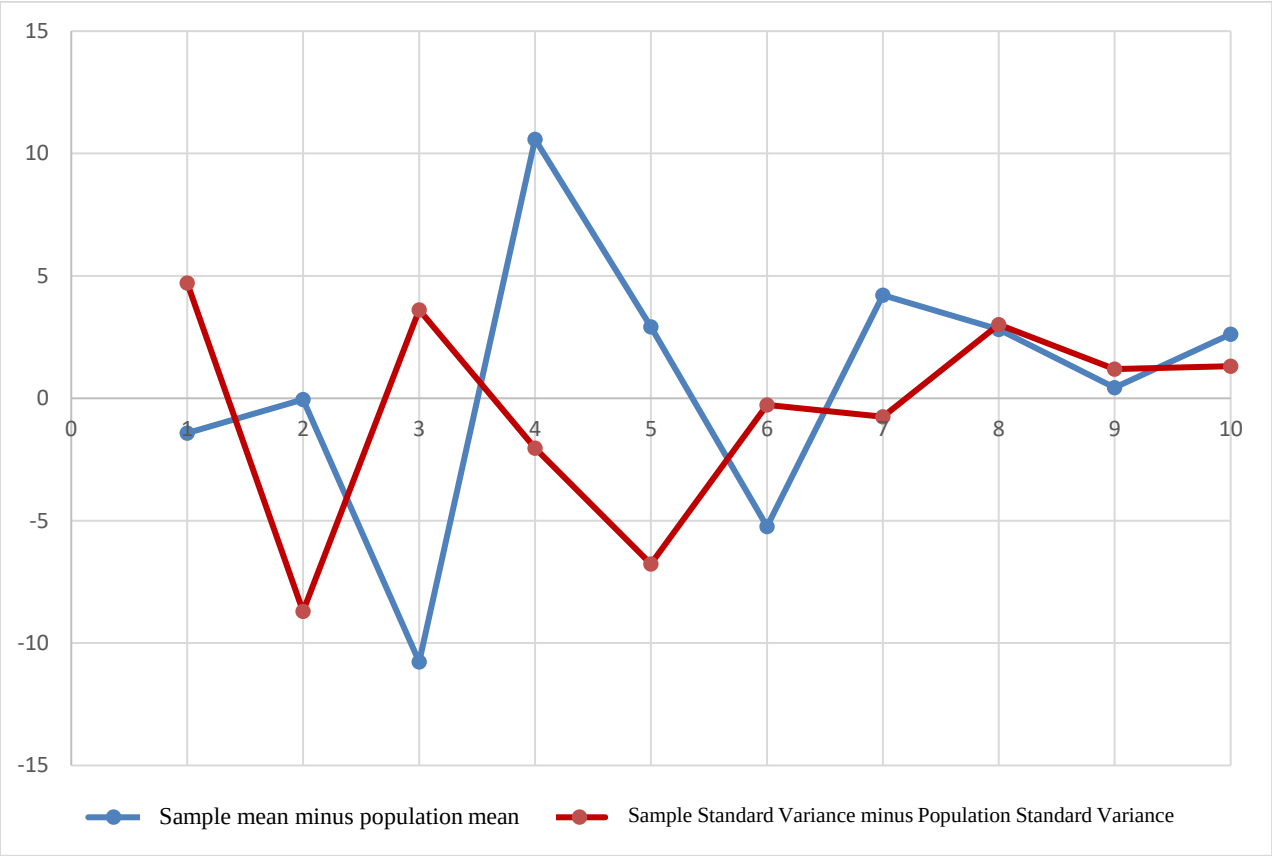
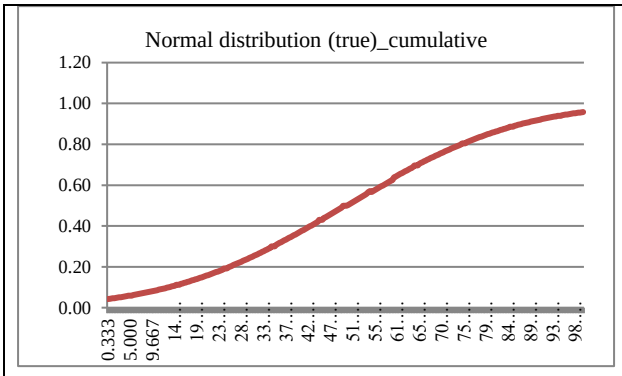
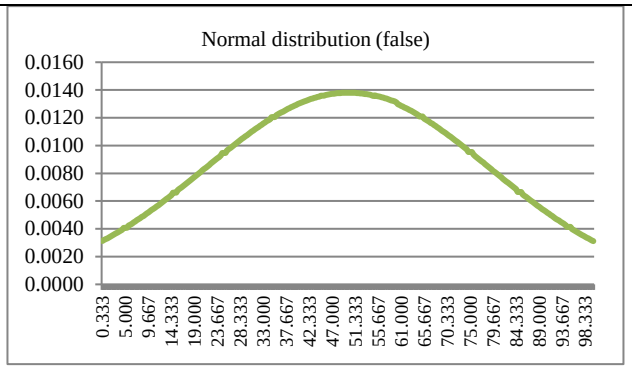


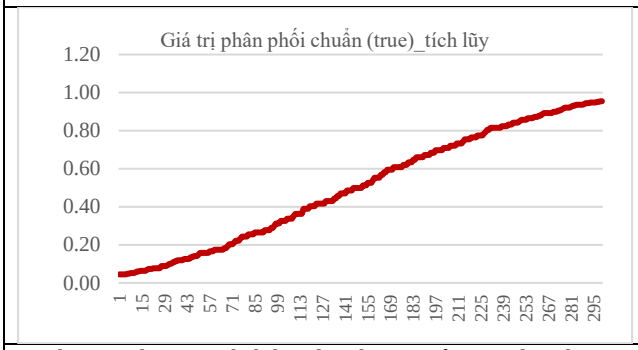
Figure 3. As the number of observations increases, the difference between the sample and the population decreases, approaching 0

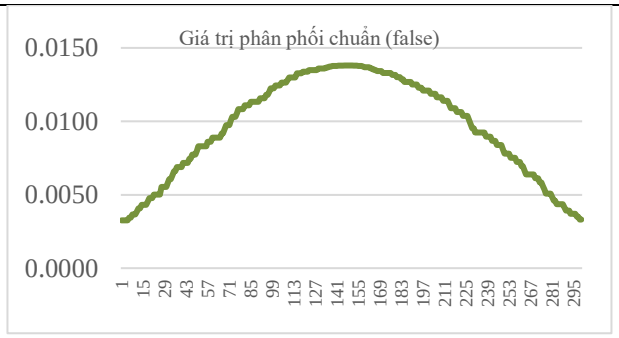




The cumulative probability distribution of the population

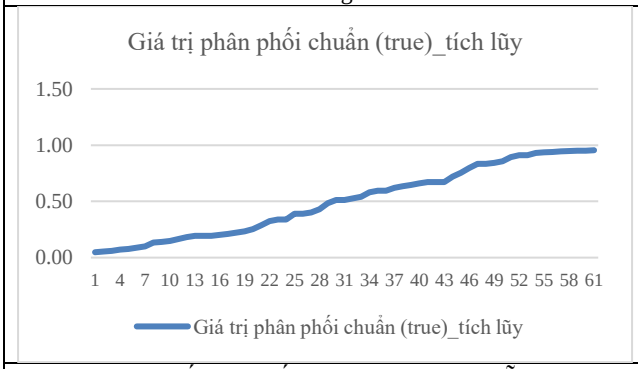
The population standard probability distribution

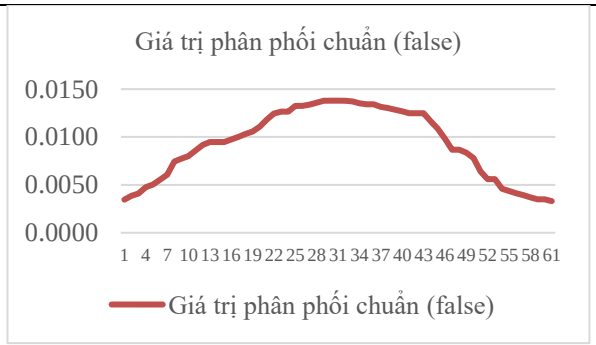




The cumulative probability distribution of a sample is large enough

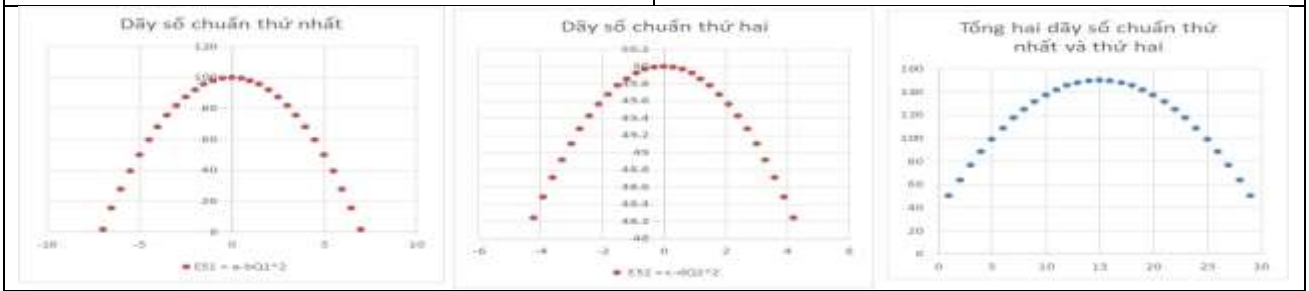
The standard probability distribution of a large enough sample





Đường phân phối xác suất tích lũy của một mẫu nhỏ

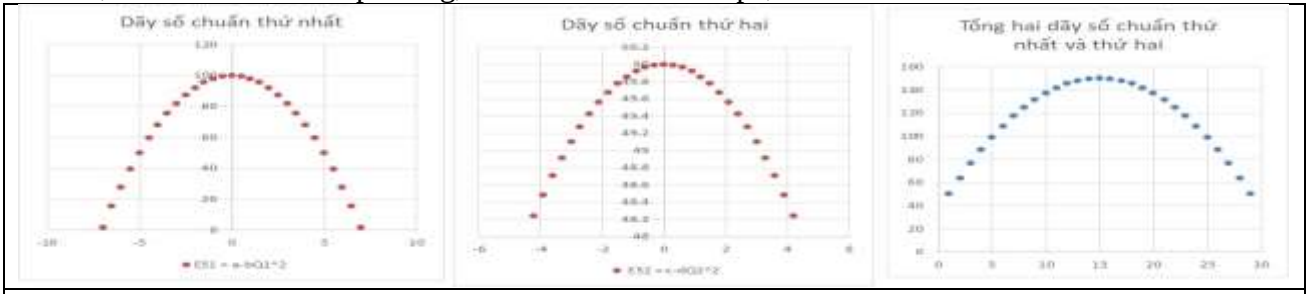
Đường phân phối xác suất chuẩn của một mẫu nhỏ



If two sequences of numbers are normal and related, the sum of those two sequences must be a normal sequence

Figure 4. Signs that a sequence of numbers is good or bad

Thus, a sequence of numbers is considered more reliable when the sequence is drawn in the shape of a bell or close to a bell (Figure 4). For each administrative, census, sample, baseline, and thematic statistic, when included for plotting, if there is no bell shape, the numbers are considered unreliable.



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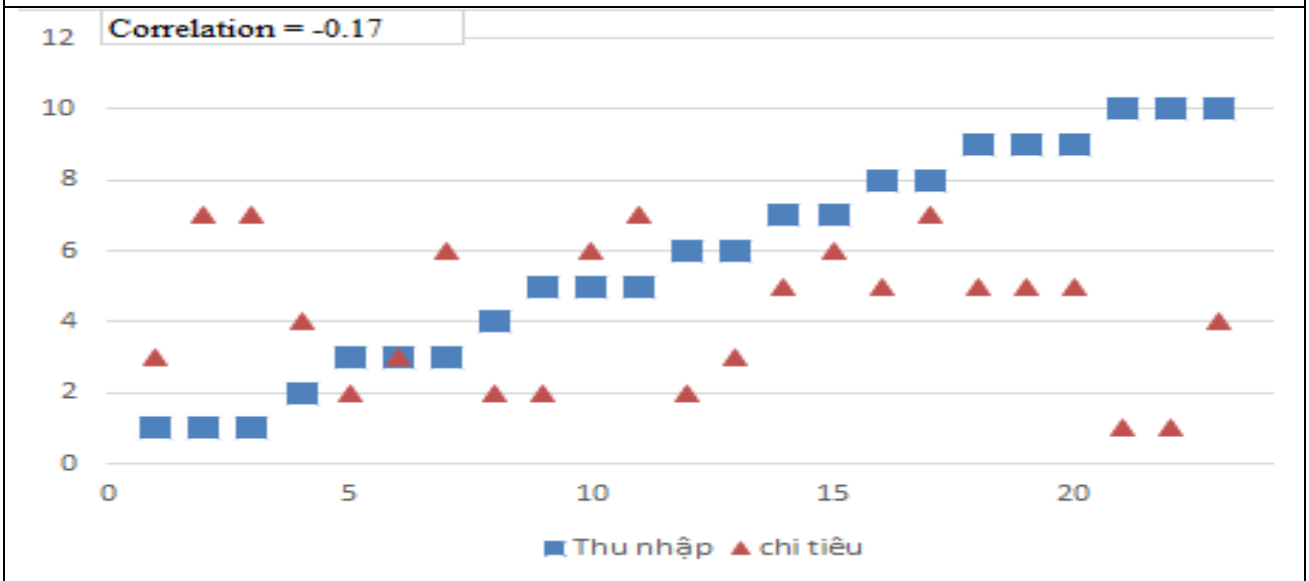


Two series of numbers are considered good when the correlation coefficient is reasonable: for example, income increases, expenditure increases

Figure 5. How to know if 2 series of numbers are reliable or not

Besides, to check whether two sequences of numbers are reliable or not, people take the sum of those two sequences, then draw and check whether the final graph is bell-shaped or not. This approach can be extended to more than 2 series of numbers with the ultimate goal to ensure that the numbers entered for calculation are reliable numbers. To quickly check whether two sequences of numbers have a reasonable relationship with each other, people use the correlation function. Two or more series of numbers are bell-shaped, but the correlation coefficient is not reasonable. For example, when income increases, expenditure usually increases and vice versa (Figure 5).

