Official Statistics for SDGs- Lesson 1

1.1 Lesson1

Notes:

Welcome to the first lesson of Official Statistics for the Sustainable Development Goals (SDGs) course.

This course introduces the fundamental knowledge of official statistics. This course will help you understand how to compile and monitor SDG indicators related to official statistics.

1.2 Lesson Outline

Lesson Outline

1-1 Definition and Roles

1-2 History

1-3 Evidence-Based Policy Making and Official Statistics

1-4 Generic Law on Official Statistics

1-5 Source of Data

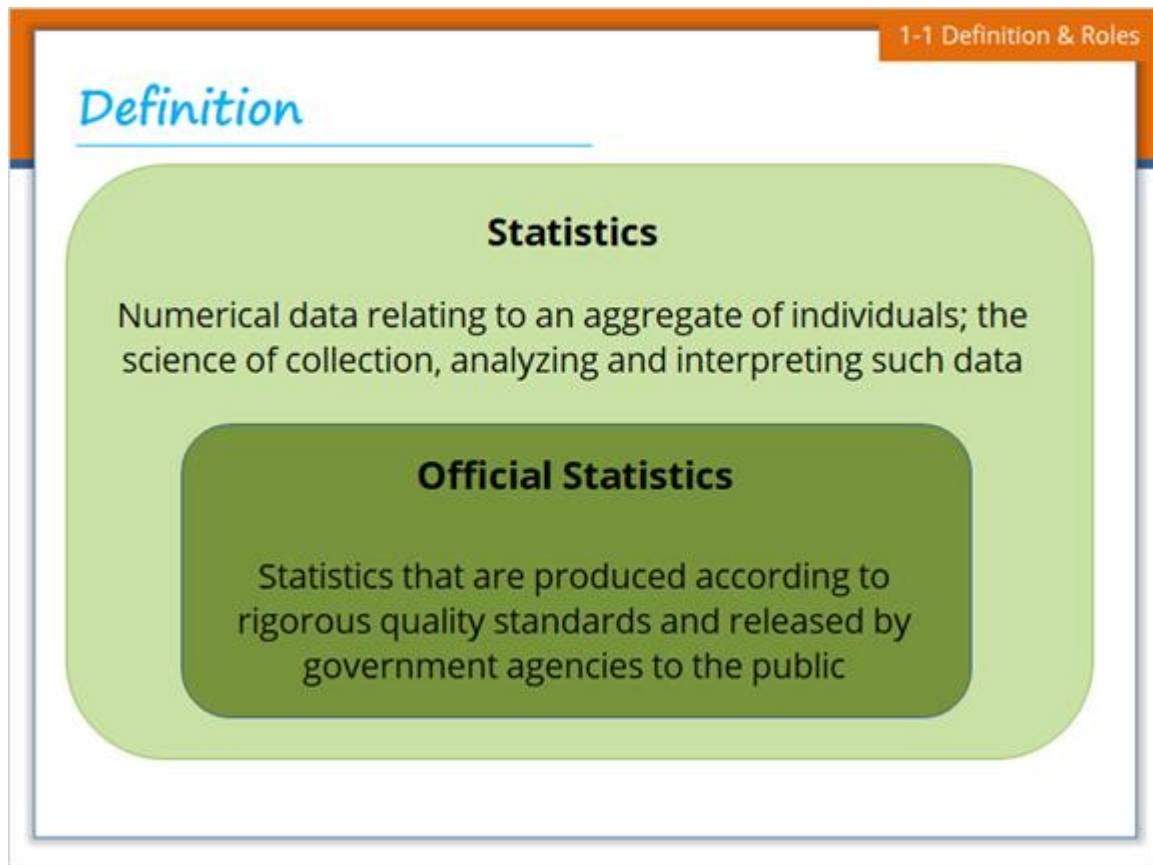1-6 Fundamental Principles of Official Statistics

Notes:

The first lesson introduces fundamental key words prerequisite to understanding official statistics including definition, rationale and system.

1-1 Definition and Roles
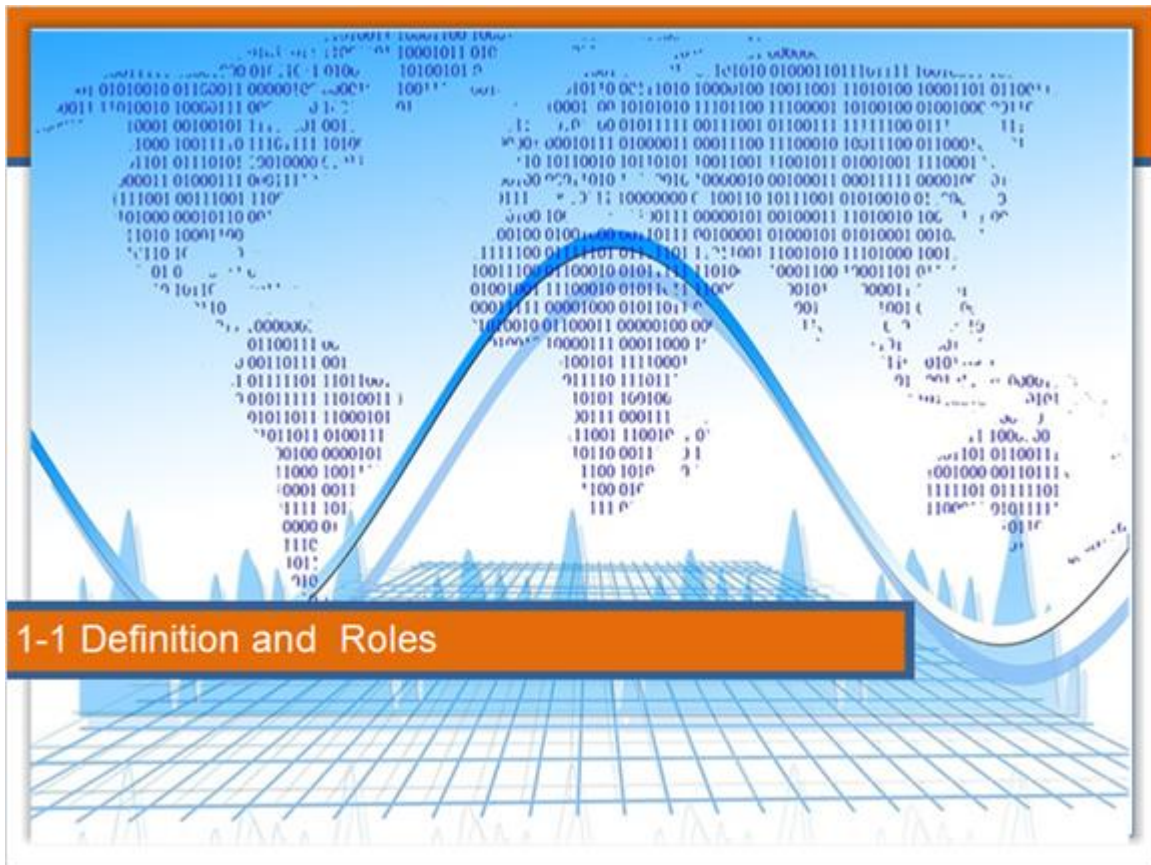
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1.4 Definition and Role-Statistics

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Generally the term "statistics" means quantitative and qualitative, aggregated and representative information characterizing a collective phenomenon in a considered population. Statistics are numerical data but not a group of individual data. A significant factor of statistics is to find characteristics from the group as the aggregate of data.

"Official" is used here as having state recognition. The OECD defines official statistics as statistics disseminated by the National Statistical System, excepting those that are explicitly stated not to be official. The UN Fundamental Principles of Official Statistics describe official statistics as providing an indispensable element in the information system of a democratic society, serving the Government, the economy and the public with data about the economic, demographic, social and environmental situation. According to the Principles, official statistics are produced by government agencies and can inform debate and decision-making both by governments and by the wider community.

Statistics deemed to be official are therefore a component of a wider information system supporting a society's decision-making processes; one issue is then whether

or not and how statistical information is labelled as official. Being official naturally implies that the statistical data respond to a collective need and are fit for purpose, satisfying as far as possible explicitly agreed upon quality standards for statistical production processes and outputs.

While this course defines statistics and official statistics as shown on the slide, various definitions exist for statistics and official statistics. Most definitions of official statistics are conceptually similar to this, but there is no international consensus on exactly how to define the term.

In the glossary of statistical terms of the OECD, official statistics are disseminated by the national statistical system, excepting those that are explicitly stated not to be official. Some national statistical offices explicitly state what are considered official statistics in their countries. The UK, for example, uses a stricter definition of official statistics that includes criteria such as recurrent production and national representation. They provide a flowchart for identifying official statistics. The Statistics Act of Japan defines official statistics as statistics produced by administrative organs, local public entities, or incorporated administrative agencies, etc.

1.5 Roles of Official Statistics in History
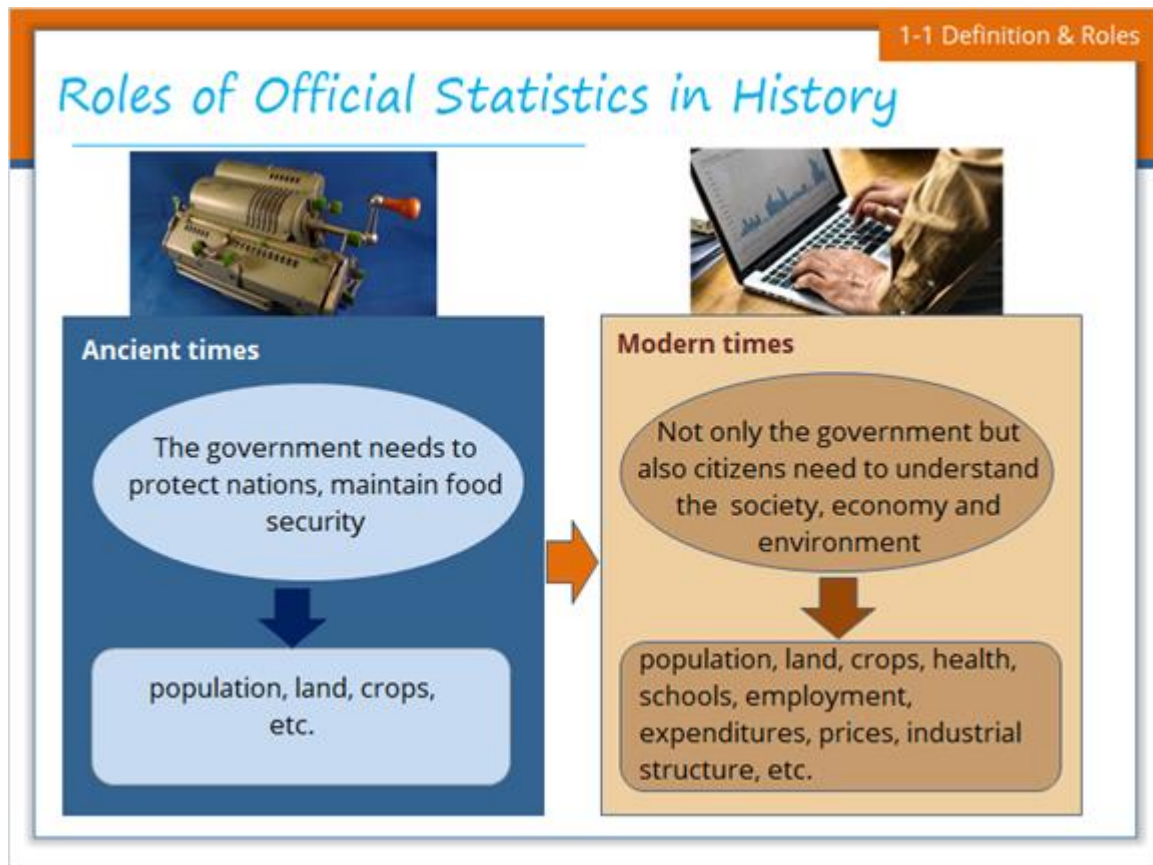
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In ancient times, in order to protect nationals, secure foods, and manage a country, basic information for drafting and taxation was needed. There are records remaining from ancient times that surveyed the population or agricultural areas. In and after modern times, it has become important not only for the government but also for its citizens to objectively capture social, economic and environmental situations. Thus, the government conducted a survey on the population, land, crops, health, schools, employment, expenditures, prices, and industrial structures. The purpose of statistics is to objectively and accurately grasp the current situation.