3.2. Actual names and statistics currently in use and published

There are many types of data used in reports, research projects, newsletters, database websites and many other types of data information written and published by many individuals and organizations on the Internet. reality. However, readers and even users of these data pay little attention. Those types of statistics typically fall into 10 categories:

– Raw data

- Number of divisors
- Primary number
- Preliminary data
- Secondary number
- Adjusted figures
- Processed data
- General data
- Official figures
- Report number
- Number of achievements

Depending on the type of statistics, the agency or unit with functions and duties prescribed by the state will publish it. For the official import and export data published by the General Department of Customs. The Ministry of Agriculture and Rural Development only publishes import and export data of agricultural products if they do not coincide with or do not conflict with those announced by the General Department of Customs. For agricultural import and export data, there are 5 types of numbers that are frequently used and published:

- Raw data (data according to HS code in Excel file format).
- Preliminary number (published on the website of the General Department of Customs).
- Adjustment number – is the preliminary number that is recalculated after about 6 months after the preliminary number is published (published on the website of the General Department of Customs).
- Official number – is the adjustment number that is recalculated or reviewed after about 1.5 years after the adjustment number is published (published on the website of the General Department of Customs).
- Aggregate Number – is the number of different units that aggregate themselves based on raw data.

For the program of basic investigation and thematic investigation, the functions and duties of the units will be regulated each year:

- The focal point
- Investigation unit
- Investigation unit
- Supervision inspection unit
- Data processing unit
- Data entry unit
- Statistical report writing unit
- The unit that publishes the data

Most of the current agricultural statistics are officially announced by the General Statistics Office. The Ministry of Agriculture and Rural Development is now allowed to publish official data on forestry, for example forest area, import and export of some woodchip products.

4. Collect, store and synthesize agricultural statistics

4.1. Collection and storage of administrative agricultural statistics

Most sets of agricultural statistics through the Ministry of Agriculture and Rural Development are designed to be collected through the administrative system, i.e. data are collected from commune to district; district to province; province to the Center for Informatics and Statistics. This system also has interaction in the opposite direction but at a low level - from the central level to the commune level. Lower tiers send figures via text message, email, and online software. However, it is very difficult to know how this system works in reality. Since December 2011, the online administrative statistics system between the Center for Informatics and Statistics and the Departments of Agriculture across the country has been built and is operating to this day. Administrative statisticians of the Departments of Agriculture are trained in statistical math and in the use of online statistical software so that they can be updated regularly. That is, the operation of this system is relatively clear from the Department level to the central level (Center for Informatics and Statistics) but it is not clear from the commune level to the provincial level.

The General Departments and Departments have also developed a similar administrative statistics system. The difference is that the General Departments and Departments have subordinate units at the Provincial, District and Commune levels. For example, the Veterinary Department has sub-departments of veterinary medicine at the provincial level, the district veterinary station and the veterinary staff at the commune level. A similar system has also been developed by the Forest Protection Department, the General Department of Water Resources. However, it is currently difficult to know how these systems send data and information to the central level. Most likely these figures are saved on Excel files and mainly transferred via email.

The officials who do administrative statistics in the agriculture and rural development sector are often part-time officers, which means that statistics is just one of the daily tasks of each person. The degree of part-time tends to increase gradually from the central level to the commune level.

Statistical officers at the ministerial level usually work for the Center for Informatics and Statistics, the Department or the planning department. Provincial Statisticians usually work for the Planning Department, Office. District Statistical Officers usually work in the Economic Department. Commune Statistical Officers usually work in the Cadastral Department.

4.2. Collect and store survey statistics

The data from the survey programs under the Ministry of Agriculture and Rural Development are collected by surveying samples of different sizes through questionnaires written on paper, on mobile phones and on tablets. Most data from survey programs are stored in Excel files, some in Word and Access file formats, as shown in Figure 6.

The Center for Informatics and Statistics is managing about 70% of the servers of the Ministry of Agriculture and Rural Development. These servers are used to store most of the basic survey data. The Center for Informatics and Statistics also stores data of a number of units under the Ministry of Agriculture and Rural Development in the form of server rental contracts.

4.3. Collect and store data collected from the General Statistics Office and Customs

The statistics of the General Statistics Office and the General Department of Customs are regularly sent to the Center for Informatics and Statistics due to the signing of a cooperation agreement on data sharing between specialized state agencies. Usually data sharing is Excel files and the Center for Informatics and Statistics stored on personal computers or Web databases.

4.4. Reports written from the synthesis of administrative and census agricultural statistics

Administrative statistics, surveys and other state agencies are compiled by the Center for Informatics and Statistics into the following main reports (Figure 7):

- Monthly statistical report: this report is sent to the leadership of the Ministry of Agriculture and Rural Development, usually from the 23rd to the 27th of every month. The content of the report has five main parts:

    - Manufacture
    - Market price
    - Disaster
    - Disease
    - Processing
    - Import and Export

- Quarterly export forecast report: this report is sent to the leaders of the Ministry of Agriculture and Rural Development every quarter. This report forecasts the indicators of total export and total import of the agricultural sector, forecasting export value for 11 commodity sectors: rice, seafood, pangasius, shrimp, pepper, cashew, coffee, rubber , vegetables, livestock, timber and wood products.
- Leadership Bulletin: This newsletter is sent to the leaders of the Ministry of Agriculture and Rural Development every two months. The main body of this Newsletter is usually about policy proposals.

Besides the 4 main reports, there are also many other reports, for example science and technology, specialized topics, newsletters, research reports made by other units under the Ministry of Agriculture and Rural Development. The above reports are published on the web as shown in Figure 7.

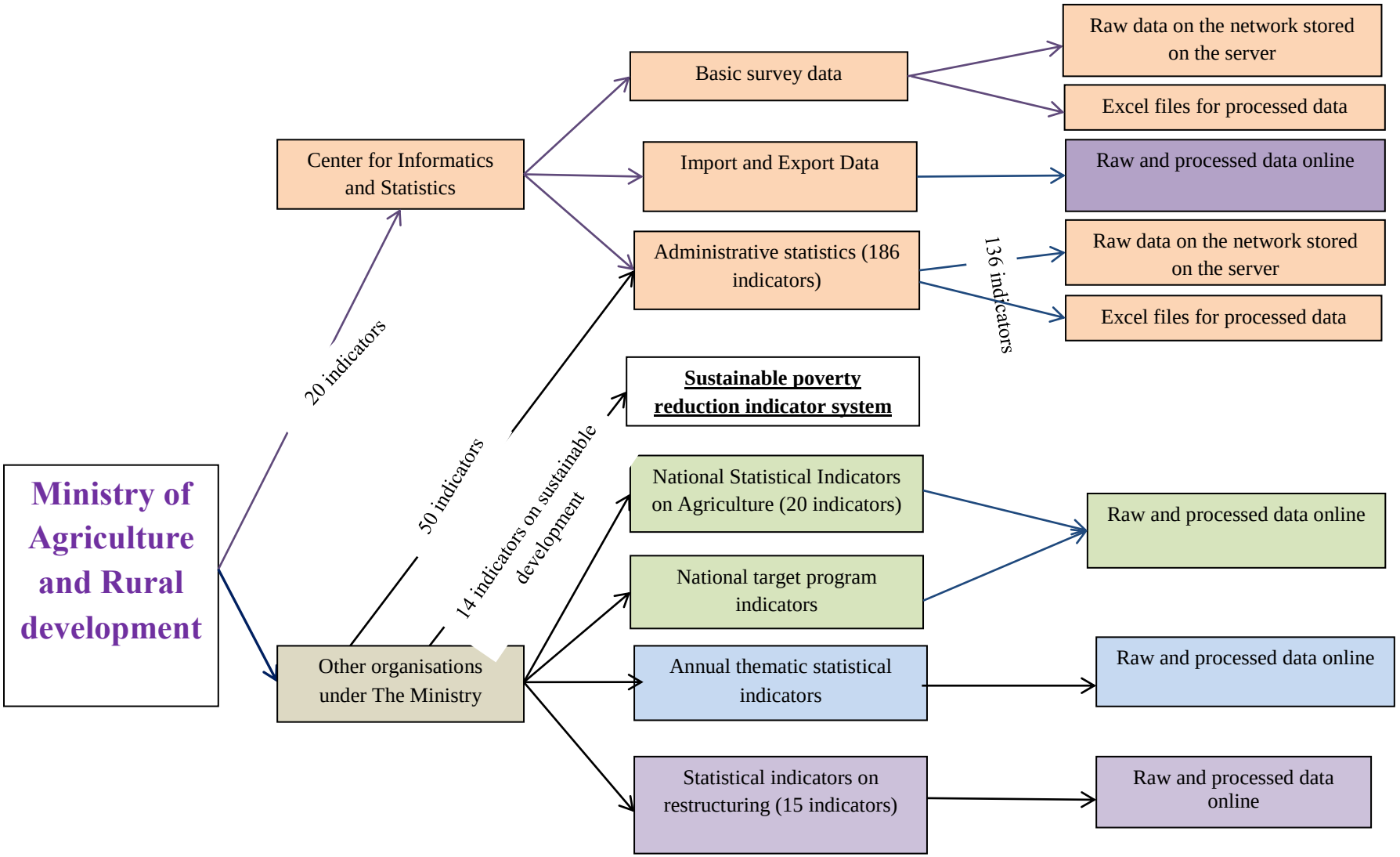
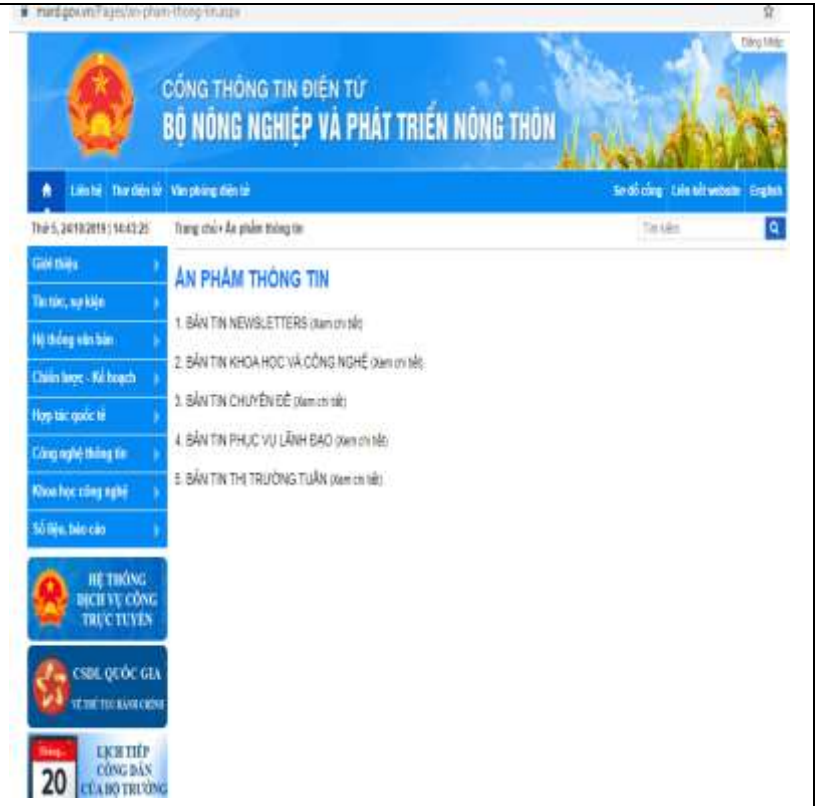


Figure 6. Statistical data storage under the Ministry of Agriculture



https://www.mard.gov.vn/Pages/default.aspx

https://www.mard.gov.vn/Pages/an-pham-thong-tin.aspx

Figure 7. Data and reports published on Website

5. International cooperation activities on application of remote sensing technology

5.1. Asian Development Bank

The Asian Development Bank cooperates with the Center for Informatics and Statistics to implement the project "Measuring Rice Yields from Space: The Case of Thai Binh Viet Nam". ” from 2014 to 2019. Foreign experts working on this project from countries such as Japan, India, Philippines. The domestic experts mainly come from the Center for Informatics and Statistics (Software and Database Department, Statistics Department and Analysis and Forecasting Department), General Statistics Office (Agriculture Department).

Figure 8. Location of Thai Binh province

The main tasks of the Vietnamese side include:

- Cropp cutting to estimate rice yield at some sample points in the field (about 200 samples).
- Measure the area in the field with specialized software installed on the iPad at some sample points (about 200 samples).
- Interviewing farmers according to a model designed by foreign experts.
- Participate in training courses taught by foreign experts on image interpretation software (INAHOR), area measurement software.
- Participate in seminars organized by the Asian Development Bank.

The main tasks of foreign experts include:

- Calculating rice area and yield through satellite images.

- Compare the numbers from remote sensing images with the numbers from sample measurements in the field.
- Training for Vietnamese officials on the use of software.
- Write the final Research Report of the project.
- Organize seminars.

The specific products of the project are shown in Figure 9:
- Mapping rice yield by color, yield increases when the color changes from pink to red.
- Compare the numbers calculated by satellite images and measurements in the field, draw 2 normal distributions merged together.

The comparison results show that the mean value is relatively similar between the two types of data, however, the number from the remote sensing image giving a bell shape (normal distribution) is more balanced, that is, there is less error due to measurement. measured than in the field. As such, field measurements should be stopped at a level that helps to check and adjust the yield calculation based on satellite imagery.

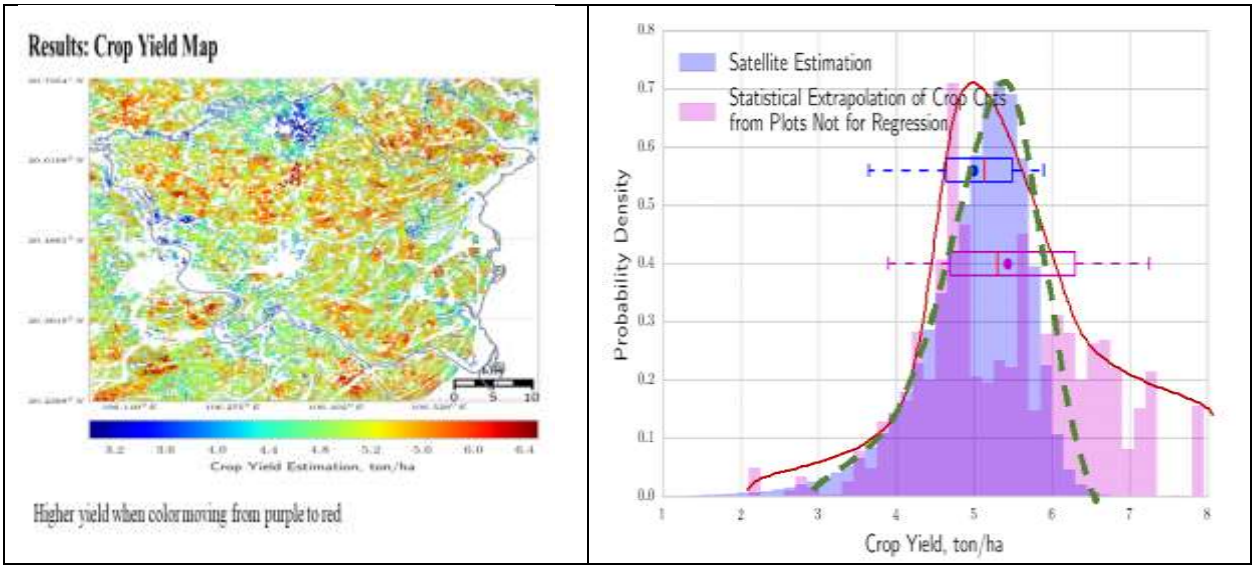


Figure 9. Map of rice yield by color and normal distribution of remote sensing and field measurements, Thai Binh in 2016

5.2. Food Security Organization for Southeast Asia (AFSIS) and Japan Space Center (JAXA)

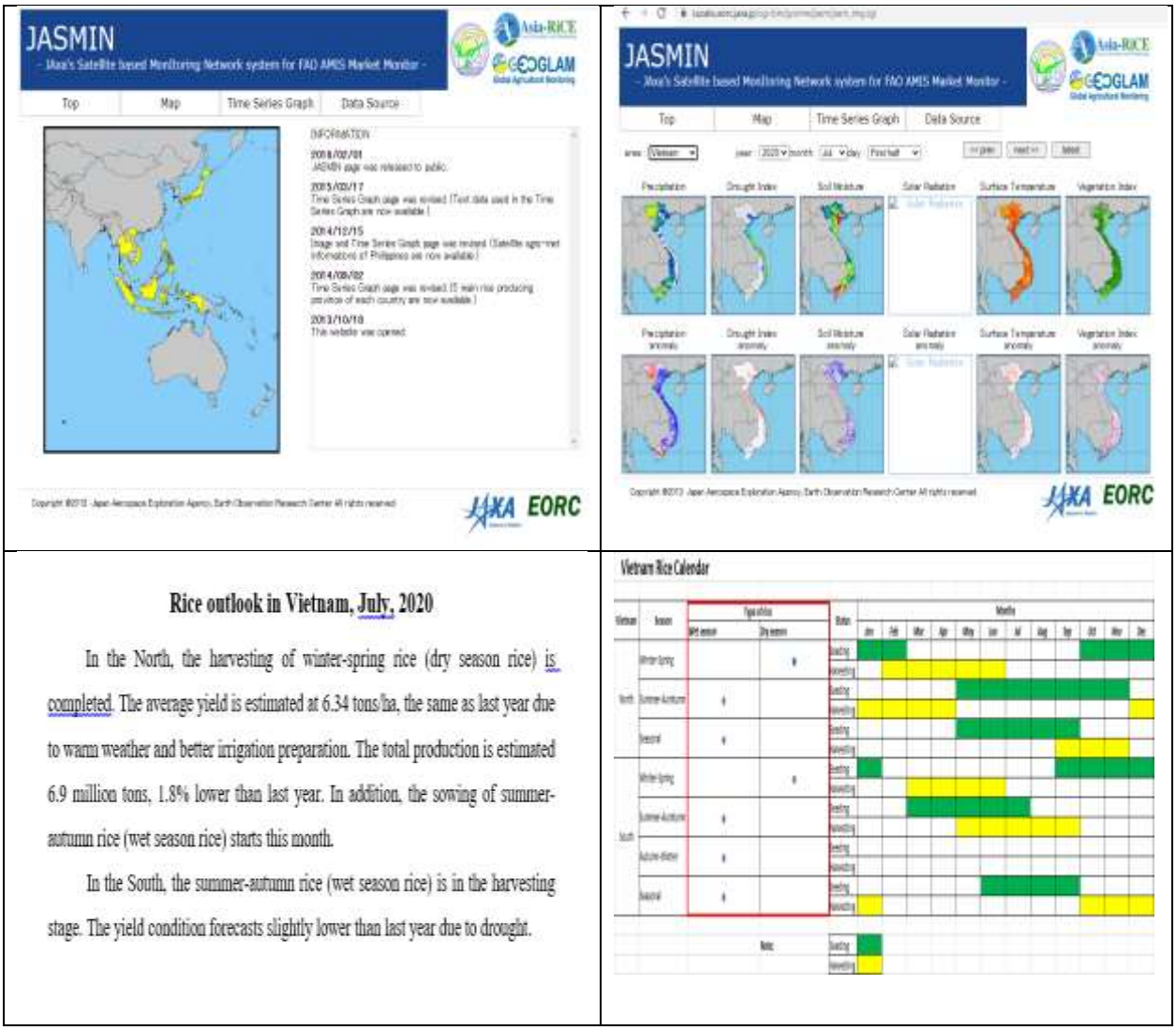
This activity has been carried out monthly from 2013 to present under an expert contract. Administrative statistics are mainly used to write the Rice_Outlook Report. The data and qualitative descriptions in this Report are used to compare and contrast different types of remote sensing data produced by JAXA such as: temperature, humidity, drought, and precipitation (Figure 9) .

In order to write this short report, experts from Japan and Vietnam discussed many contents such as:
- Characteristics of rice statistics in Vietnam: name, season, time between crops.
- Features or Format of Rice Outlook Report.

From the above discussions, the two sides' experts have designed the Form to enter and calculate data to suit the data layout of international organizations (Figure 10).
In some cases, after writing, the Japanese expert may ask some qualitative questions and ask the Vietnamese expert to answer, such as:

- What is the situation of mangroves in the Mekong Delta?
- How is the flood situation in the north and south?

What is the situation of Vietnam's rice export policy during the COVID-19 epidemic?



https://suzaku.eorc.jaxa.jp/cgi-bin/gcomw/jasm/jasm_top.cgi
Figure 10. JASMIN Websites and Data Format and Monthly Report Rice_Outlook

6. Cooperating with the Center for Space Technology Application in Ho Chi Minh City. Ho Chi Minh

Remote sensing data on rice area in the two regions of the Red River Delta and the Mekong River Delta by the Center for Space Technology Application of Ho Chi Minh City. Ho Chi Minh City implemented, within the framework of the state-level research project "Research and application of multi-time, multi-resolution optical and radar remote sensing data to monitor changes in area,

productivity and output." rice in the Red River Delta and the Mekong River Delta. The extracted data from remote sensing images are used to compare with official statistics published by the General Statistics Office and administrative statistics provided by the Center for Informatics and Statistics.

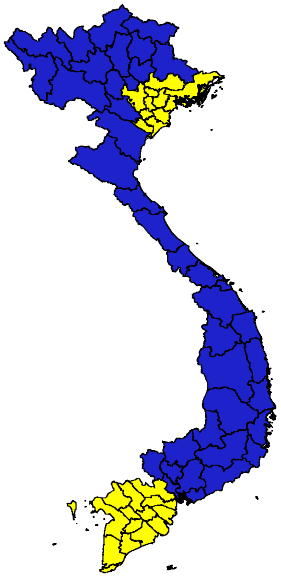


Figure 11. Location of Red River Delta (above) and Mekong River Delta (below)

6.1. Compare administrative statistics with remote sensing numbers

Remote sensing data by the Center for Space Technology Application of Ho Chi Minh City. Ho Chi Minh City provides monthly Informatics and Statistics Center for provinces in the Mekong Delta from September 2018 to present, to compare with administrative statistics sent monthly by Departments of Agriculture. . This comparison is sent to the head of the Planning Department, Department of Crop Production every month from October 2018 to September 2019. From October 2019 to present, this comparison is sent quarterly. The comparison results show that there is a huge difference between the two types of numbers and the number of administrative reports is much higher than that of remote sensing. The difference fluctuates very strongly at the provincial level (Figure 12). The number of remote sensing seems to be closer when compared with climate changes in the Mekong Delta: saltwater intrusion, water shortage, heavy rain, flooding.

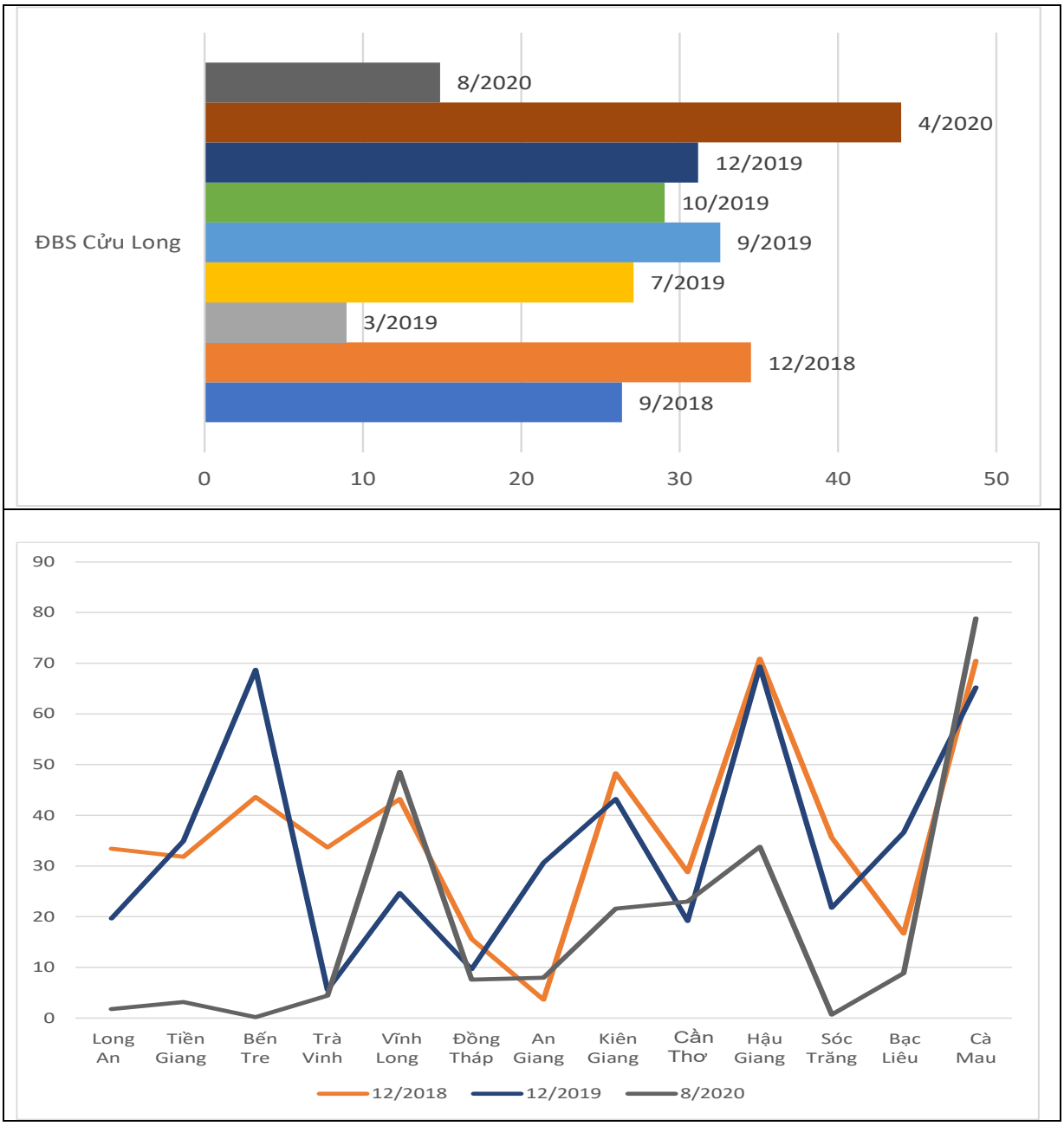


Figure 12. Comparison of administrative numbers with monthly remote sensing numbers in the Mekong Delta provinces

6.2. Compare official statistics with remote sensing numbers

Remote sensing data were used to compare with official provincial statistics published by the General Statistics Office for the 2018 Winter-Spring crop in the Mekong Delta and Red River Delta (Figure 13). The results show that the official production statistics are often much higher than the remote sensing numbers, especially true for provinces in the Mekong Delta. Official

statistics on both production and area are often higher than those for remote sensing in the provinces of the Red River Delta.