1.6 Current Role of Official Statistics
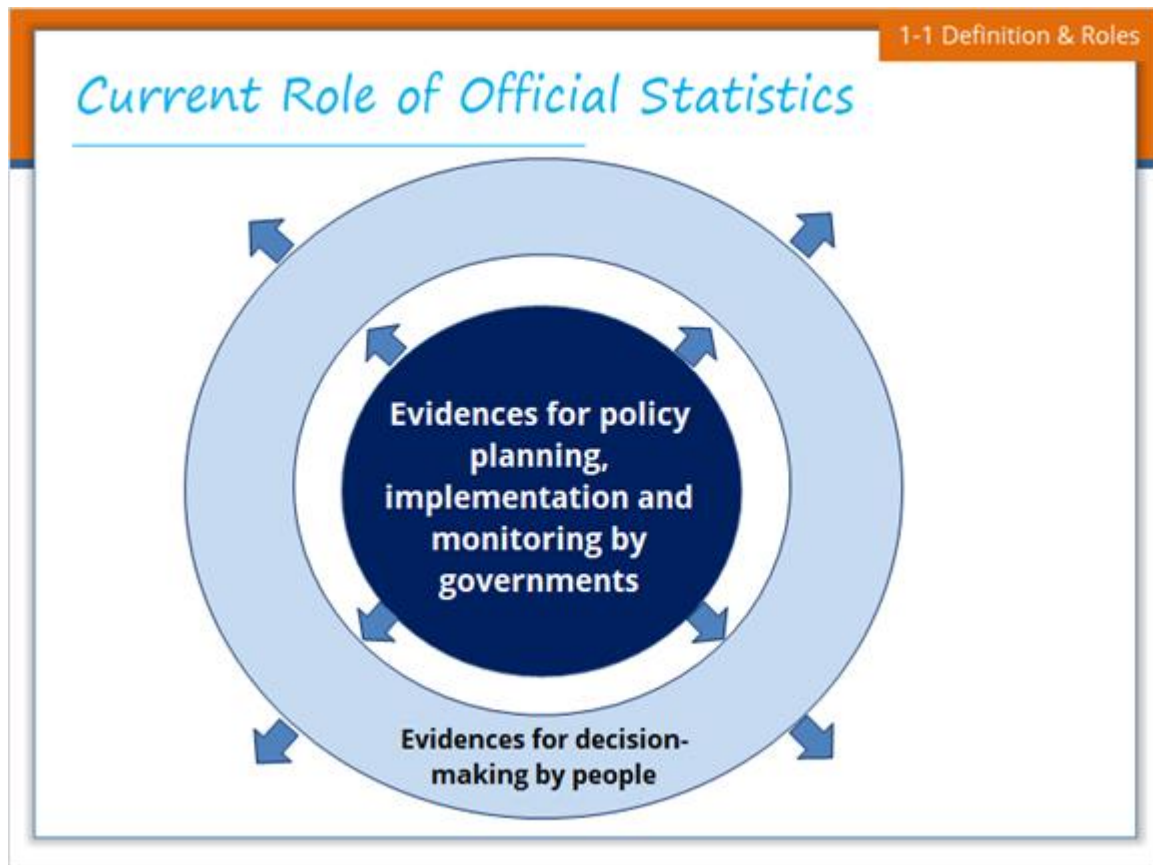
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Nowadays, national policy makers need statistics to help them identify areas where policies need to be developed such as by monitoring trends, for more in-depth analysis that will lead to policy reform, for monitoring policy implementation and for evaluating whether the policy reforms worked and why. Better, more relevant and more timely statistics lead to better, more evidence-based policies that are more likely to achieve national development goals. Citizens of countries need statistics to help hold policy makers accountable, as well as for information about the society in which they live, and businesses need to make evidence-based business decisions. Statistics also help citizens advocate for change, often through civil society groups. Official statistics are expected to provide an objective perspective, to enable public scrutiny of government actions and accountability to the public. However, it is not only policy makers and citizens who constitute the demand for statistics. The production of statistics faces further demands, often competing, that will influence the pattern of production and the priorities of national producers and users. These include demands by international organizations for their own programme design and monitoring needs, as well as for advocacy and for global/regional monitoring.

1.7 Characteristics of Official Statistics

Notes:

There are some characteristics of official statistics that are different from private statistics.

Official statistics are impartial and free from political or commercial influence. Statistical legislation gives official statisticians guaranteed professional independence, thus ensuring objective and unbiased information. Methods and procedures for collection, compilation and dissemination of statistical data are based solely on professional considerations, ethics and scientific principles, as well as internationally agreed concepts and methods. This is a unique feature of official statistics.

They are of best professional quality. These same arrangements ensure that official statistics are of high quality. Professional peer pressure and review acts as a strong mechanism to maintain and improve the quality of official statistics, so they come

with this assurance.

The provision of uniquely comprehensive information that is consistent over time is another characteristic of official statistics. Non-official producers of statistics generally act in accordance with their own needs and circumstances. This means they often have little or no incentive to maintain statistics that are produced and consistent over long periods of time. Furthermore, official statistics generally cover topics, regions, types of activities and other groupings that are essential to our societies but for which non-official producers of statistics may have no incentive to operate. Examples include statistics on economic development, construction, employment, prices, human capital, housing, health, wellbeing, agricultural supply and demand, business performance, international trade, and other similar topics. Statistics needed for public policy and service delivery, measuring national progress, legislative requirements and international reporting obligations are the top priorities. Without official statistics these needs would be largely unmet.

Assured equal access to official statistics is a fundamental principle of official statistics to honor people's right to information and secure equal access to statistics for everyone. By contrast, non-official providers of statistics and information may often have a commercial or other incentive structure which means they will not want to share all statistics that they compile. In the absence of official statistics, this would lead to seriously suboptimal economic and social outcomes.

Official statisticians are trusted guardians of data and confidentiality. Statistical offices have a uniquely strong legal setting for ensuring strict confidentiality of individual data, as well as a reputation built up over many decades. Individual data are not given to any other authorities and cannot be used for any other purposes than statistics and selected scientific research projects. Consequently, businesses and households are prepared to provide information to official statisticians that they would not be prepared to give to other statistical providers.

1.8 Main Principles of Official Statistics
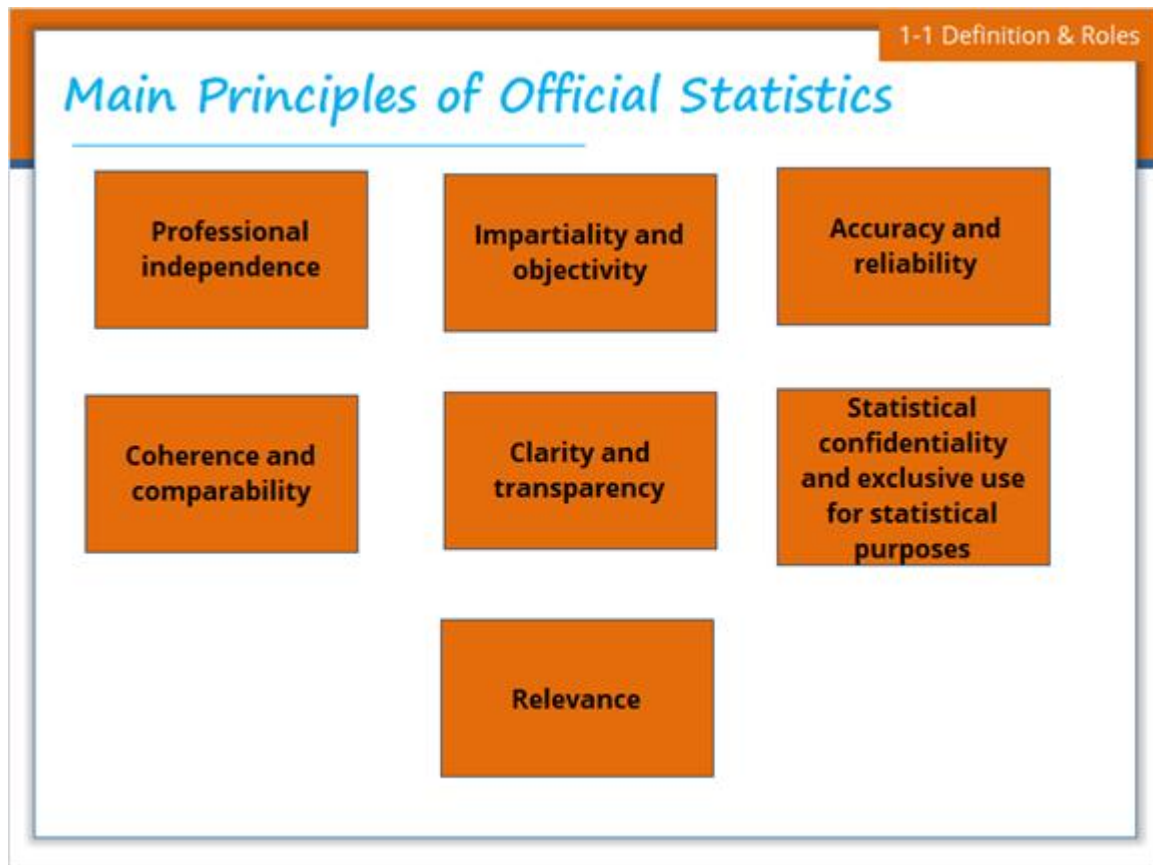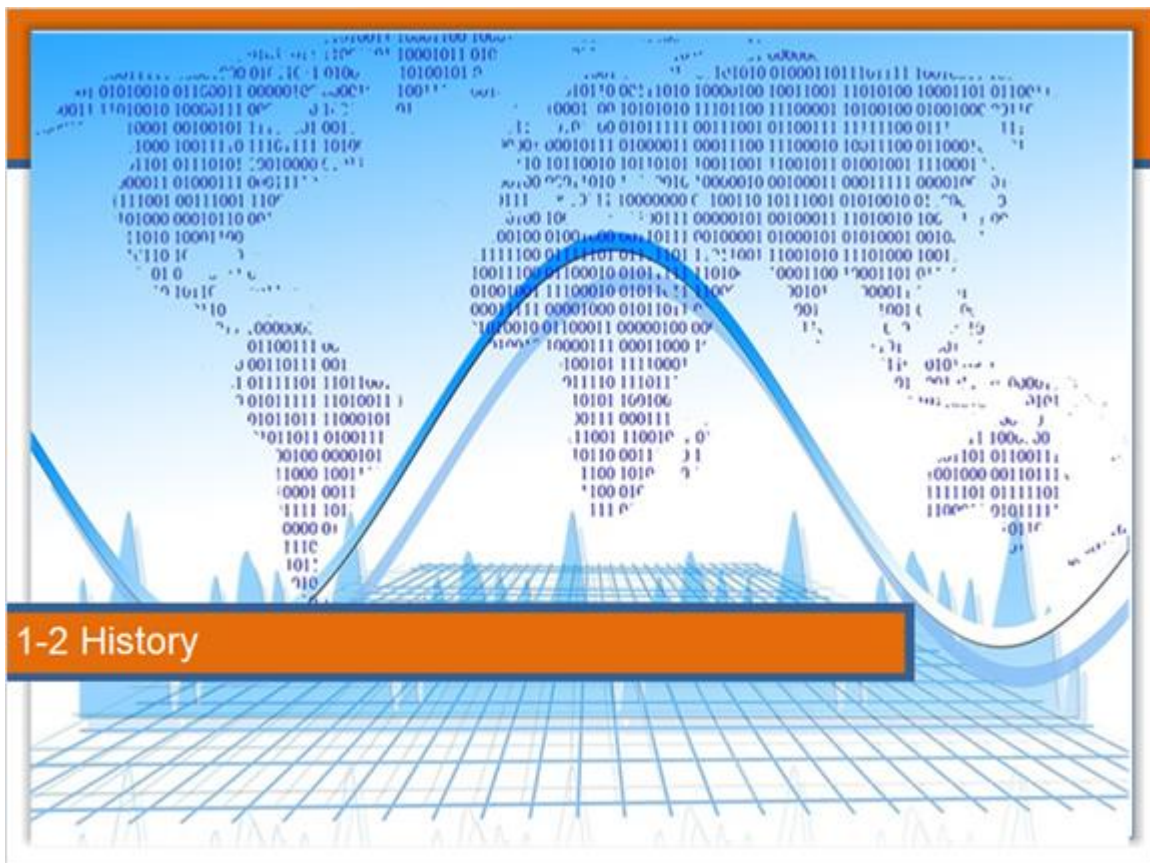

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All producers of official statistics develop, produce and disseminate official statistics according to the following main principles of official statistics and other agreed statistical principles:

- **Professional independence** means that producers of official statistics decide, independently and free from any pressures or interference from political or other external sources, on the development, production and dissemination of statistics, including the selection of data sources, concepts, definitions, methods and classifications to be used, and the timing and content of all forms of dissemination. Producers of official statistics, in their respective areas of competence, may comment publicly on statistical issues and any misuse of official statistics;

- **Impartiality and objectivity** means that official statistics must be developed, produced and disseminated in a neutral, reliable and unbiased manner according to professional standards and free from any political statements or considerations. All users must be given equal and simultaneous access to official statistics;

- **Accuracy and reliability** means that official statistics must reflect as faithfully,

accurately and consistently as possible the reality and be based on scientific criteria used for the selection of sources, methods and procedures;

- **Coherence and comparability** means that statistics are consistent internationally and comparable over time and across regions and countries;

- **Clarity and transparency** means that official statistics must be presented in a clear and understandable way, and the methods and procedures applied must be transparently communicated to users to facilitate proper interpretation;

- **Statistical confidentiality and exclusive use for statistical purposes** means that individual data collected or obtained by producers of official statistics that refer to natural or legal persons are to be strictly confidential and used exclusively for statistical purposes;

- **Relevance** means the degree to which official statistics meet current and emerging user needs and honor citizens' right to public information.

1.9 1-2 History

1-2 History

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1.10 History of Official Statistics
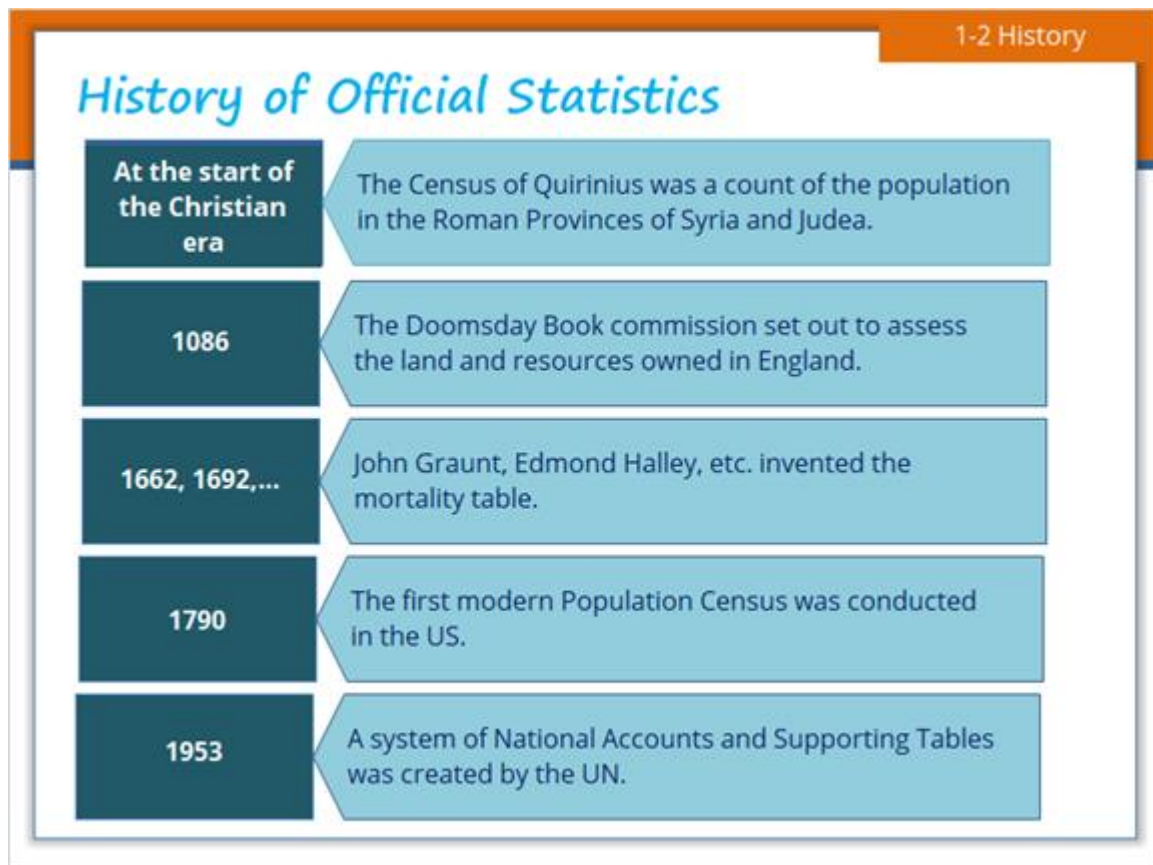
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Let us look through the history of official statistics.

In one guise or another, governments have been recording details about their subjects or peoples for a considerable period of time. For example the Census of Quirinius was a count of the population in the Roman Provinces of Syria and Judea for the purpose of taxation taken at the start of the Christian era during the reign of the Roman Emperor Augustus. In the UK the Doomsday Book commissioned in 1086 AD set out to assess the land and resources owned in England at that time. The primary motivation was again for reasons of taxation, but records were compiled of landholders, tenants, workers, livestock, and buildings; the book provides a statistical snapshot of those times. Interestingly the book does not provide an accurate count of the population.

In the period of the latter half of the 17th century John Graunt and Edmond Halley invented the mortality table.
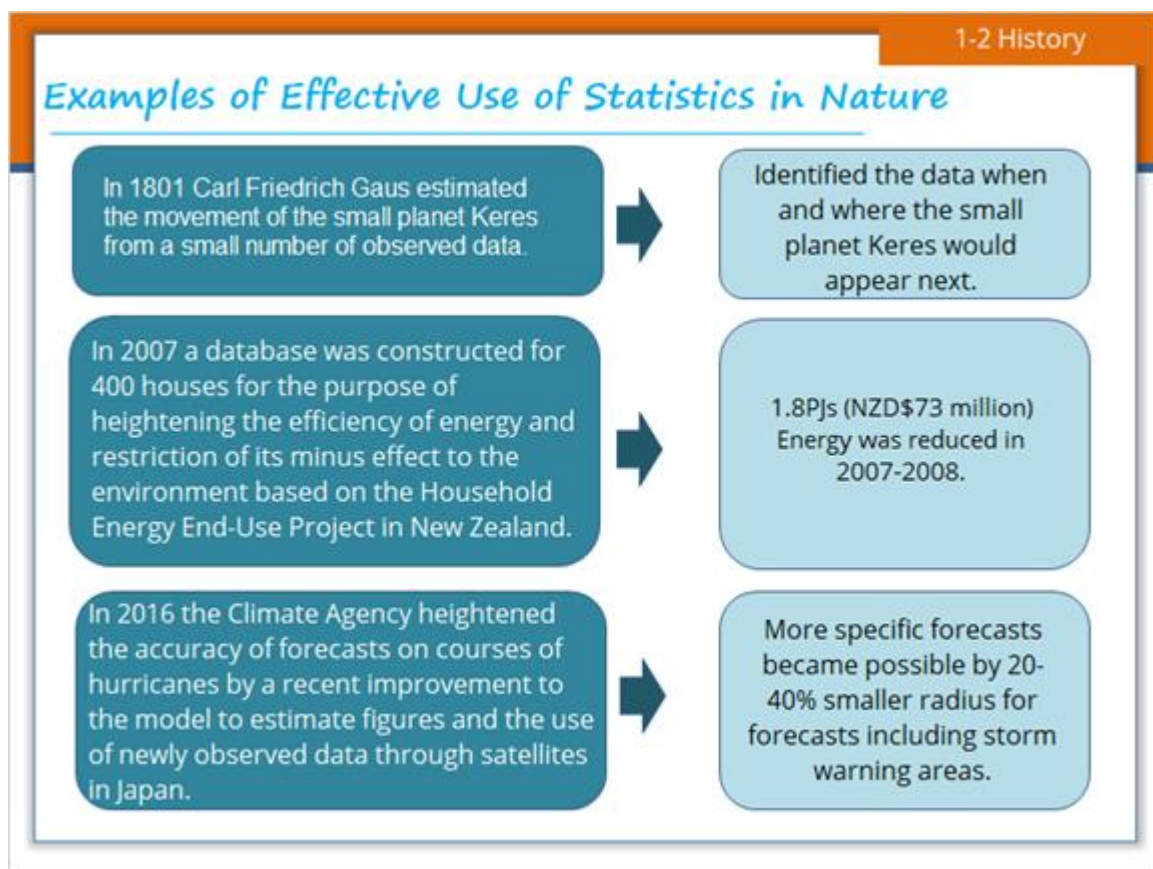
The first modern Population Census was conducted in the US in 1790. The Ottoman Empire also carried out its first census in the period 1831-1838 although this was

restricted to men because only they served in the army and paid taxes.

Adolph Quetelet as the supervisor of statistics for Belgium from 1830 applied statistical concepts to social phenomena and established the theoretical foundations for the use of statistics in sociology.

As for National Accounts, Measurement of National Income and the Construction of Social Accounts, the pre-systematized version was created by the UN in 1947, the System of National Accounts and Supporting Tables in 1953.

1.11 Examples of Effective Use of Statistics in Nature

Examples of Effective Use of Statistics in Nature

In 1801 Carl Friedrich Gaus estimated the movement of the small planet Keres from a small number of observed data.

➡ Identified the data when and where the small planet Keres would appear next.

In 2007 a database was constructed for 400 houses for the purpose of heightening the efficiency of energy and restriction of its minus effect to the environment based on the Household Energy End-Use Project in New Zealand.

➡ 1.8PJs (NZD$73 million) Energy was reduced in 2007-2008.

In 2016 the Climate Agency heightened the accuracy of forecasts on courses of hurricanes by a recent improvement to the model to estimate figures and the use of newly observed data through satellites in Japan.

➡ More specific forecasts became possible by 20-40% smaller radius for forecasts including storm warning areas.

Notes:

Statistics have made our society better in history.

From this slide, some examples of the effective use of statistics are introduced in nature, medicine, insurance, society and economy.

Considering the examples on the slides, data are quite important for the measurement of nature and developed according to the development of science and technology.

1.12 Examples of Effective Use of Statistics in Medicine
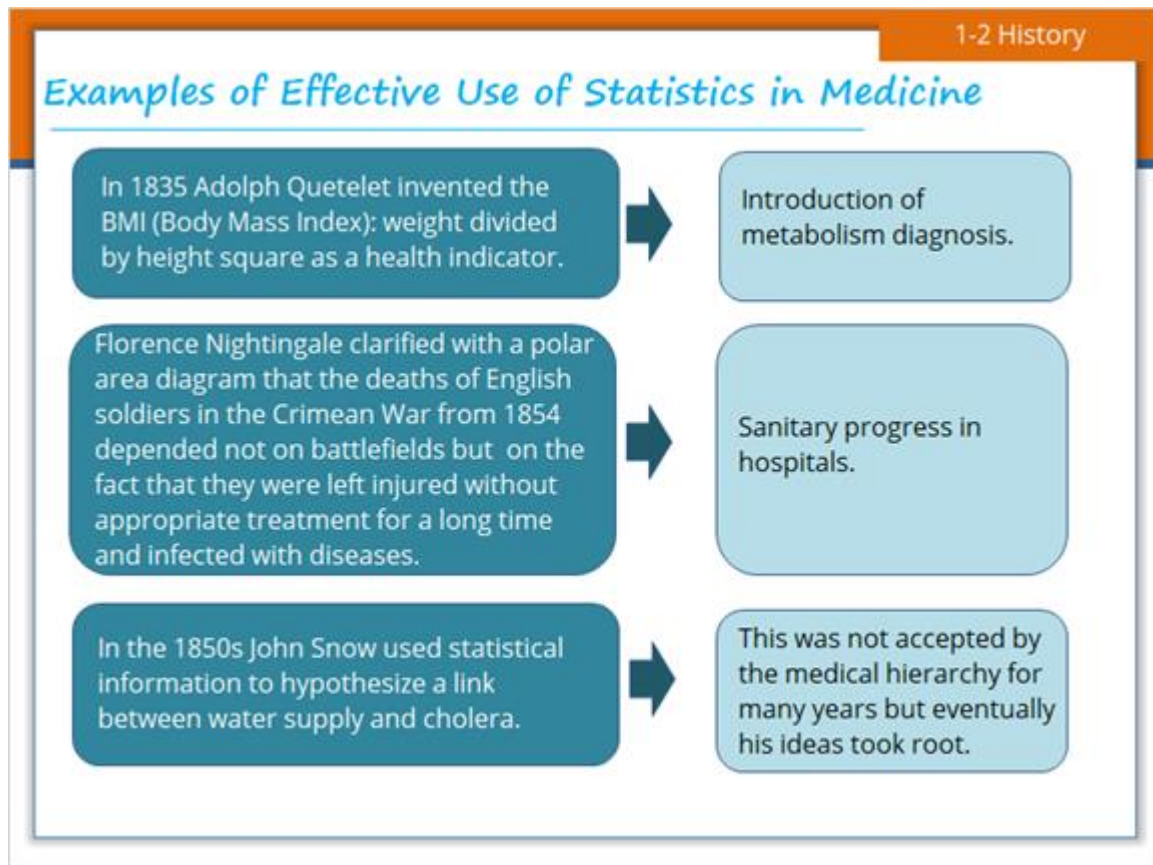
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Statistics played a large and significant role in medicine. In addition to the invention of the BMI, Adolph Quetelet as the supervisor of statistics for Belgium applied statistical concepts to social phenomena and established the theoretical foundations for the use of statistics in sociology and contributed to the foundation of International Statistical Congresses and the origins of the International Statistical Institute (ISI).