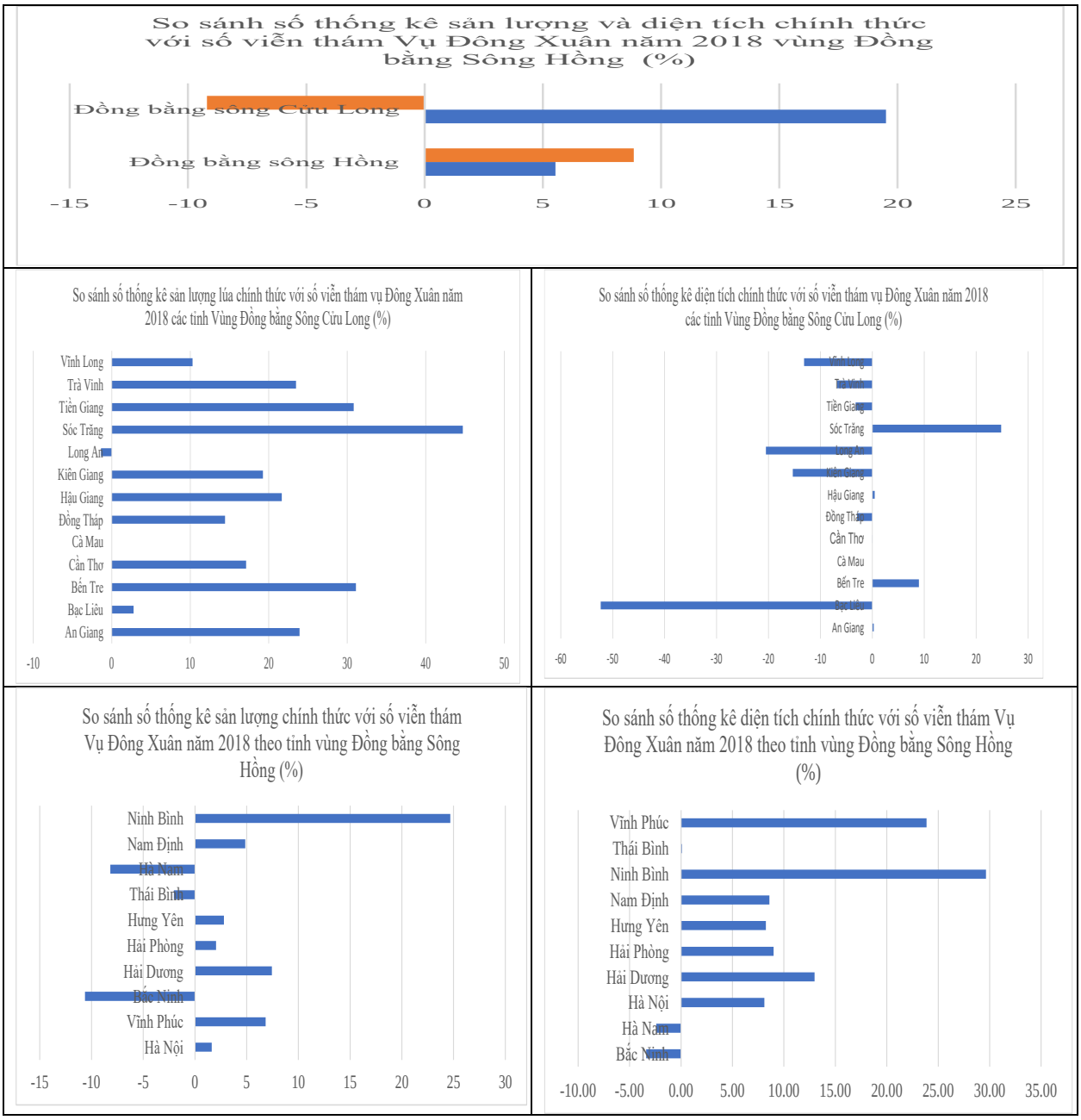


Figure 13. Comparison of official statistics with remote sensing numbers on rice area Winter-spring crop 2018

7. Basic principles of remote sensing image interpretation

7.1. Digitize photos and redraw them based on numbers

Suppose there is a picture of a Mushroom in a 10x10 cm photo frame as shown in the picture below, how to

i. Estimated area of mushroom shape:
   a. The whole mushroom
   b. Dark part
   c. Pale part.
ii. Redraw the image in digitized form:
   a. Black and white image format
   b. Color image format
iii. Calculate the area according to the digitized map:
   a. The whole mushroom
   b. Dark part
   c. Pale part

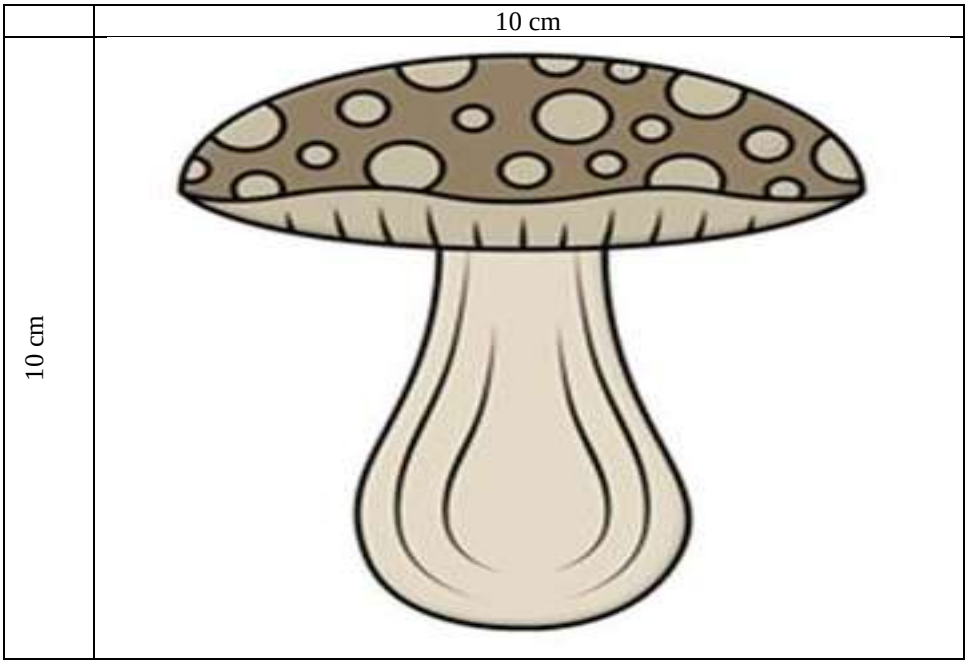


Figure 14. Picture of a 10 x 10 cm. flag-sized mushroom

i) Redraw the mushroom by digitization and estimate the area of the mushroom based on digitization

The picture of a mushroom can be evenly divided into small squares of equal sizes. The more squares, the more similar the digitized image is to the original image. Any square that has a passing image is numbered 1, and no stroke is numbered 0, then we have a digitizing table. From that digitizing table, we color the cells with the number 1 in gray and colorless on the cells with the number 0 (Figure 15 and Figure 16).

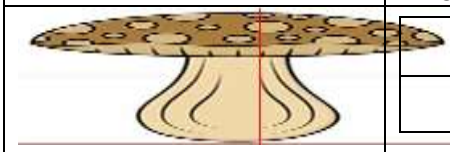
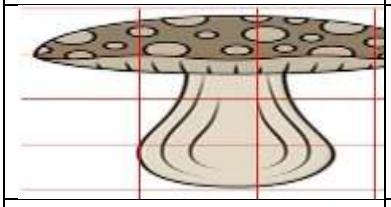
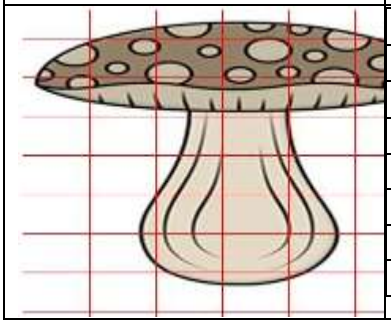
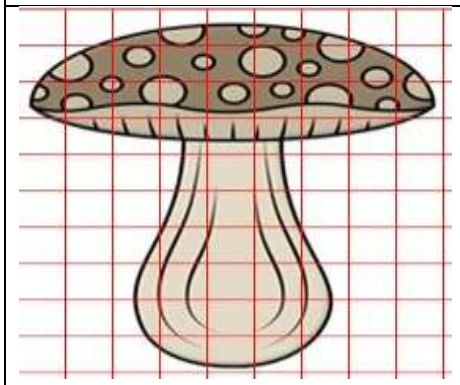
Image subdivision (resolution)	Line Digitizer Table	Digitized photo
2x2 resolution	**Based on visual observation, assign a value of 1 to cells containing mushrooms**	**Area of mushroom = (10/2) x (10/2) x 4 = 100 cm^2**
	1 1 1 1	1 1 1 1
4x4 resolution		**Area of mushroom = (10/4)x(10/4) x 12= 75 cm^2**
	1 1 1 1 1 1 1 1 0 1 1 0 0 1 1 0	1 1 1 1 1 1 0 1 1 0 1 1
7x7 resolution		**Area of mushroom = (10/7)x(10/7) x 32= 65.3 cm^2**
	0 0 1 1 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1 0 0 0 0 0 1 1 1 0 0 0 1 1 1 1 0 0 0 1 1 1 1 0 0 0 0 1 1 0 0 0	0 0 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1 0 0 0 0 1 1 1 0 0 1 1 1 1 0 0 1 1 1 1 0 0 0 1 1 0 0

Figure 15. How to digitize and draw digitized images

9x9 resolution

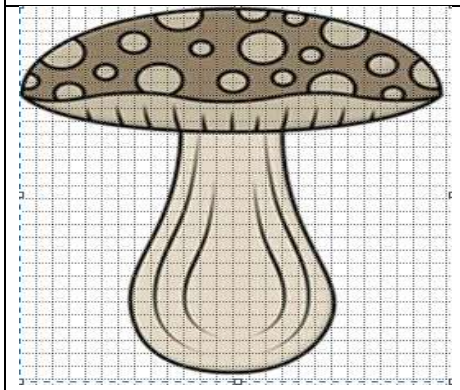


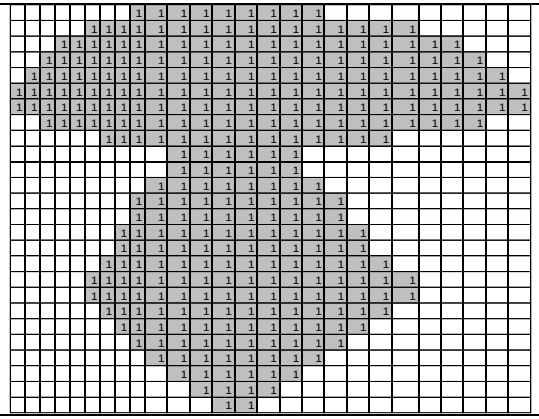
0	0	1	1	1	1	1	0	0
0	1	1	1	1	1	1	1	0
1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	0
0	0	0	1	1	1	0	0	0
0	0	0	1	1	1	0	0	0
0	0	1	1	1	1	1	0	0
0	0	1	1	1	1	1	0	0
0	0	1	1	1	1	1	0	0
0	0	0	1	1	1	0	0	0

Area of mushroom = (10/9)x(10/9) x 52= 64.2 cm^2

0	0	1	1	1	1	1	0	0
0	1	1	1	1	1	1	1	0
1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	0
0	0	0	1	1	1	0	0	0
0	0	0	1	1	1	0	0	0
0	0	1	1	1	1	1	0	0
0	0	1	1	1	1	1	0	0
0	0	1	1	1	1	1	0	0
0	0	0	1	1	1	0	0	0

26x26 resolution





Area of mushroom = (10/26)x(10/26) x 345= 51 cm^2

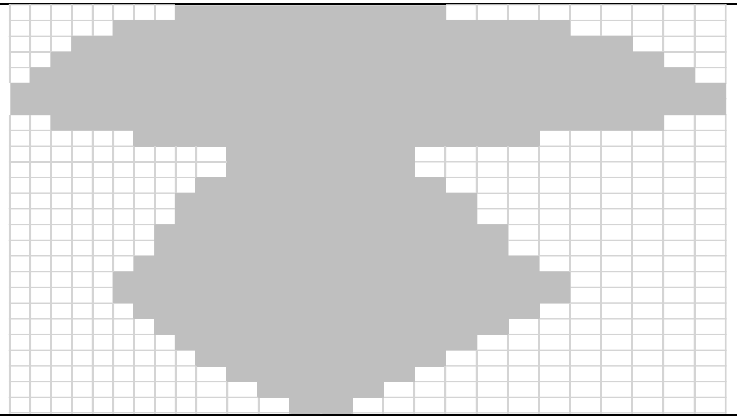


Figure 16. How to digitize and draw digitized images

At a resolution of 2 x 2 (ie divided into 4 squares), any cell with a sharp image is numbered 1, the resulting digitized image is gray in all 4 cells. Then the area of the mushroom is 100 cm^2. Thus, the digitized image is a square. When the resolution is increased, to 8 squares, 49 squares, 81 squares, and 676 squares, the digitized image becomes more and more similar to the original photo. Then the estimated area of the mushroom is 51 cm^2.

Depending on the level of technology and skill, how detailed can one make a digitized image and the area of the mushroom is closer to the true value. In fact, no one knows what the correct area value of the mushroom is, but it is known how to give a more approximate result.

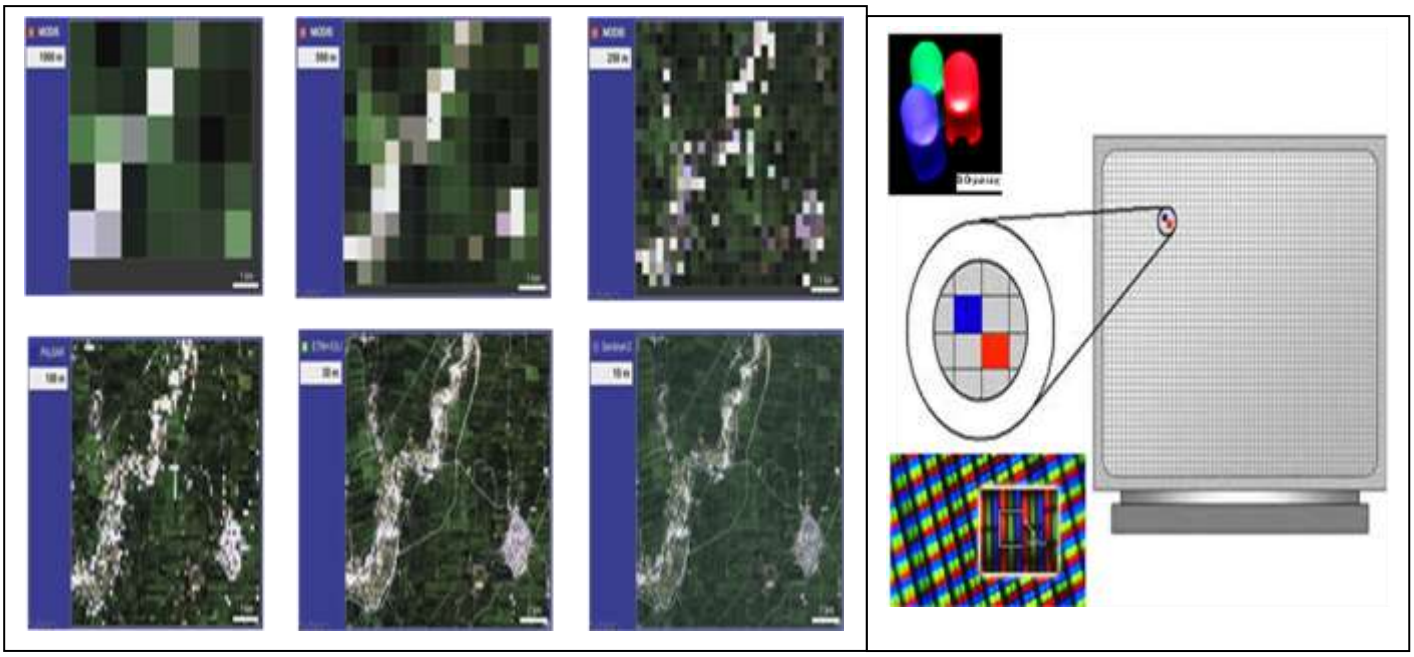


Figure 17. The higher the resolution, the sharper the displayed image

The smallest area of a digital image is often referred to as a pixel or picture element. Depending on the level of technology, the size of the pixel is how small or how big. Currently, each pixel on an LED TV screen is about 9/1000 cm 2 in size.