More recent examples are the following.

In 1948, President Franklin Roosevelt initiated an epidemiology research for 5,127 dwellings in Framingham. It was identified that cardiovascular disease tends to appear among patients with high blood pressure and cholesterol and that smoking and sedentary lives increase the risk of cardiovascular disease after a nine-year period from the start of the research.

In 1983, Paul Rosenbaum and Donald Rubin estimated the cause and effect relationship by creating similar groups based on the propensity score: conditional probability of assignment to a particular treatment given a vector of observed

covariates, and contributed to the development of the evaluation of policy and education as well as epidemiology.

Around 2010, Takuya Kudo counted the number of patients with cardinal diseases such as diabetes and heart diseases from a hospital in a poor area in New York City and realized effective budget allocation in medicine.

1.13 Examples of Effective Use of Statistics in Insurance
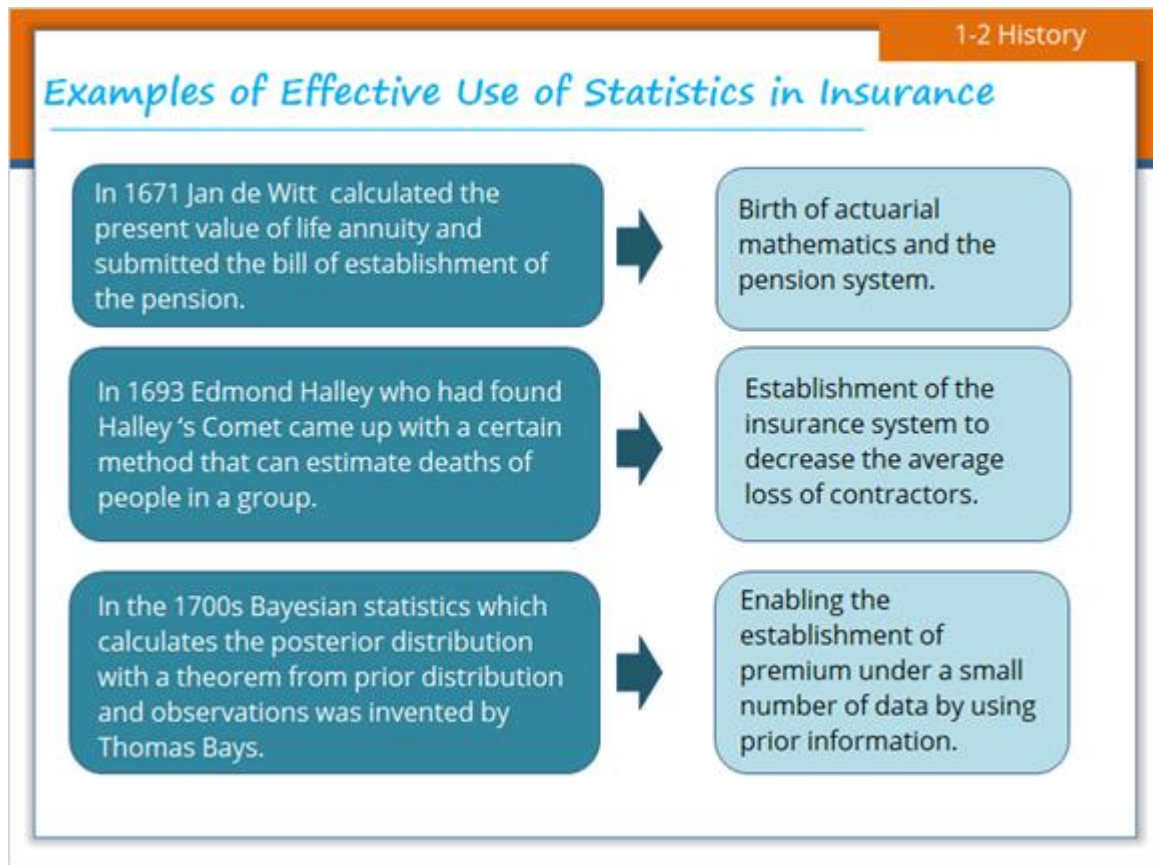
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Insurance has been developed using the probability theorem and has a significant role in our recent society. Its role became one of the great issues of the national government beyond profits of private companies and local groups of people.

1.14 Examples of Effective Use of Statistics in Society
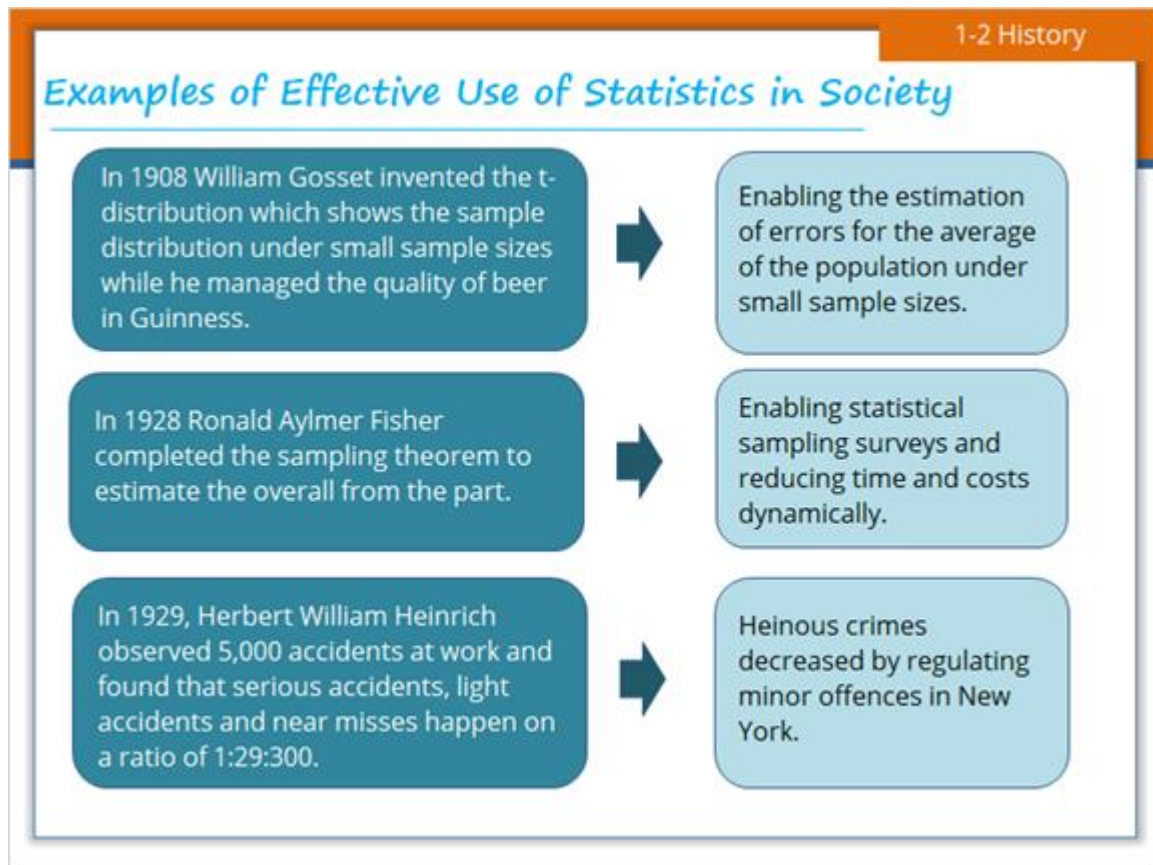
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Other than the examples on the slide, statistics have been used to find frauds. In the 1800s Adolph Quetelet calculated the gap from the Normal Distribution of stature data assembled for the purpose of imposing military service in France, and found that two thousand people had faked their stature in order to skive off military services. In 1881 Simon Newcomb suggested that, among numbers 1, 2, ... 9, the probability of number 1 reaches about 0.3%, and that the probabilities become smaller as the number increases. In 1938, Frank Benford used this as the law for an indicator to find frauds in records of financial accounts.

1.15 Examples of Effective Use of Statistics in Economy

Examples of Effective Use of Statistics in Economy

In 1905 Max Otto Lorenz created the Lorenz Curve for the purpose of measuring inequality of income distribution.	Enabling the evaluation of policies of poverty and income reallocation.
In 1920, Ronald Aylmer Fisher introduced the Design of Experiments that selects segments to which certain conditions randomly apply after dividing fields into segments in agricultural experiments.	Contributing to quality management in agriculture, manufacturing, etc.
In 1921, Gustav Cassel released Purchasing Power Parity as one of the concepts to explain factors to decide the exchange rate.	Enabling international comparison of prices and GDP.
In 1936, Wassily Leontief created the Input-output tables for the US.	Enabling the analysis of structures of economy and industry and the ripple effect of economic policies and refinement of National Accounts.

Notes:

In economics some devices to express the economic situation using statistics have succeeded. Their performances have been included in the dissemination of official statistics.

By using the Lorenz Curve, Corrado Gini, involved in the problem of how to measure inequalities in income and wealth in different countries, created the Gini coefficient in 1914, which is often used to evaluate inequality of income and expenditure using data.

Wassily Leontief received the Nobel Prize for the creation of Input-output tables. Richard Stone received the Nobel Prize for developing an accounting model around 1950 that could be used to track economic activities on a national and, later, an international scale, and which later developed into National Accounts.

1.16 Recognition of Wealth of Statistics

Notes:

There are a lot of proverbs related statistics including "Statistics is the grammar of science" by Karl Pearson.

Considering official statistics, a lot of people including famous people recognize the wealth of official statistics as you can see from the phrases on the slide.

On the other hand, there are some critical phrases about statistics as well. "There are three kinds of lies: lies, damned lies, and statistics" (Benjamin Disraeli). This phrase suggests that statistics can be the main source of misunderstanding. The phrase "42.7 percent of all statistics are made up on the spot." shows us the impact of numbers. It shows that numbers have a big influence on us, even numbers created without any evidence, like 42.7.

"The latest survey shows that three out of four people make up 75 percent of the world's population" indicates that some statistics are created for a worthless purpose, for example, understanding a fact that is already taken for granted. Government officials should realize that statistics entail such risks, and should create, compile, analyze and disseminate statistics in keeping with quality and have good communication with stakeholders. The meaning of stakeholders will be elaborated on in 3-6 Communication, Lesson 3.

1.17 1-3 Evidence-Based Policy Making and Official Statistics

1-3 Evidence-Based Policy Making and Official Statistics

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1.18 Evidence-Based Policy Making and Official Statistics
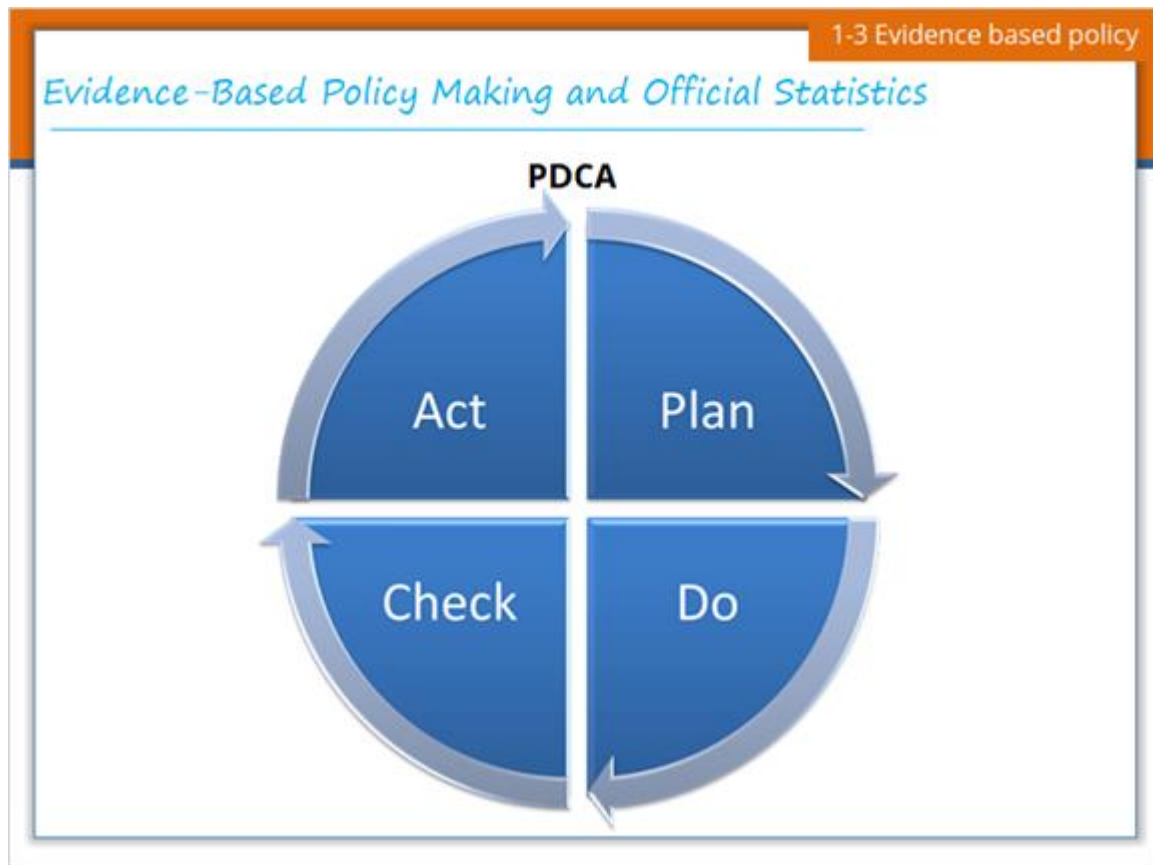
Notes:

PDCA: **Plan**, **Do**, **Check** and **Act** is a repetitive four-stage model for continuous improvement in business process management but is also important for the management of policy.

For instance, the Sustainable Development Goals (SDGs) are decided at the UN General Assembly, SDG indicators decided at the UN Statistical Commission as the master **plan**. They are specified in countries. Now countries are putting forward various actions to reach the Goals, targets and indicators at the process of **do**ing. Their performances are monitored by countries and international organizations at the **check**ing process. Based on the monitoring, the **act**ions will be changed for the better achievement of the Goals.

The PDCA can be applied to statistical processes. Some countries compile the master plan and progress their actions following the plan in a cycle of PDCA.

1.19 What is Evidence-Based Policy?
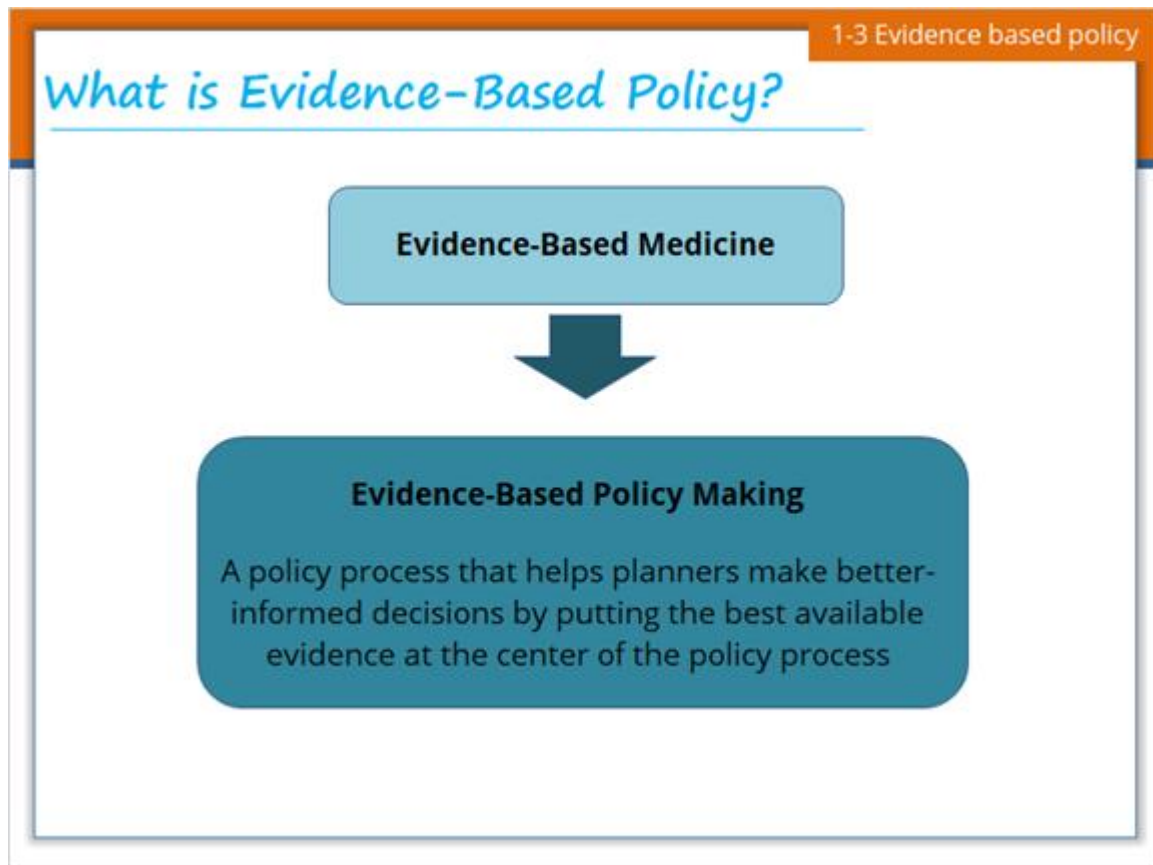
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Evidence-based policy has been defined as an approach that helps people make well-informed decisions about policies, programs and projects by putting the best available evidence at the heart of policy development and implementation. This definition is similar to that of the UN in the Millennium Development Goal (MDG) guide which states that evidence-based policy making refers to a policy process that helps planners make better-informed decisions by putting the best available evidence at the center of the policy process.

Evidence-based policy making is an extension of the concept of evidence-based medicine to other aspects of socio-economic development. In the field of health, a defining feature of the evidence-based approach is the use of scientifically rigorous studies and statistical analyses, such as randomized controlled trials, to identify interventions and practices capable of improving policy-relevant outcomes. The inextricable links between statistics, evidence and policy were highlighted by Adrian Smith, former President of the UK's Royal Statistics Society (RSS), who used his 1996 presidential address to call for the extension of evidence-based approaches from medical practice to the broad process of policy making.

1.20 Differences to Policy Making by the Use of Strong Evidence

Notes:

The use of strong evidence can make a difference to policy making in at least five ways:

Achieve recognition of a policy issue: This occurs when data and evidence throw light upon hidden or newly emerging social or economic issues. Once the information is revealed, groups such as civil servants, non-governmental organizations, development agencies or the media, advocate and lobby for a new policy issue to be recognized and addressed.

Inform the design and choice of policy: Once a policy issue has been identified, the next step is to analyze it, so that the dimensions, nature and impact of the problem can be understood. This understanding, which relies heavily on the application of statistical methods, provides the basis for subsequent policy recommendations.

Forecast the future: Forecasting future scenarios is important in order to draw attention to the possible impacts of current trends on existing policies and programs. Forecasting can also allow an assessment of whether policy goals and

targets are likely to be met.

Monitor policy implementation: Once policies are executed, information is required by policy makers to monitor the expected results associated with the policies. Careful monitoring can reveal when key indicators are going off-track, which prompts further analysis potentially leading to a change of policy.

Evaluate policy impact: Advanced statistical methodologies are usually needed to evaluate the impact of policies, including their unintended effects. Incorporating an explicit mechanism for evaluating policy impact from the beginning, at the design phase of policy development, is key to enabling a good evaluation.

1.21 Official Statistics for Decision-Making
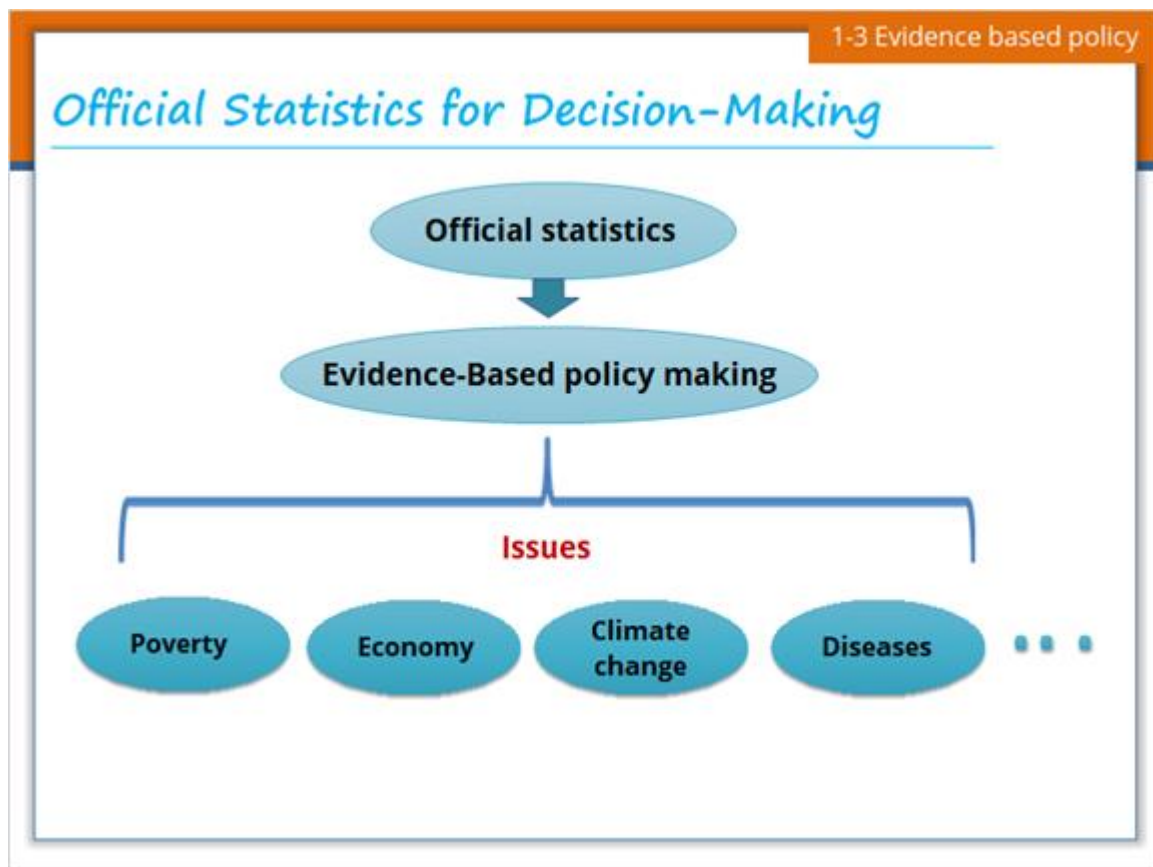
Notes:

Official statistics are inherently about providing relevant information and are becoming ever more important in the information age. Official statistics provide an indispensable element in the information system of a democratic society, serving

the government, the economy and the public with data about the economic, social and environmental situation:

- They enable decision-makers to function on the basis of high quality information - whether in the public sector for policy making or service delivery, in the commercial sector or people making decisions in their everyday lives - thus leading to better outcomes.