In each pixel, there are 3 LED points corresponding to 3 basic colors. Mixing these 3 colors will create all all the colors we see every day (16.8 million colors).

ii) Redraw the mushroom by digitization and estimate the area of the mushroom based on digitization

Suppose with the current level, people can make a picture with a resolution of 9 x 9, corresponding to 81 squares. The question is how to know the area of the dark colored part of the mushroom and the lighter part of the mushroom. The steps to calculate the area for 2 types of colors are presented in the table below. Then, the area of the dark part is 25.9 cm 2 (Figure 18). The area of the light colored part is 64.2 cm 2 . Based on this principle, one can apply to calculate the rice area according to age, ie according to the color of light reflection.

Calculate area for dress and light colors

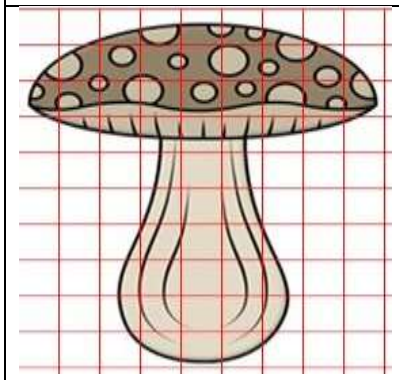
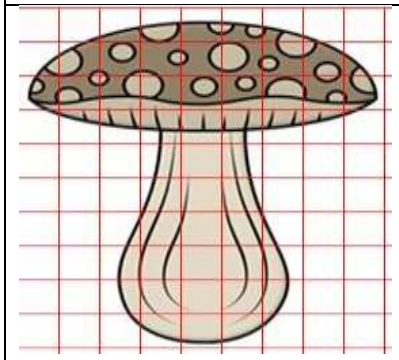
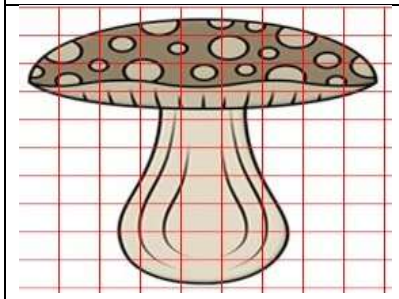
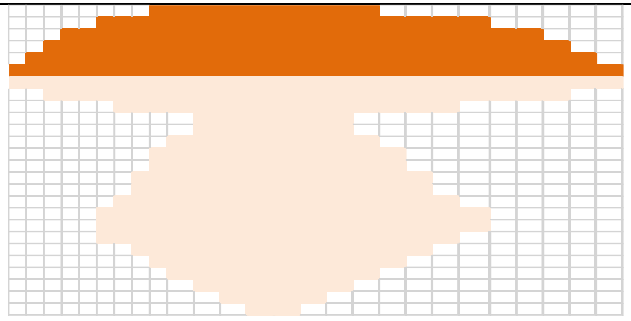
Resolution of the photo 9x9	Color digitizing table	Calculate area based on digitized map
	Based on visual observation, assign the value 1 to cells with bold color, 0 to the remaining cells	**Bold area = (10/9)x(10/9) x 21= 25.9 cm^2**
	0 0 1 1 1 1 1 0 0 0 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 1 1 1 1 1 0 0 0 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Based on visual observation to assign the value 1 to the cells with light color, 0 is the remaining cells	**Pale area = (10/9)x(10/9) x 31= 38.3 cm^2**
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 1 1 1 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 0 1 1 1 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 1 1 1 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 0 1 1 1 0 0 0
		Area of mushrooms = 25.9+38.3 = 64.2 cm^2
		0 0 1 1 1 1 1 0 0 0 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 0 0 0 0 1 1 1 0 0 0 0 0 0 1 1 1 0 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 1 1 1 1 1 0 0 0 0 0 1 1 1 0 0 0

Figure 18. How to digitize and draw digitized images for dark and light colors

7.2. Calculate distance based on different shooting angles

Suppose there is a satellite 200 km above the earth's surface. The satellite has a camera attached and takes pictures of the earth's surface at 3 angles AFB, BFC, CFE. Each shooting angle is 30 ^{o}. The same angle, but each angle will produce a different image, for example, the distance between two points on the earth's surface. Let's calculate the distance AB, BC and CE respectively with 3 shooting angles AFB, BFC, CFD.

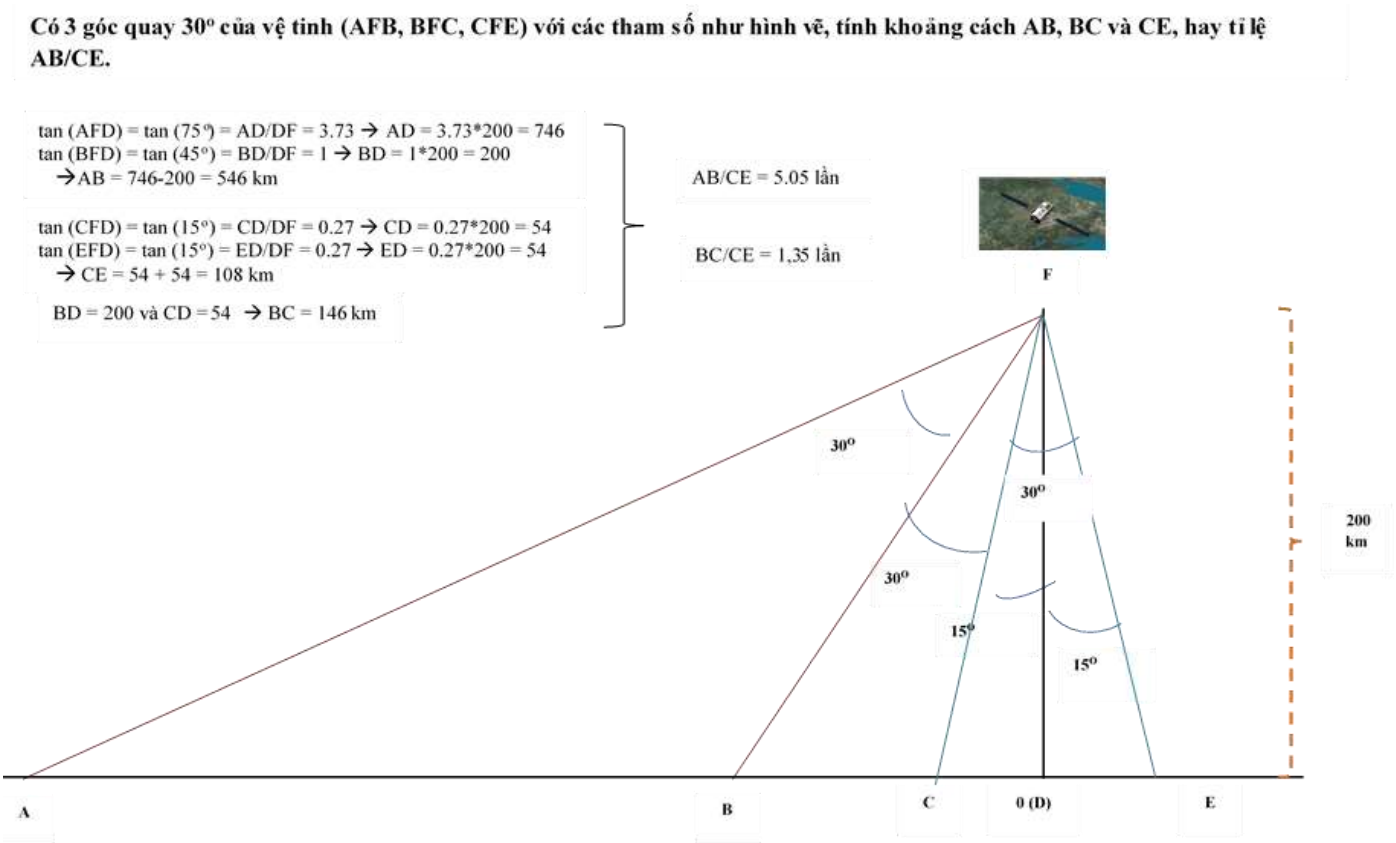


Figure 19. How to calculate distance or length from photos with different angles

7.3. Practice measuring area through online remote sensing images

7.3.1. Sources of remote sensing images

Currently, there are 2 main sources of supply from 2 websites:

- https://scihub.copernicus.eu/dhus/#/home
- https://explorer.earthengine.google.com/#workspace

7.3.2. Source of Copernicus

To get to this page, you need to copy and paste the address (https://scihub.copernicus.eu/dhus/#/home) into the toolbar, then the computer screen will display as below.

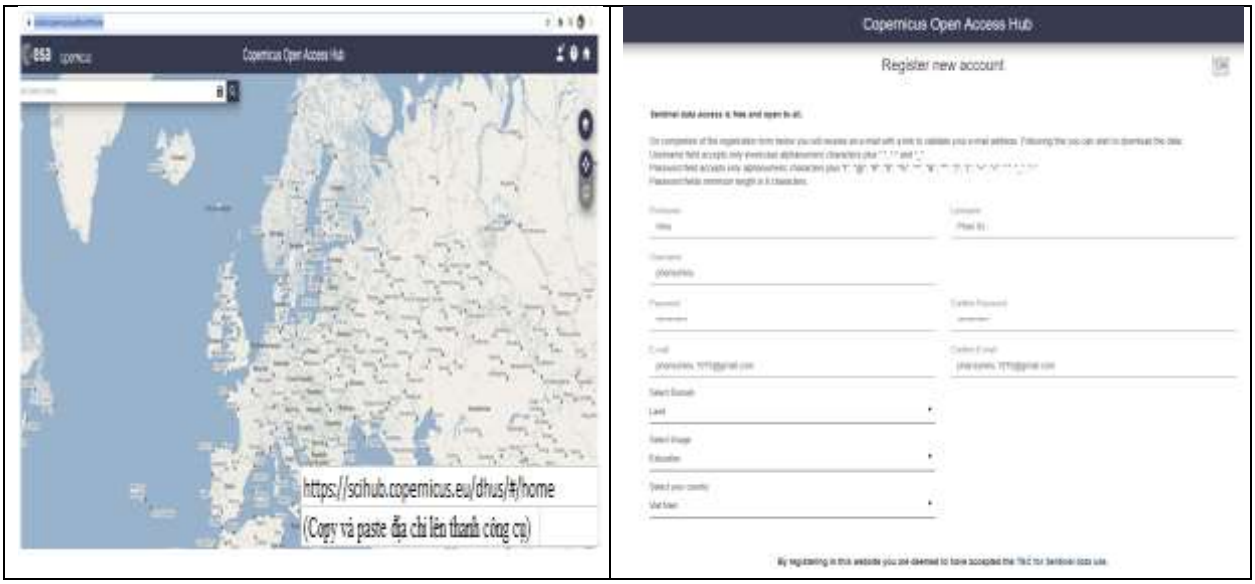


Figure 20. Account in Copernicus website

Go to the Sign up section to register a new username and password. In this case it is:

- Username: phansyhieu
- Pass: hieu12345678

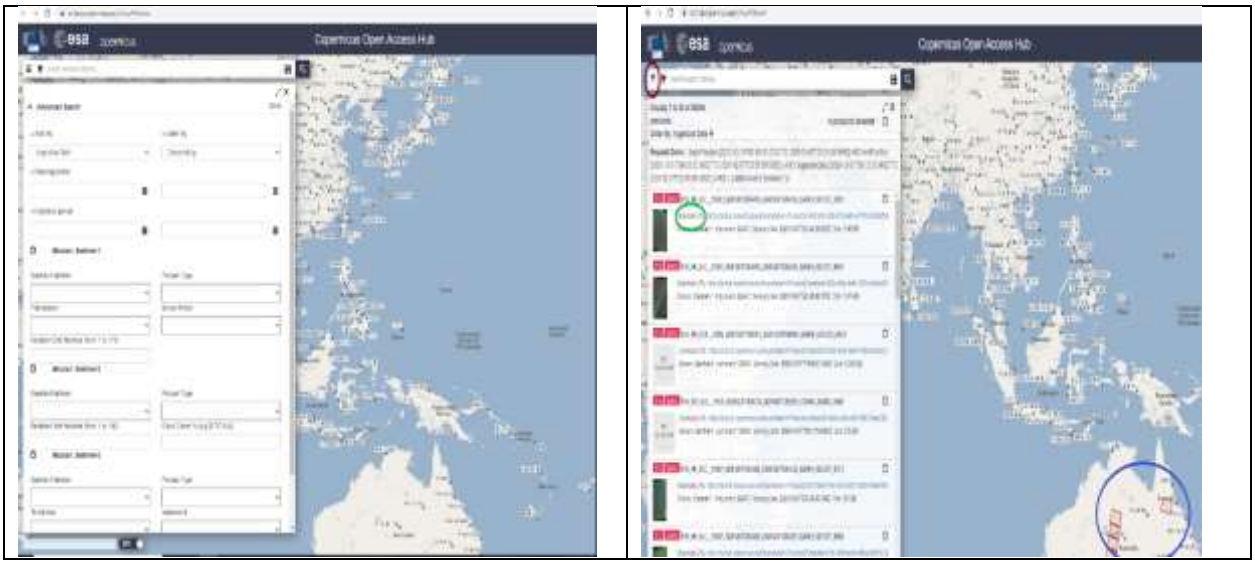


Figure 21. How to select images in Copernicus website

Do as shown in the image above, select the images they need, then download. If there are too many days and images, and the download time is very long, it can simply take 30 minutes, 1 hour, 2 hours, and can be much longer if the computer is not good enough.

When downloading to your computer, folders and files are in ZIP format, need to unzip, folders and files organization is relatively complicated. Bonus images or satellite images are placed in folders with the word “IMG DATA”. When opening this folder on a personal computer with the form below,

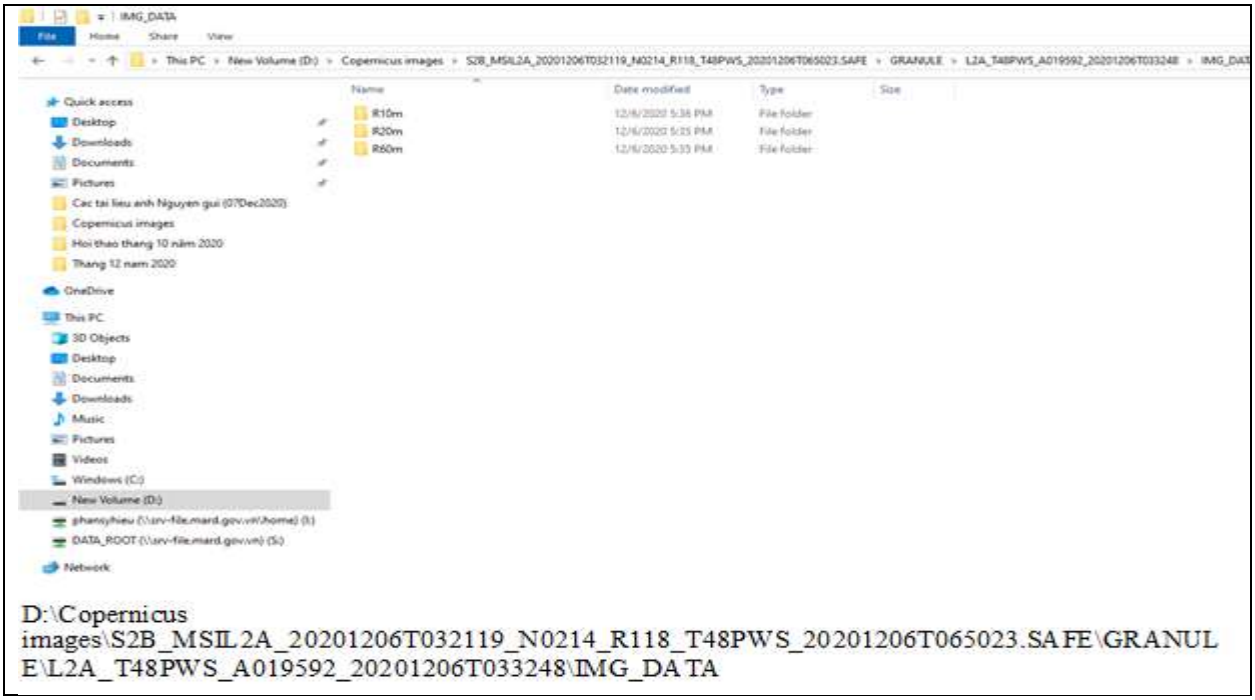


Figure 22. Store images in personal computer

7.3.3. Source of Google Earth Engine

Need to register a gmail account, declare username and password, then you can access the website (https://explorer.earthengine.google.com/#workspace) as below. Manipulating the image below will display the maps you choose. Depending on what type of photo I choose to suit the purpose of use. These images cannot be downloaded to a personal computer.

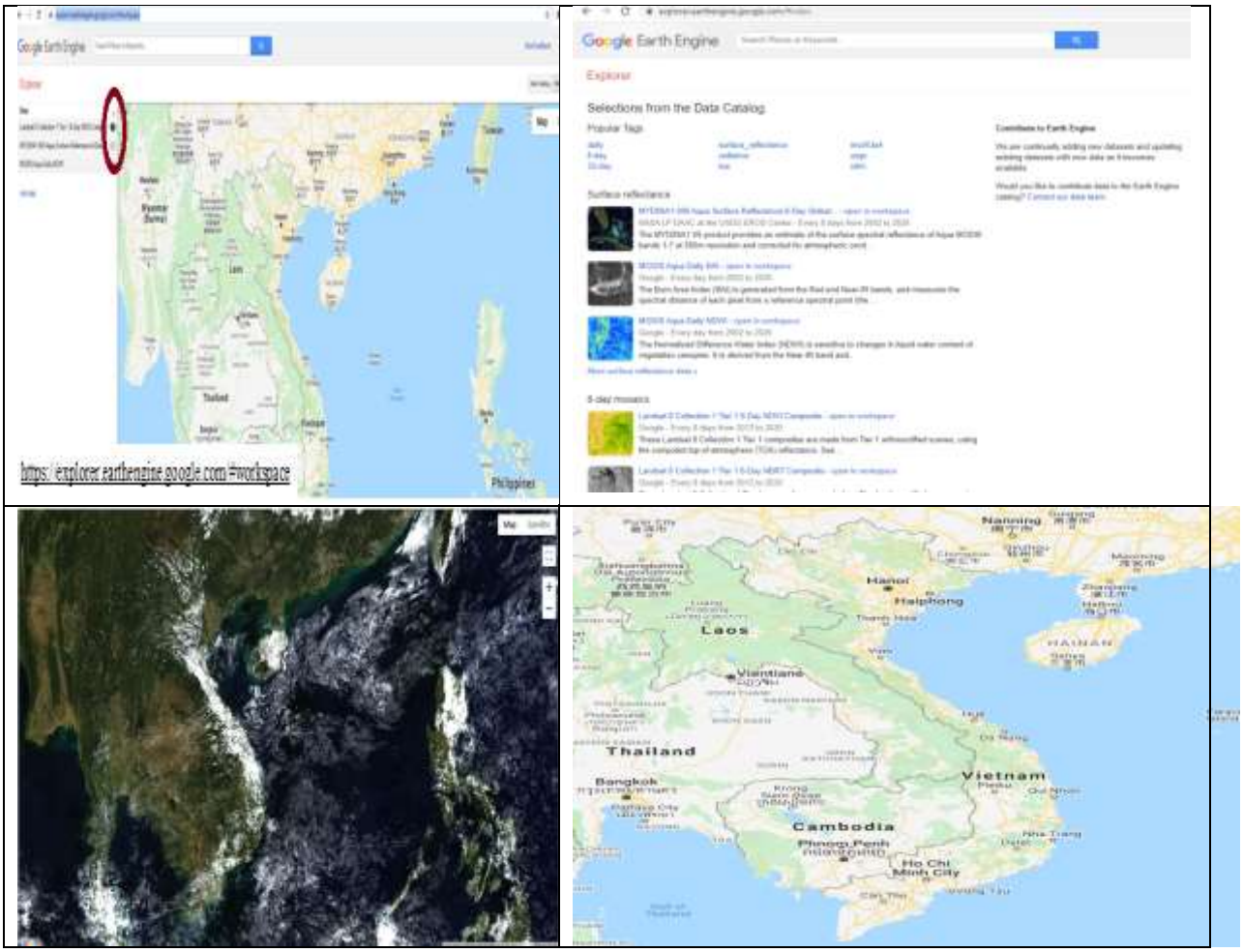


Figure 23. How to select images from Google Earth engine.

7.4. Remote sensing image analysis

7.4.1. Software SNAP

This software is used to process remote sensing images such as noise filtering, coupling satellite images together, layering satellite images... so that in the end the user has an image that best suits their needs. There are many different ways of displaying, many different calculation operations to map out the objects that the user needs to track, for example, the map for rice, other images are not included in the final photo. These final images can be converted to shp., NPG, JPEC files….

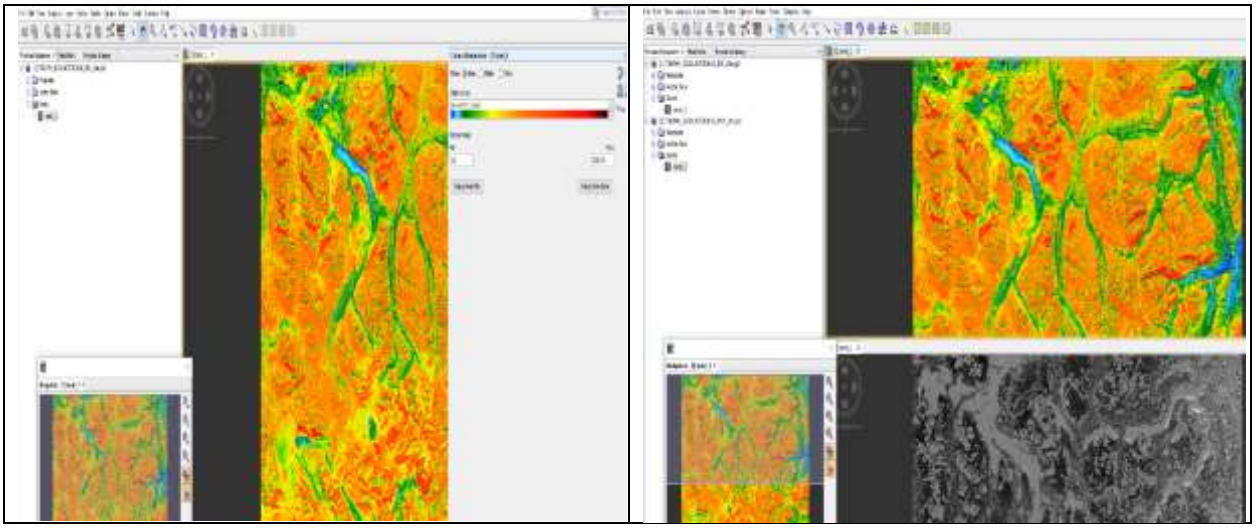


Figure 24. Analysis images by Software SNAP .

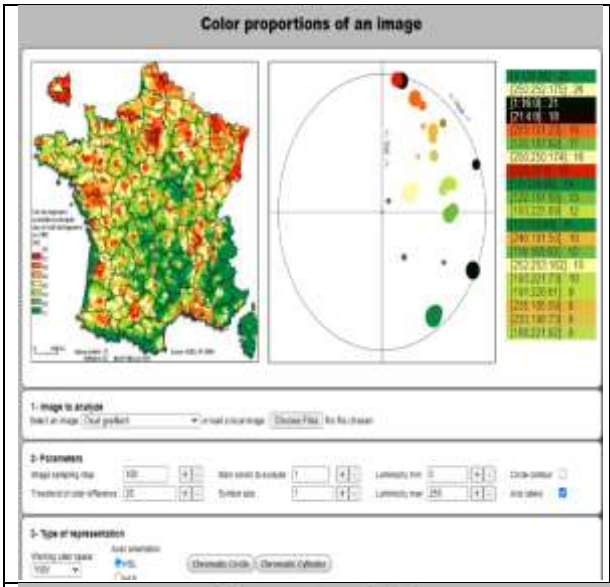
7.4.2. Measure area by color with GEOTEST and Image Measurement software

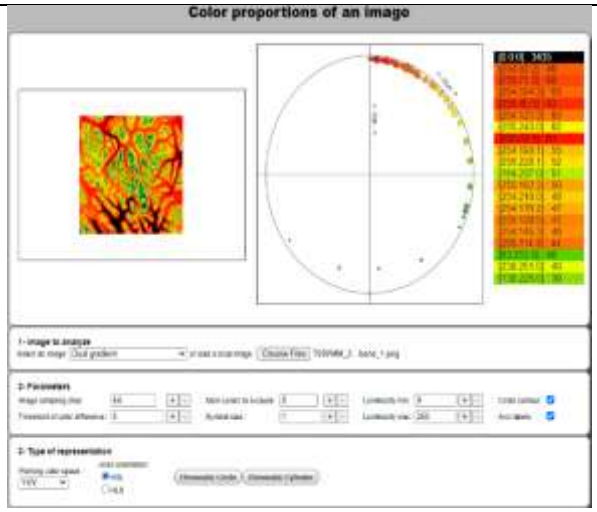
GEOTEST is an online software, https://www.geotests.net/couleurs/frequences_en.html#ce, that has different operations to assign colors to different types of objects. Image Measurement is software that installs on a laptop or desktop computer. This software helps to determine the area for each pixel or a group of pixels. The results will be displayed as shown in the images below.

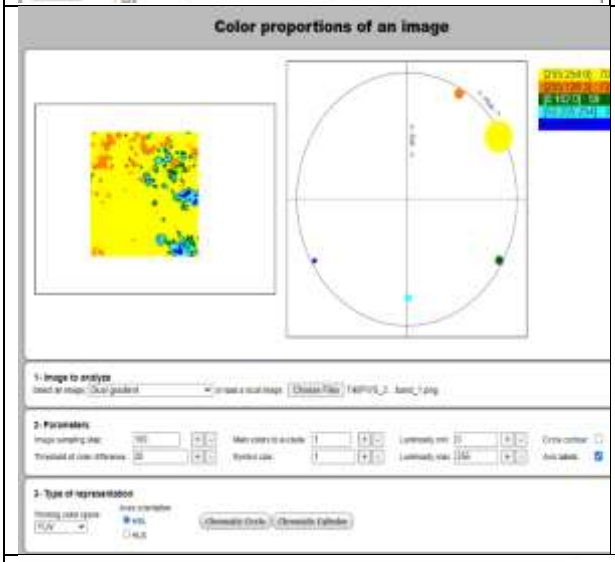
The reasons for choosing these two software for quick training for agro-forestry statisticians at all levels include:

- Most statisticians at all levels lack basic knowledge such as: o Informatics (binary system, digitization)
    - Math (spatial geometry, statistics, probability, sampling)
    - Physics (types of waves)
    - Remote sensing (satellite, type of image...)
- Statisticians at all levels lack a lot of basic investment that can be used for complex jobs such as:
    - Good computer (lots of memory, fast processing speed, sharp screen)
    - Good internet connection (fast speed, large amount of information transmitted)
- Conditions of Vietnam in general are also very difficult:
    - No private satellite yet o Can't launch satellite by itself
    - No own photography technology yet
    - No specialized photos for Vietnam yet
    - There is no separate image processing software

Therefore, using SNAP software is relatively complicated, the time to download and use images is very long, the computer may hang, and the statistician can get frustrated very quickly during the training and working process. The images used today are images provided free of charge by various organizations. Because they are free images, it takes a lot of time to process them to include the right kind of photos that we really need.