- They allow citizens to hold public and other bodies accountable. They enable people to understand society by providing relevant information while respecting the rights of people described in the statistics.

- They facilitate research and analysis to proceed on the basis of a comprehensive evidence base leading to innovation and improved economic and social outcomes. It is a fundamental principle of official statistics to honor people's right to information and secure equal access to statistics for everyone. Without statistics governments would fumble in the dark, investors would waste money and electorates would struggle to hold their political leaders accountable.

Official statisticians have by no means a monopoly on producing statistics, let alone the wider information base. Nevertheless, they do have numerous comparative advantages and unique selling points, as compared to other statistics and information.

Let us look at some cases of countries from Recommendations for Promoting, Measuring and Communicating the Value of Official Statistics, Economic Commission for Europe (ECE), 2018.

Statistics New Zealand assesses the economic value of some of its statistics:

- Population Census: Despite difficult quantification, census delivers benefits well in excess of its direct costs (a net present value of close to $1 billion over the next 25 years). Every dollar invested in the census generates a net benefit of five dollars in the economy. The economic value was calculated based on a thorough review of the main uses of census data in health, education, social development, resource allocation, policy making and research by the central and local government, the private sector and academia.

- Experimental work has been undertaken on measuring the economic value of the Consumer Price Index (CPI) and tertiary education data in the Integrated Data Infrastructure to develop a methodology and capability for measuring the economic value of statistics.

- Customer Measurement Framework: a project to develop a framework and indicators to measure users' awareness, access, use and satisfaction with statistical products and services.

Since 2012, the Spanish Statistical Office (Instituto Nacional de Estadistica, INE) has been measuring the economic impact of statistical information in the media to have

a more accurate perception of how the public values official statistics and to know about their interests. INE evaluates news regarding their office and its statistical activities in 1,327 written publications (newspapers, magazines and supplements), 18 radio stations, 28 television channels and 6,410 online platforms. Based on this, the value of INE operations in the media is estimated to have increased to €372 million in 2014.
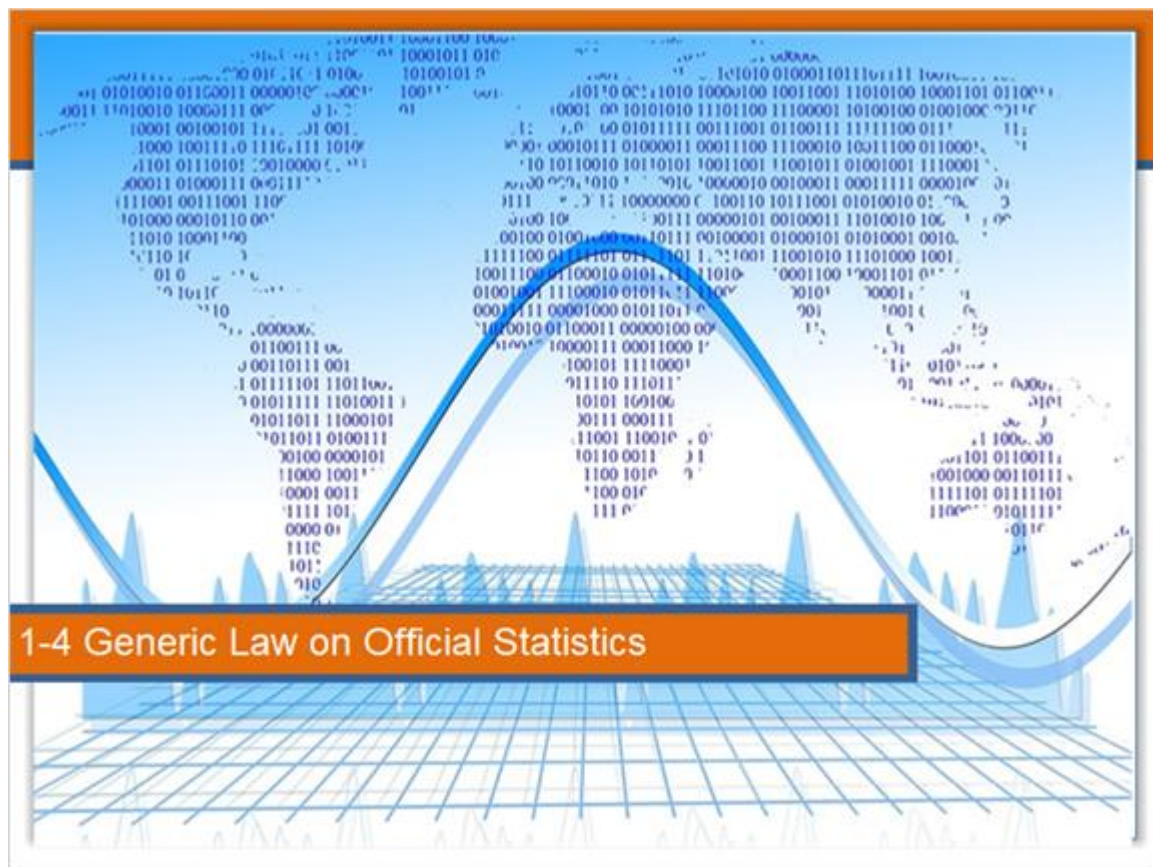
1.22 Good Data for Development are Lacking
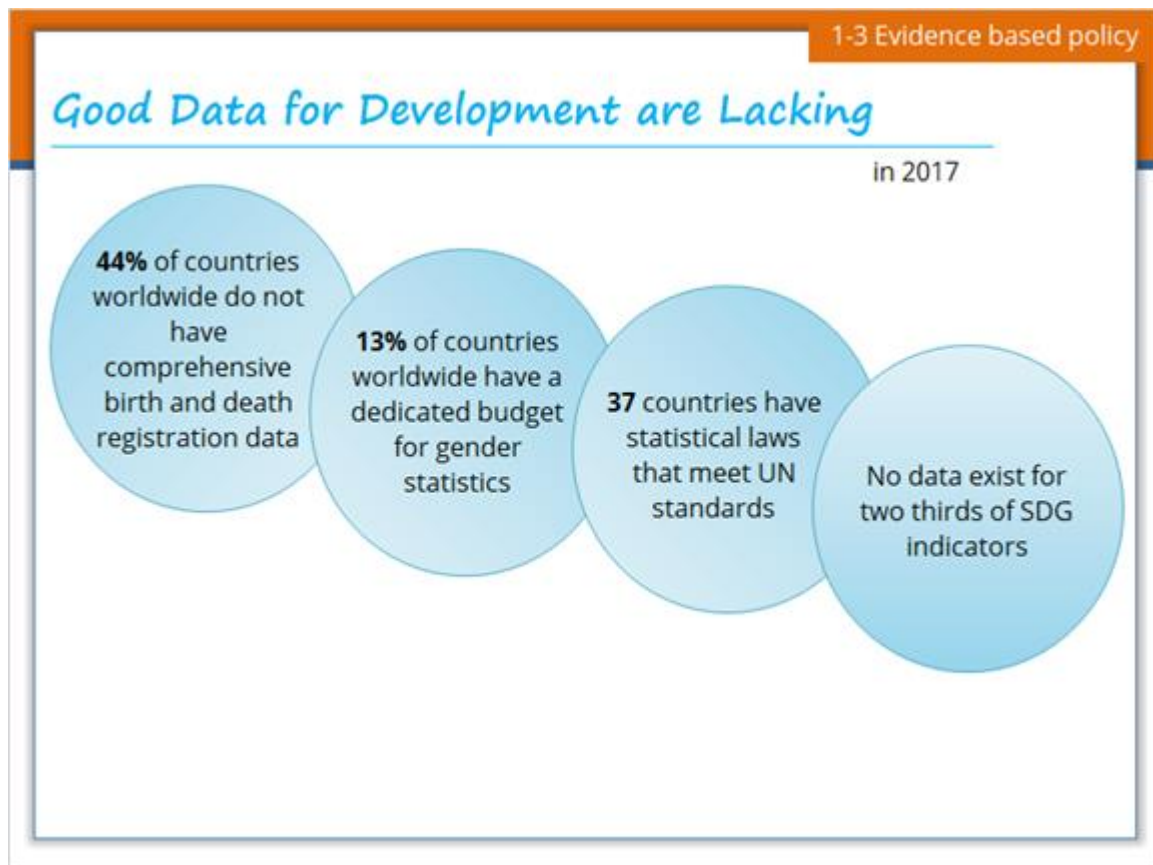
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Yet it is not always clear that statistical offices are able to fully step into this role. There are a number of constraints, including lack of essential data; ambiguous relationships between governments and National statistical Offices (NSOs); inadequate collaboration between the research community and NSOs; and failures of NSOs, to engage with researchers in policy and program evaluation. NSOs will be explained in Lesson 2.

The inadequate availability and poor quality of statistics in many countries limit their

contributions to evidence-based policy discussions. Statistical offices face difficulties in generating some kinds of data that are critical for building the evidence base. For example, there are major data deficiencies, especially in management and use of administrative data. In some settings there are weaknesses in even basic statistics on population size and its distribution.

The slide shows some examples. The possibilities for us to achieve data are quite different among regions and countries. To respond to the call for greater transparency in government and to provide open access to data, countries may have to create or revise their statistical laws and regulations.

1.23 1-4 Generic Law on Official Statistics

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1.24 Purpose of the Generic Law on Official Statistics

Notes:

The purpose of the **Generic Law,** is to develop official statistics law, is important for countries.

The Law is accompanied by explanatory notes to facilitate the understanding and interpretation of the Law and to describe how the individual articles provide important building blocks of a sound legal basis for producing official statistics.

The National Statistical System (NSS) and the quality of official statistics will be explained in the following Lessons afterwards.

1.25 Contents of the Generic Law on Official Statistics

Contents of the Generic Law on Official Statistics

- Provides a model that can be adjusted to national circumstances

- Defines the rights and obligations of the bodies that compose the National Statistical System (NSS) as well as the scope of that system and the principles and procedures to be applied in developing, producing and disseminating official statistics

- Lays down the obligations of respondents who provide data for statistical purposes and ensures their rights and the protection of confidential data

Notes:

The Law is accompanied by explanatory notes to facilitate the understanding and interpretation of the Law and to describe how the individual articles provide important building blocks of a sound legal basis for producing official statistics.

Statistics Law of Europe: Regulation (EC) No 223/2009 of the European Parliament and of the Council shows statistical principles in Article 2.

• The development, production and dissemination of European statistics shall be governed by the following statistical principles:

(a) "Professional independence", meaning that statistics must be developed, produced and disseminated in an independent manner, particularly as regards the selection of techniques, definitions, methodologies and sources to be used, and the timing and content of all forms of dissemination, free from any pressures from political or interest groups or from community or national authorities, without prejudice to institutional settings, such as community or national institutional or budgetary provisions or definitions of statistical needs;

(b) "Impartiality", meaning that statistics must be developed, produced and disseminated in a neutral manner, and that all users must be given equal treatment;

(c) "Objectivity", meaning that statistics must be developed, produced and disseminated in a systematic, reliable and unbiased manner; this implies the use of professional and ethical standards, and that the policies and practices followed are transparent to users and survey respondents;

(d) "Reliability", meaning that statistics must measure as faithfully, accurately and consistently as possible the reality that they are designed to represent and implying that scientific criteria are used for the selection of sources, methods and procedures;

(e) "Statistical confidentiality", meaning the protection of confidential data related to single statistical units which are obtained directly for statistical purposes or indirectly from administrative or other sources and implying the prohibition of use for non-statistical purposes of the data obtained and of their unlawful disclosure;

(f) "Cost effectiveness", meaning that the costs of producing statistics must be in proportion to the importance of the results and the benefits sought, that resources must be optimally used, and the response burden minimized. The information requested shall, where possible, be readily extractable from available records or sources. The statistical principles set out in this paragraph are further elaborated in the Code of Practice in accordance with Article 11.

2. The development, production and dissemination of European statistics shall take into account international recommendations and best practice.

The law describes the European Statistics Code of Practice which will be quoted in Lesson 3.

1.26 Typical Main Elements Covered in the Law

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The elements on the slide including definitions, principles, data sources, and the role of organizations are covered in the law.