Mầu	Số điểm	%	Diện tích M^2
Vàng: 700	700	79.3	31710.1
Cam: 72	72	8.2	3261.6
Xanh đậm	59	6.7	2672.7
Xanh nhạt	38	4.3	1721.4
Xanh thẫm	14	1.6	634.2
Tổng	883	100	40000
Diện tích ảnh:		40000	

	Tên	Số điểm	Diện tích ước tính (000 ha)
[186:220:136] : 13	Rừng giầu	13	2,239.27
[253:252:192] : 13	Rừng trồng	13	2,239.27
[241:246:190] : 13	Rừng trồng	13	2,239.27
[249:249:249] : 12	Đất khác	12	2,067.02
[251:249:250] : 12	Đất khác	12	2,067.02
[187:217:131] : 11	Rừng khá	11	1,894.76
[245:247:198] : 10	Rừng trồng	10	1,722.51
[244:248:245] : 10	Đất khác	10	1,722.51
[246:246:206] : 9	Đất khác	9	1,550.26
[244:252:201] : 9	Đất khác	9	1,550.26
[253:253:253] : 8	Đất khác	8	1,378.01
[197:218:151] : 8	Rừng khá	8	1,378.01
[189:210:163] : 8	Rừng khá	8	1,378.01
[228:238:176] : 8	Rừng vừa khai t	8	1,378.01
[210:216:168] : 8	Rừng vừa khai t	8	1,378.01
[253:253:253] : 8	Đất khác	8	1,378.01
[253:252:210] : 8	Rừng vừa khai t	8	1,378.01
[253:253:249] : 8	Đất khác	8	1,378.01
[253:253:253] : 8	Đất khác	8	1,378.01
[206:223:165] : 7	Rừng khá	7	1,205.76
Tổng điểm		191	32,900.00
Tổng diện tích Việt Nam (km2)		329000	

Tên loại đất	Diện tích ước tính (000 ha)
Rừng giầu	2239.27
Rừng khá	5856.54
Rừng trồng	6201.05
Rừng vừa khai thác	4134.03
Tổng đất có rừng	14296.86
Tổng đất khác	14469.11
Tổng diện tích Việt Nam	32900.00

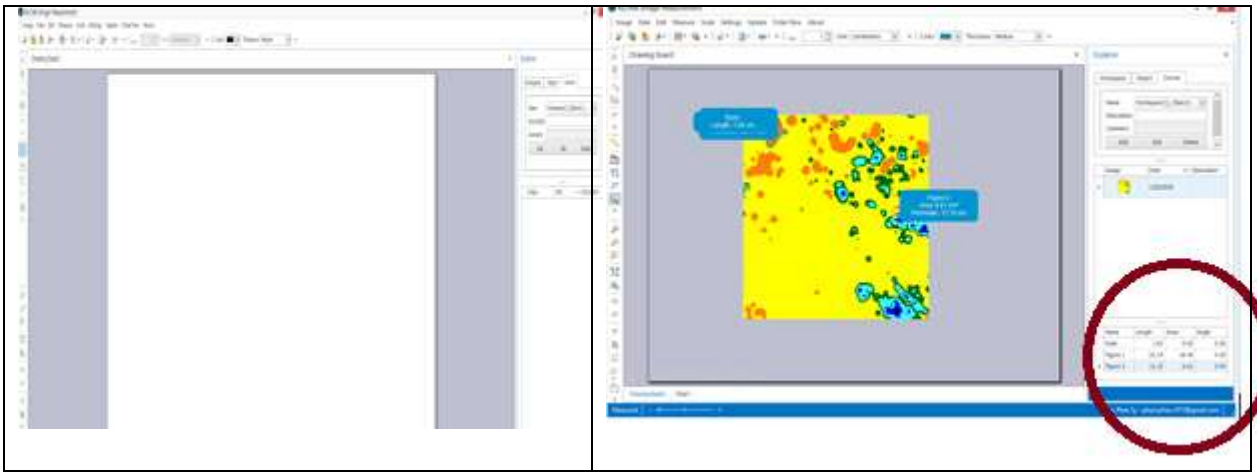


Figure 25. Analysis images by Software GEOTES

8. Difficulties in understanding and using agricultural statistics

The current official statistics, administrative statistics and survey programs of Vietnam on agriculture have many weaknesses, making it difficult for readers and those wishing to use such data. . Some notable weaknesses are:

- Difficult to understand the content of the data due to unclear concepts, difficult to measure, mostly "divisors".
- It is difficult to distinguish between different survey programs because the questions in the questionnaires are very similar.
- There are many confusing phrases, difficult to distinguish the difference such as:

    - Statistical indicators
    - Statistics
    - Statistical indicator group
    - Statistical Index
    - Statistical Division
    - Statistical sets of indicators
    - Statistical databases
    - Statistical data
    - Statistical Information
    - National, provincial, and sectoral statistical indicators
    - General survey, sample survey, thematic survey, specialized survey.

- There are so many published numeric types that it is difficult to tell the actual difference between numbers such as:

    - Raw number
    - Number of divisors
    - Primary number
    - Secondary number
    - Composite number
    - Adjustment number
    - Processed number
    - Official number

  - Administrative number
  - Report number
  - Number of achievements

- The functions and duties of the units will be specified from year to year and are easy to change:

  - The focal point
  - Investigation unit
  - Investigation unit
  - Supervision inspection unit
  - Data processing unit
  - Data entry unit
  - Statistical report writing unit
  - The unit that publishes the data

- The statistics are stored in many forms, formats, software, personal computers, work servers, so it is difficult to integrate them together.
- It is difficult to detect or recalculate formulaic relationships between numerical types, for example between secondary and raw data.
- The frequency of data is very thick, so lower level organizations cannot provide it to higher state organizations, leading to statistical staff at different levels being forced to "estimate".
- Data from international organizations and non-governmental organizations including sustainable development goals are kept privately and separately. Therefore, it is difficult to know where it comes from and how to use it.
- As a quick assessment by qualitative observation, data with the same or near-identical names may have an overlap of more than 30%.
- The type statistics used are so flexible between the types of publications that it is difficult to tell where the numbers in each publication come from and the differences between the types of publications:

  - Market Newsletter
  - Newsletter market price
  - Trade newsletter
  - Trade promotion newsletter
  - Newsletter of market production
  - Policy bulletin
  - Research report
  - Statistic
  - Forecast report
  - Synthesis report
  - Specialized reports
  - Thematic reports

9. Activities to improve the agricultural statistical system

In fact, the agricultural statistical system has begun to receive attention for improvement since 2005. Therefore, the Government of Vietnam has allowed Ministries and sectors to develop their own statistical systems, relatively independent of General Statistics Office since 2006. The

Ministry of Agriculture and Rural Development has also carried out many different activities, providing capital to varying degrees from 2006 to present to build its own agricultural statistics system and are relatively independent, specific activities can be listed as follows:

- In 2006, the Center for Informatics and Statistics was established.
- From 2006 to 2009, a database of prices of all kinds from the commune to the provincial level was built and operated until now.
- In 2010, promulgating the Ministry-level administrative statistical indicators set.
- In 2011, providing funding to build software to send administrative data online from Departments of Agriculture to the Center for Informatics and Statistics.
- From 2012 to 2015, provide funding to train statistics professional and how to use online software for officials from district level to central level nationwide.
- In 2014, a website for statistics on imports, exports, and prices of agricultural products was set up.
- In 2019 and 2020, updated the website, cleaned up the metrics, and integrated other good metrics into it, as shown in Figure 18. This is currently the most commonly used metric at the ministry. Agriculture and Rural Development.
- Since 2017, the Center for Informatics and Statistics has also developed a method to combine remote sensing and survey numbers to run the model and write policy reports (Figure 19). and practice on hypothetical data, there is no funding to deploy in practice. This activity may be more difficult because the Center for Informatics and Statistics has decided to gradually transition to a fully autonomous unit from July 1, 2020.
- Since 2018, when starting cooperation with the Center for Space Technology Application of Ho Chi Minh City, In Ho Chi Minh City, the Center for Informatics and Statistics began to try to convey information about the application of remote sensing technology for agricultural statistics, first for rice, and then for non-statistical statistics. space" that is difficult for humans to do with manual equipment such as forest area, industrial tree area. However, the specific effect in the country has not been achieved yet. Remote sensing activities are of little benefit to international organizations.
- From 2019, the Center for Informatics and Statistics also became aware of the need to work with a number of NGOs to collect the data and reports that these organizations make while the Ministry of Agriculture and Rural Development has not implemented, however, the specific results are still unclear.

For various reasons, Vietnam's agricultural statistical system has remained very little changed over the past 15 years. The statistics of the Ministry of Agriculture are not yet independent relative to the agricultural statistics of the General Statistics Office. Most agricultural statistics published by the Ministry of Agriculture and Rural Development are actually numbers published by the General Statistics Office.

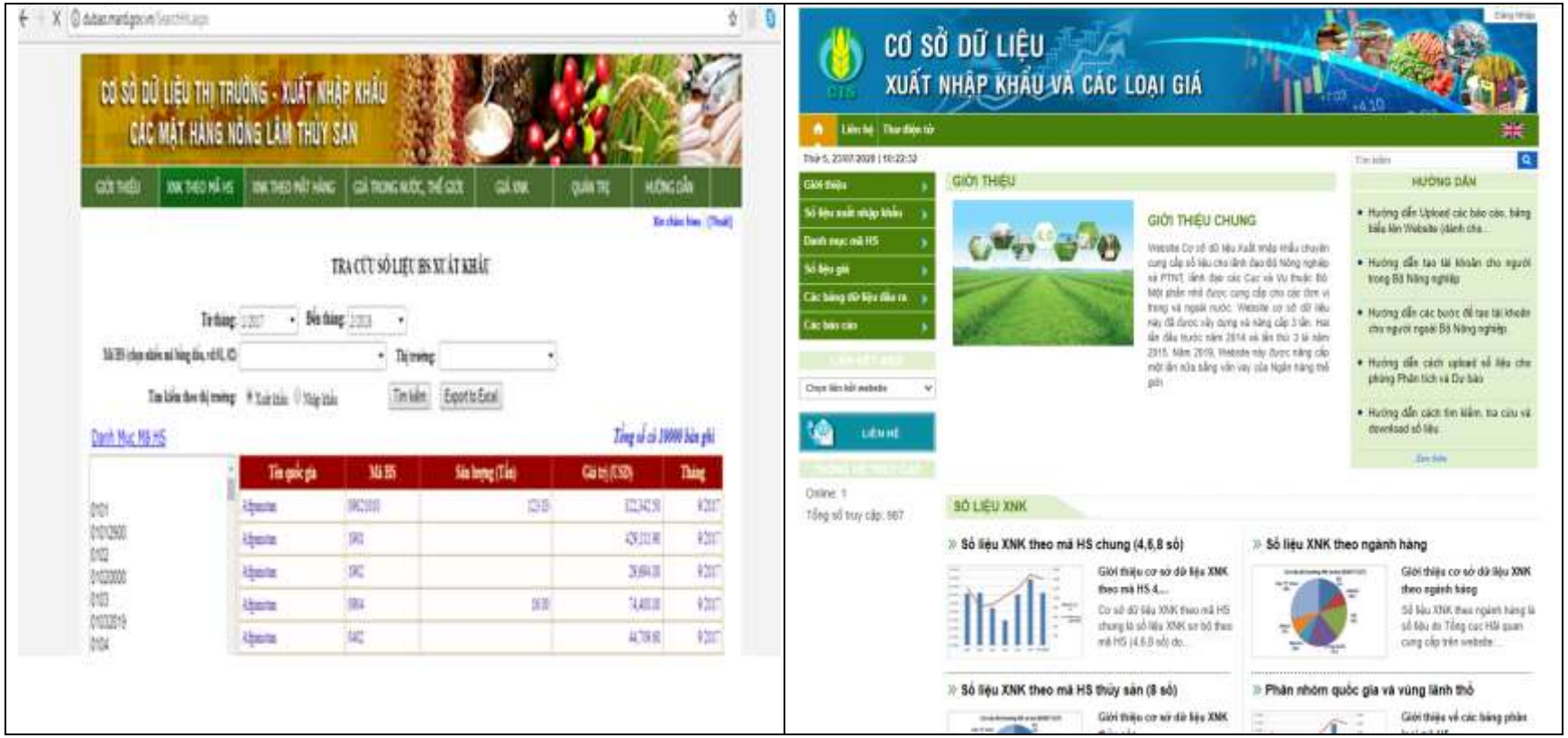


Figure 26. Integrating several reliable databases into 1 website (https://vnagro.mard.gov.vn/Pages/Trang-chu.aspx)

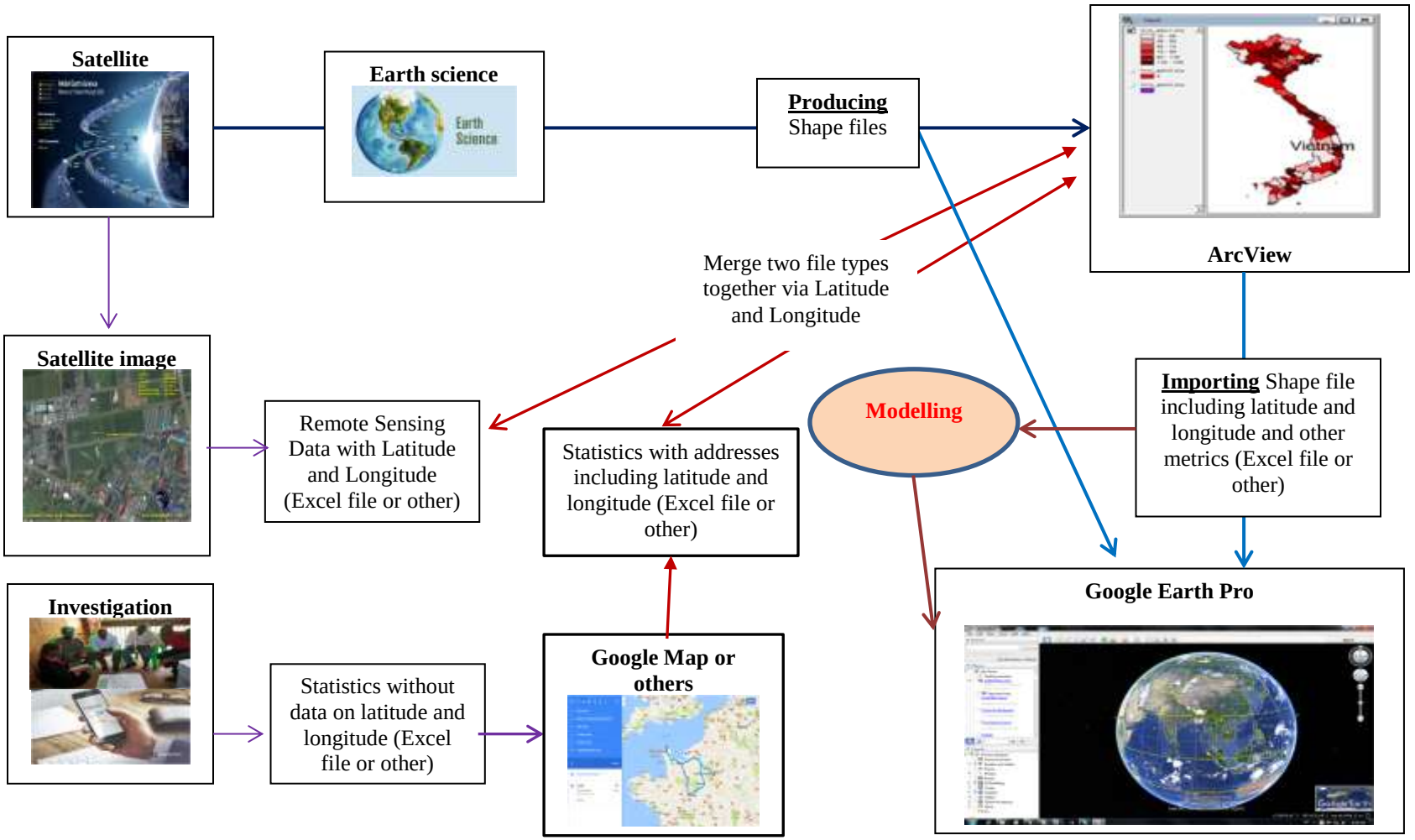


Figure 27. Connecting survey data, remote sensing data to run the model and write the Report

Note:

- Free remote sensing stock at website: https://scihub.copernicus.eu/
- Image interpretation software:
  - ESA Sentinel-1
  - QGIS

10. Conclusion

System statistics Vietnam's agricultural sector is very complex, there are 11 different types of numbers, and up to 3-4 participation level agency published official data. In all kinds of them, the Convention is the most common type. And the same kind of numbers but there may be more bodies announced "unofficial" and used for many different purposes. The system was designed by the state management unit with a lot of indicators (300 indicators), the frequency of the short collection, processing and synthesis in a very short time. Thus, with time, this metric system grew rapidly. The statistics are collected and stored by a variety of methods and formats. Not to mention the statistical indicators also a lot of overlap between the data source name. Therefore, activity reports, test, process, summarize and analyze the data very difficult, in many cases can not be forced to "wish" to catch up and match " Practice". Agricultural statistical system Vietnam has very little change over the past 15 years. The statistics of the Ministry of Agriculture has not yet independently relative to the agricultural statistics of the General Statistics Office. Most agricultural statistics published by the Ministry of Agriculture and Rural Development is actually a number announced by the General Statistics Office.

The state statistical system has been and is in the process of being improved. However, currently only agricultural import and export data is relatively well stored, processed and aggregated and used regularly by agencies inside and outside the Ministry of Agriculture and Rural Development. All other metrics are in the process of being improved. Remote sensing data on rice area in the provinces of the Mekong Delta by the Center for Space Technology Application of Ho Chi Minh City. Ho Chi Minh City has been sent to the leadership of the Ministry since September 2018. Some leaders of the Ministry of Agriculture and Rural Development have realized the big difference but have not taken any specific action on the application in the near future. .

Administrative statistics on rice production are currently used in cooperation with the Food Security Organization of Southeast Asia on a monthly basis, mainly for comparison and comparison with other types of data obtained from satellites. of JAXA, Japan from 2014 to present. These comparisons are also sent monthly to the leadership of the Ministry of Agriculture and Rural Development but have not received any response so far. The reason may be that the letter is written in English, accompanied by the monthly provision of username and password, which is difficult to track if not interested.

JAXA also collaborated with the Ministry of Agriculture and Rural Development, with the support of the Asian Development Bank, to produce remote sensing data on rice production and yield in the sample province of Thai Binh from 2015-2019. The results have also been announced at many national and international conferences. International organizations are very concerned because they can do it for commercial purposes.

In general, remote sensing data on production and yield for rice is more accurate than other types of statistics currently available, such as official and administrative data. Therefore, there are many activities to promote the widespread application of remote sensing technology for agricultural statistics in Vietnam.

11. Appendix

11.1. The Ministry of Statistics of Indicators for the New Rural Program

1. Make a plan and execute the plan
2. Traffic
3. Irrigation
4. Electricity
5. School
6. Cultural facilities
7. Rural market
8. post office
9. Residential area
10. Income
11. Poor households
12. Labor structure
13. Organizational form of production
14. Education
15. Health
16. Cultural
17. Environment
18. Strong socio-political organization system
19. Social Security and order

11.2. Statistical data set for the agricultural restructuring program

1. Growth rate of added value of agriculture, forestry and fishery
2. Income growth per hectare of arable land
3. Growth rate of income from livestock
4. Growth rate of income from seafood production
5. Income growth rate per hectare of productive land
6. Income growth per hectare of salt-producing land
7. Growth rate of income from processing agricultural, forestry and fishery products
8. Growth rate of labor productivity in agriculture, forestry and fishery
9. Value ratio of agricultural, forestry and fishery products produced in the form of cooperation and association
10. Value share of agricultural, forestry and fishery products produced under good manufacturing process (GAP) or equivalent
11. Percentage of agricultural area irrigated to save water
12. Percentage of sustainably managed production forests
13. Percentage of farmers with training in agriculture
14. Proportion of trained women in agriculture
15. Percentage of livestock facilities in the area that treat waste with biogas or technological solutions for efficient and clean treatment and use

11.3. Group name of administrative statistical indicators

1. Some general indicators (5 indicators)
2. Agricultural land (5 indicators)

3. Agriculture (25 indicators)
4. Forestry (15 indicators)
5. Fishery (3 indicators)
6. Salt industry (3 indicators)
7. Plant protection (8 indicators)
8. Veterinary Medicine (14 indicators)
9. Irrigation (8 indicators)
10. Item management & flood prevention (4 stats)
11. Mechanization, processing of agricultural and forestry products and rural industry (7 indicators)
12. Agro-forestry quality management (6 indicators)
13. Project and construction management (5 indicators)
14. Import and Export (4 items)
15. Rural development (18 indicators)
16. Education - training (7 indicators)
17. International cooperation (3 indicators)
18. Science and Technology (8 indicators)
19. Production cost - price - market (6 indicators)
20. Agricultural extension (4 indicators)

11.4. The purpose name of the statistical indicators of the Sustainable Development Goals

21. Objective 1: End all forms of poverty everywhere (9 targets);
22. Objective 2: Eliminate hunger, ensure food security, improve nutrition and promote sustainable agricultural development (7 indicators);
23. Objective 3: Ensure healthy lives and enhance well-being for people of all ages (20 indicators);
24. Objective 4: Ensure quality, equitable and inclusive education and promote lifelong learning opportunities for all (14 indicators);
25. Objective 5: Achieve gender equality, empower and create opportunities for women and girls (16 targets);
26. Objective 6: Ensure adequate and sustainable management of water and sanitation resources for all (9 indicators);
27. Objective 7: Ensure access to affordable, reliable and sustainable energy sources for all (5 indicators);
28. Objective 8: Ensure sustainable, inclusive and continuous economic growth; create full, productive and good jobs for all (17 indicators);
29. Objective 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and enhance innovation (9 indicators);
30. Objective 10: Reduce inequality in society (7 indicators);
31. Objective 11: Sustainable and resilient urban and rural development; ensure a safe living and working environment; rationally allocate population and labor by region (10 indicators);
32. Objective 12: Ensure a sustainable production and consumption model (9 indicators);
33. Objective 13: Respond promptly and effectively to climate change and natural disasters (2 indicators);

34. Objective 14: Conserve and sustainably use ocean, sea and marine resources for sustainable development (7 indicators);
35. Objective 15: Protect and develop forests sustainably, conserve biodiversity, develop ecosystem services, combat desertification, prevent degradation and restore land resources (4 indicators);
36. Objective 16: Promote a peaceful, just and equal society for sustainable development, providing access to justice for all; building effective, responsible and participatory organizations at all levels (10 indicators);
37. Objective 17: Enhance deployment and leverage global partnerships

11.5. Group name of the multidimensional sustainable poverty reduction program

38. Households with at least one member who is full 15 years old who was born in 1986 and returned from lower secondary education and is not currently attending school;
39. Households with at least one member between 5 and under 15 years of age who is not currently attending school;
40. Households where someone is sick but has no access to health care (illness is defined as a serious illness/injury so they have to stay in bed and have someone to take care of in bed or leave work/study without care) not attend) normal activities);
41. Households with at least one member age 6 or older who currently do not have health insurance;
42. The household is living in a house or apartment of the indecisive or simple type;
43. Housing area per capita of households is less than 8 m 2 ;
44. Households do not have access to hygienic water;
45. Households that do not use hygienic toilets/toilets;
46. Households without members using phone and internet subscriptions;
47. The household has no assets of any kind; television, radio, computer; and the commune/village speaker system could not be heard.

11.6. National Statistical Indicators

48. Land, climate and administration
49. Population
50. Labor, employment
51. Economic, administrative and non-base establishments
52. Invest
53. National account
54. Public finance
55. Currencies, securities and insurance
56. Agriculture, forestry and fisheries
57. Industry and construction
58. Domestic trade
59. International commerce
60. Price
61. Tourism
62. Transportation
63. Post and telecommunications and information technology
64. Science and technology

65. Education and training
66. Health care
67. Culture, information, sport
68. Standard of living
69. Safety and social justice
70. Environmental Protection
71. Progressive women

11.7. A "quick" assessment of the overlap between systems/programs of statistical indicators (1. Yes; 0. No)

Indicator group	National Indicators	New countryside	Agricultural restructuring	Poverty Reduction	Administration
01. Land, climate and administration	1	0	0	0	0
02. Population	1	0	0	0	1
03. Labor, employment	1	1	1	1	1
04. Economic, administrative and non-base establishments	1	0	0	0	0
05. Investment	1	0	0	0	0
06. National accounts	1	0	0	0	1
07. Public Finance	1	0	0	0	0
08. Currencies, securities and insurance	1	0	0	0	0
09. Agriculture, forestry and fishery	1	1	1	0	0
10. Industry and construction	1	1	1	0	0
11. Domestic trade	1	0	0	1	0
12. International Trade	1	0	0	0	0
13. Price	1	0	0	0	1
14. Travel	1	0	0	0	0
15. Transportation	1	1	0	0	0
16. Post and telecommunications and information technology	1	0	0	0	1
17. Science and technology	1	0	0	0	0
18. Education and training	1	0	0	0	1
19. Health Care	1	1	0	1	0
20. Culture, information, sports	1	0	0	0	0
21. Standard of Living	1	1	1	1	1
22. Safety and social justice	1	1	0	0	1
23. Environmental protection	1	1	1	0	1
24. Progressive Women	1	0	0	0	0
Me. Planning	0	1	0	0	0
ii. Socio-economic infrastructure	1	1	1	1	1
iii. Economy and organization of production	1	1	0	1	1
iv. Culture - society - environment	1	1	0	1	1
v. Political system	1	1	0	0	0
Your strength	0	0	1	0	0
One of the other things	0	0	1	0	0
Meanwhile	0	0	1	0	0

While you like	0	0	1	0	0
Income growth rate per hectare of productive land	0	0	1	0	0
Income growth per hectare of salt-producing land	0	0	1	0	0
Growth rate of income from processing agricultural, forestry and fishery products	0	0	1	0	0
Growth rate of labor productivity in agriculture, forestry and fishery	0	0	1	0	0
Value ratio of agricultural, forestry and fishery products produced in the form of cooperation and association	0	0	1	0	0
Value ratio of agricultural, forestry and fishery products produced according to good agricultural practices (GAP) or equivalent	0	0	1	0	0
Percentage of agricultural area irrigated to save water	0	0	1	0	0
Percentage of sustainably managed production forests	0	0	1	0	0
Percentage of farmers with training in agriculture	0	0	1	0	0
Proportion of trained women in agriculture	0	0	1	0	0
Percentage of livestock facilities in the area that treat waste with biogas or technological solutions for efficient and clean treatment and use	0	0	1	0	0
Households with at least one member who is full 15 years old who was born in 1986 and returned from lower secondary education and is not currently attending school;	0	0	0	1	0
Households with at least one member between 5 and under 15 years of age who is not currently attending school;	0	0	0	1	0
Households where someone is sick but does not receive health care (illness is defined as a serious illness/injury so they have to stay in one place and have to be cared for in bed or leave work/study without going to learning) activities);	0	0	0	1	0
Households with at least one member age 6 or older who	0	0	0	1	0

currently do not have health insurance;					
Households living in a house or apartment of the indecisive or simple type;	0	0	0	1	0
Housing area per capita of households is less than 8 m2;	0	0	0	1	0
Households do not have access to hygienic water;	0	0	0	1	0
Households that do not use hygienic toilets/toilets;	0	0	0	1	0
Households without members using phone and internet subscriptions;	0	0	0	1	0
The household has no assets of any kind; television, radio, computer; and the commune/village speaker system could not be heard.	0	0	0	1	0
Some common integrations	1	0	0	0	1
Agricultural land	1	0	0	0	1
Agriculture	1	0	0	0	1
forestry	0	0	0	0	1
Fishery	1	0	0	0	1
Salt industry	0	0	0	0	1
Plant protection	0	0	0	0	1
Veterinary Medicine	0	0	0	0	1
Irrigation	0	0	0	0	1
Item management & flood and storm prevention	0	0	0	0	1
Mechanization, processing of agricultural and forestry products and rural industry	0	0	1	0	1
Quality management of agro-forestry	0	0	0	0	1
Project and construction management	1	0	0	0	1
Import and Export	0	0	0	0	1
Rural development	0	1	0	1	1
Educations	1	1	0	1	1
International cooperation	0	0	0	0	1
Science and technology	0	0	1	0	1
Production cost - price - market	0	0	0	0	1
Encourage agriculture	0	0	0	0	1
End all forms of poverty everywhere	0	0	0	1	0
Eliminate hunger, ensure food security, improve nutrition and promote sustainable agricultural development	0	first	0	first	0
Ensure healthy lives and enhance well-being for people of all ages	0		0	first	0

Ensuring quality, equitable and inclusive education, and promoting lifelong learning opportunities for all	0	0	0	first	0
Achieving gender equality, empowering and creating opportunities for women and girls	0	0	first		0
Ensure adequate and sustainable management of water and sanitation resources for all	0	0	first		0
Ensuring access to sustainable, reliable and affordable energy sources for all	0	0	0	0	0
Ensure sustainable, inclusive and continuous economic growth; full employment, productivity and good for all	0	first	0	first	0
Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	0	first	0	first	0
Reducing inequality in society	0	0	0	0	0
Sustainable and resilient urban and rural development; ensure a safe living and working environment; rational distribution of population and labor by region	0	0	0	first	0
Ensuring a sustainable production and consumption model	0	first	0	0	0
Timely and effective response to climate change and natural disasters	0		0	0	0
Conservation and sustainable use of oceans, seas and marine resources for sustainable development	0	first	0	0	0
Protect and sustainably develop forests, conserve biodiversity, develop ecosystem services, combat desertification, prevent degradation and restore land resources	0	first	first	0	0
Promote a peaceful, just and equal society for sustainable development, creating access to justice for all; building effective, accountable and participatory organizations at all levels	0	0	first	0	0
Strengthening practices and fostering global partnerships	0	first	0	0	0