## 1.27 Statistical System
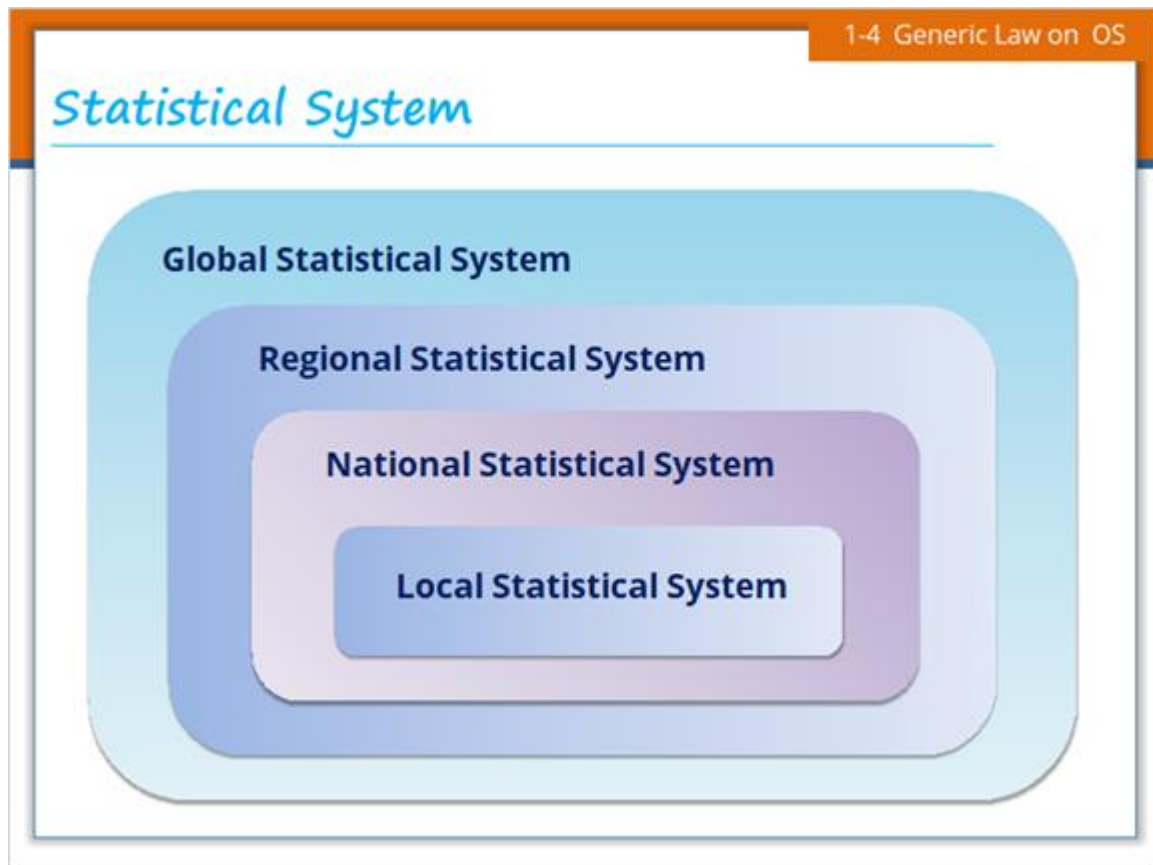
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Within the organizational system statistical systems exist. Under the global organization such as the United Nations (UN) and the Organization for Economic Co-operation and Development (OECD), there are statistical organizations. There are regional organizations such as the Economic and Social Commission for Asia and the Pacific (ESCAP) under the global organization. Within regional organizations, statistical organizations or functions exist. These global and regional statistical organizations are promoting coordination and cooperation among countries. The core statistical system exists in the governments of countries where official statistics are created, compiled and disseminated. Most countries are divided into local areas such as federations, counties, prefectures or municipalities where local governments deal with some tasks in the area including statistics. A specific explanation on the statistical system will come in Lesson 2.

1.28 1-5 Source of Data
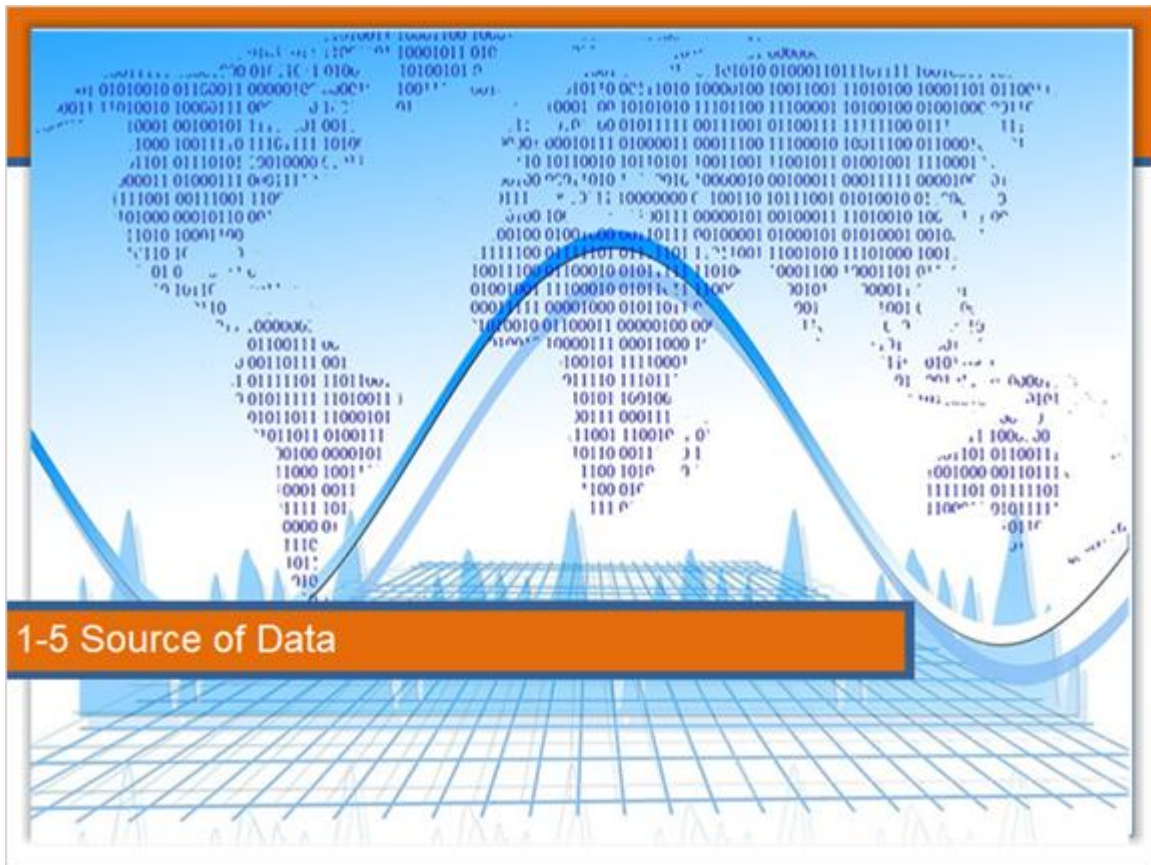
1-5 Source of Data

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1.29 Source of Data
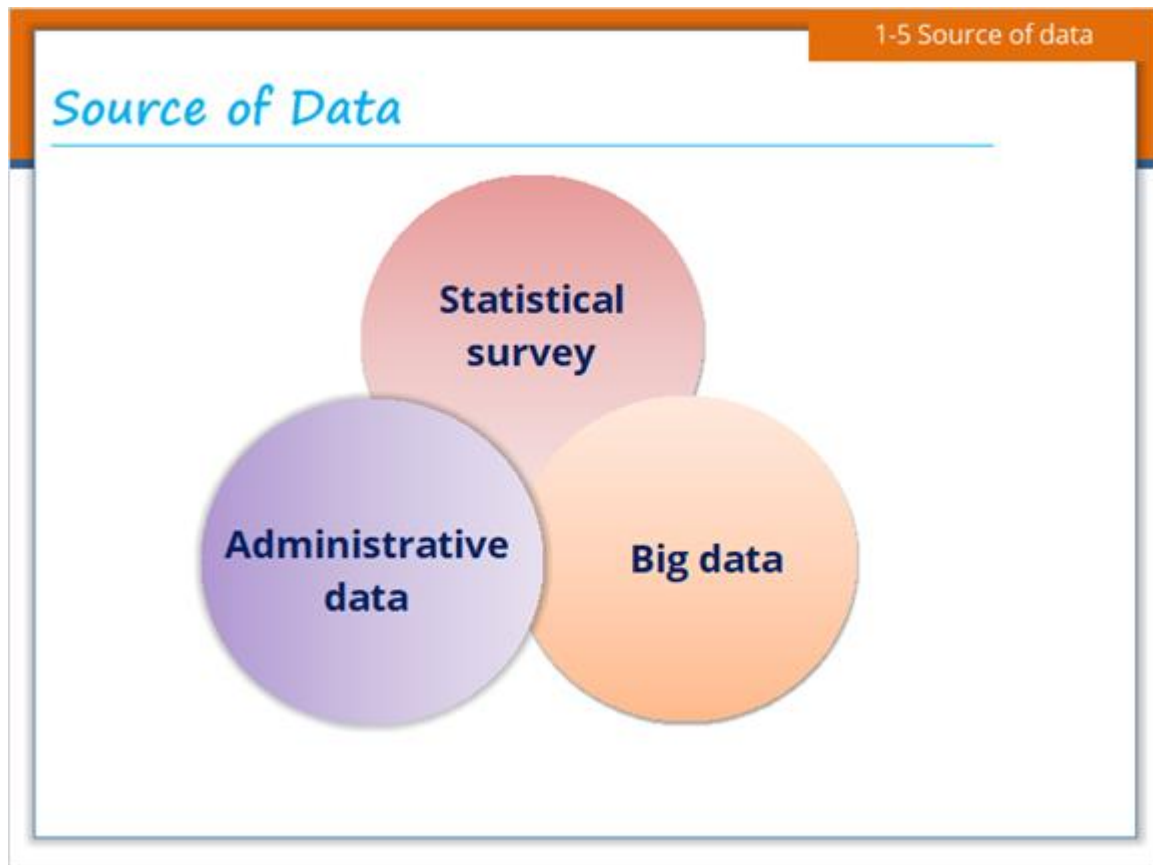
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Sources of data for statistics are classified into three types.

Statistical survey means the primary collection of individual data from respondents of a given population carried out by a producer of official statistics exclusively for statistical purposes through the systematic use of statistical methodology. Statistical surveys comprise census and sample surveys. Census targets all units of the population while sample surveys target selected units in the population.

Administrative data means data collected by, or on behalf of, national and local authorities other than a producer of official statistics, for administrative purposes in conformity with legal bases other than statistical legislation.

Big Data are, roughly speaking, data generated continuously and in enormous quantities. In the recommendations made to the UN Secretary-General by his High-level Panel of Eminent Persons on the Post-2015 Development Agenda in 2013 in its report entitled "A new global partnership: eradicate poverty and transform economies through sustainable development", there is a call for a data revolution. Big data are recognized as constituting an important part of the data revolution, which could have the potential to contribute to improving some aspects of the quality of statistics, such as timeliness

and completeness, without compromising the relevance, impartiality and methodological soundness of the statistics.

These three sources are not separated completely but have some duplications. For example, some satellite imaging is big data but is used as administrative data.

1.30   *Data Source*
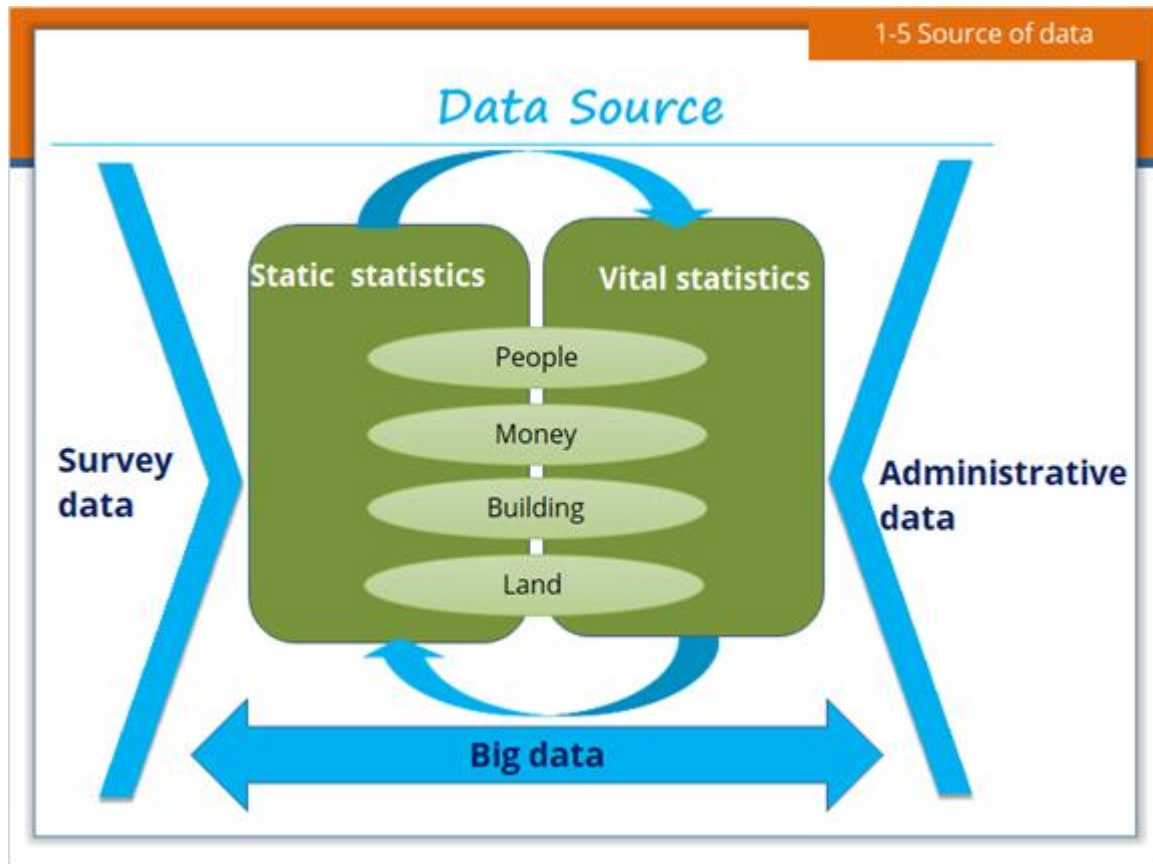
Notes:

As a tendency, main data sources for statistics are survey data while those for vital statistics are administrative data. When something is changed, it needs to be reported and registered as well as recorded as administrative data based on laws or regulations. For example, people are recorded whenever they are born or die to the civil registers. On the other hand, the population is captured through the Population Census. Ideally the population could be calculated from accurate data of birth, death and migration anytime. Nevertheless, it is difficult to record these statistics precisely. Similarly, financial transfers are reported and recorded, especially among corporations while the static financial stocks would not be recorded unless they are surveyed. Building and land transfers are also recorded while their static situation is gained through surveys

including the Population and Housing Census as well as the Economic Census. Those whose records are not obligatory are not reported automatically as well, and surveyed such as health, expenditure, employment, and time use of individuals. Big data support both survey data and administrative data. Mobiles will be alternatives for population data sources. Expenditures are recorded through scanners in stores, restaurants or institutes for services. Crop surveys can be substituted by data from satellites.

1.31 Census

Census

Households

Establishments

Population Census

Economic Census

Agricultural Census

- Individual
- Houses
- Employment
- Education

- Industry
- Capital
- Turnover
- Employment

Fishery Census
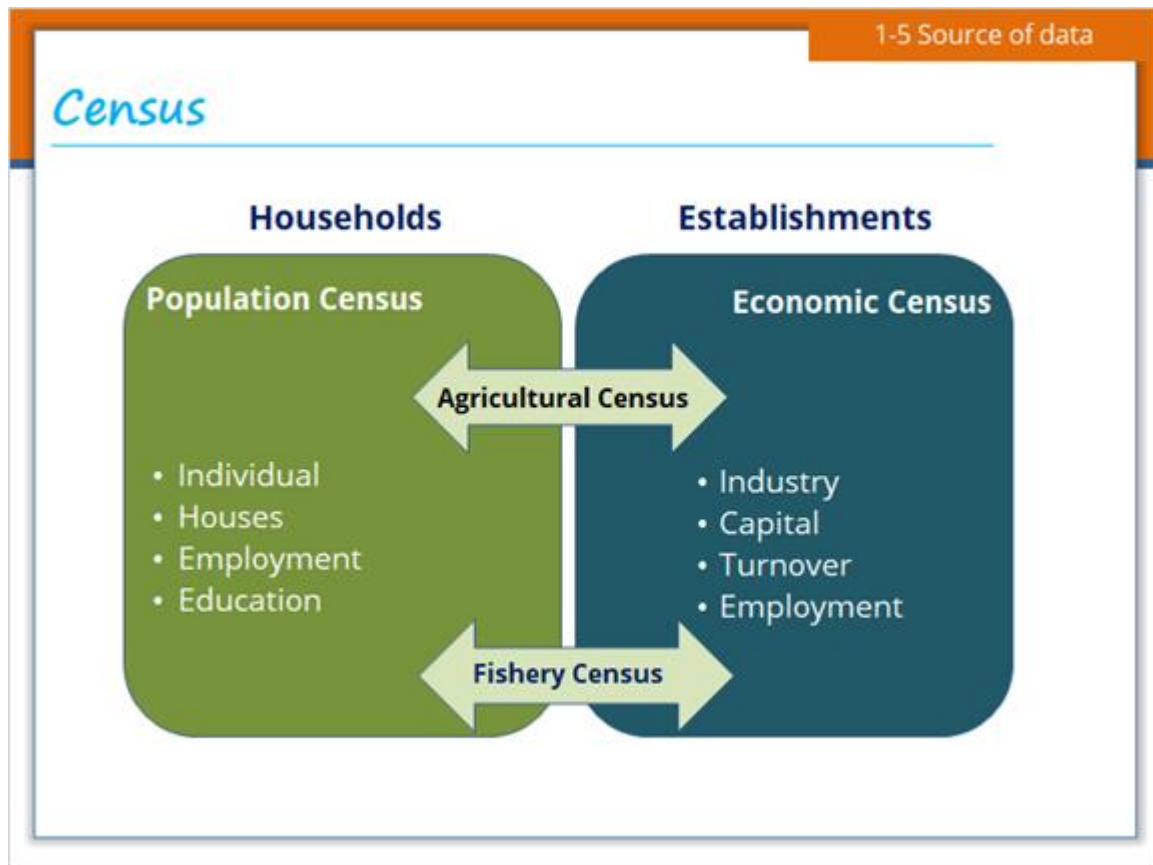
Notes:

Among statistical surveys, those whose target units are all selected are said to be the census. There are censuses both for households and establishments. The typical census for households is the Population Census. Items of the Population Census are attribution of household members, their educational and employment information as well as their houses. Thus, the Population Census is sometimes called the Population and Housing Census. Strictly speaking, a Population Census is the total process of planning, collecting, compiling, evaluating, disseminating and analyzing demographic, economic and social data at the smallest geographic level pertaining, at a specified time, to all persons in a country or in a well-delimited part of a country, while the housing census is the total

process of planning, collecting, compiling, evaluating, disseminating and analyzing statistical data relating to the number and condition of housing units and facilities as available to the households pertaining, at a specified time, to all living quarters and occupants thereof in a country or in a well-delimited part of a country.

Targets of the Economic Census are establishments like companies, corporate institutes and universities. Items of the Economic Census include both the information for workers and finance. There are other censuses for main industries including manufacturing and commerce. Targets of the Agricultural Census and the Fishery Census extend both areas for households and establishments.

1.32 Examples of Sample Surveys
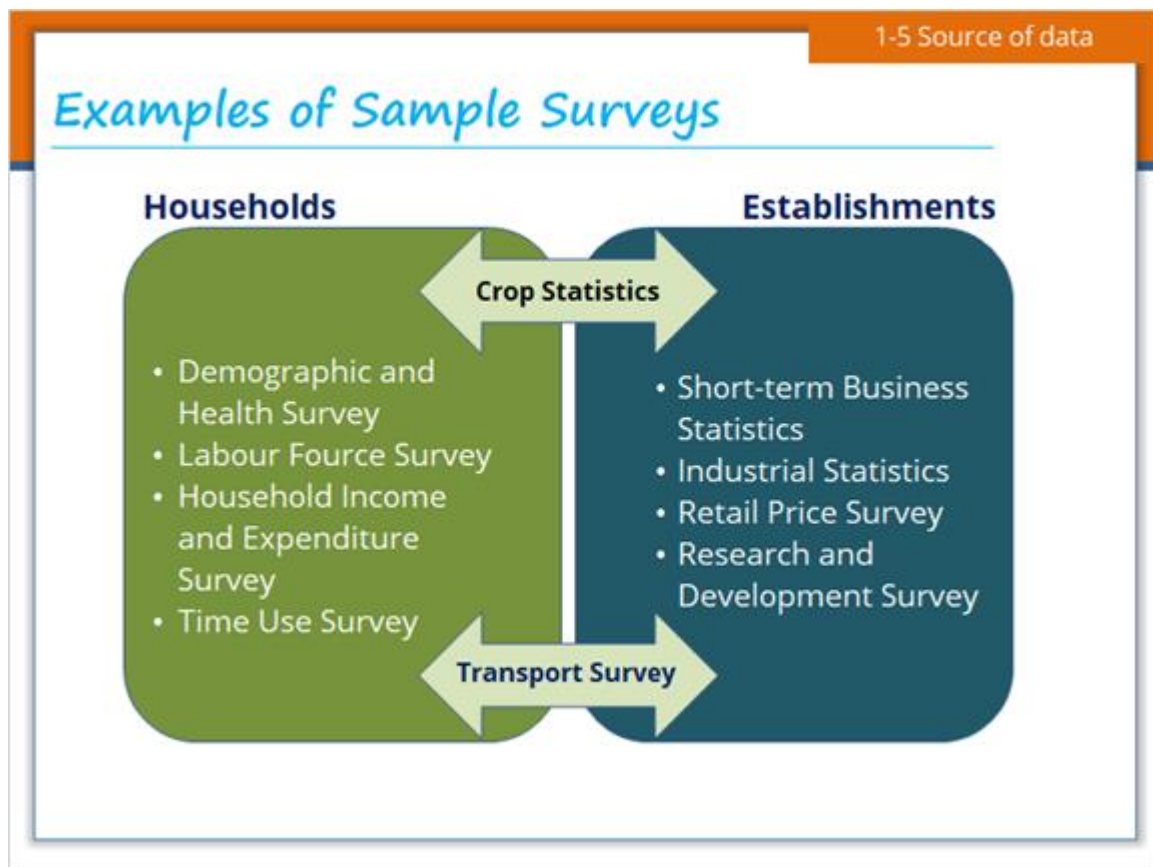
Notes:

A lot of sample surveys exist both for households and establishments.

Typical household surveys are the Demographic and Health Survey (DHS), Labour Fource Survey, Household Income and Expenditure Survey and Time Use Survey. For establishments, various kinds of surveys are conducted according to countries. In particular, data on employment, turnover and price are collected frequently monthly or

quarterly in a lot of countries. This information is captured through administrative data or big data instead of surveys in some countries. Some surveys are conducted both for households and establishments such as surveys for farmers and transport.

It is important for the government to coordinate response burdens by households and establishments.

1.33 Administrative Data

Notes:

Traditionally, administrative data are received in a highly structured manner from public administrations, and then processed, stored, managed and used by the statistical institutes. Administrative data may not capture the entire population of interest to official statistics. Among the most-cited sources of administrative data are data from tax and value added tax offices. Other sources are person registers and business registers. Transactional sources, often cited as Big Data, are supermarket scanner data, telephone communication, credit card transactions and toll collection data. In terms of sensor or satellite sources, several countries stated that they used satellite imaging for survey design. Satellite imaging was also stated as a source for studying crop production

statistics. Road sensors are used for both transportation statistics such as the traffic index in the Netherlands and environment statistics such as measuring air quality in the UK.

Partnerships with the public sector contribute to official statistics by supporting data acquisition, advancing statistical business processes, and developing information technology infrastructure, tools and software. These partnerships increase the value of statistics by supporting existing programs and addressing data gaps.

Partnerships are also crucial for coordination with the providers of administrative data. A prevalent theme among statistical agencies is to reduce response burden by taking a whole-of-government approach to data collection and production, including the sharing of government-held data to reduce duplication.

1.34 Statistical Register
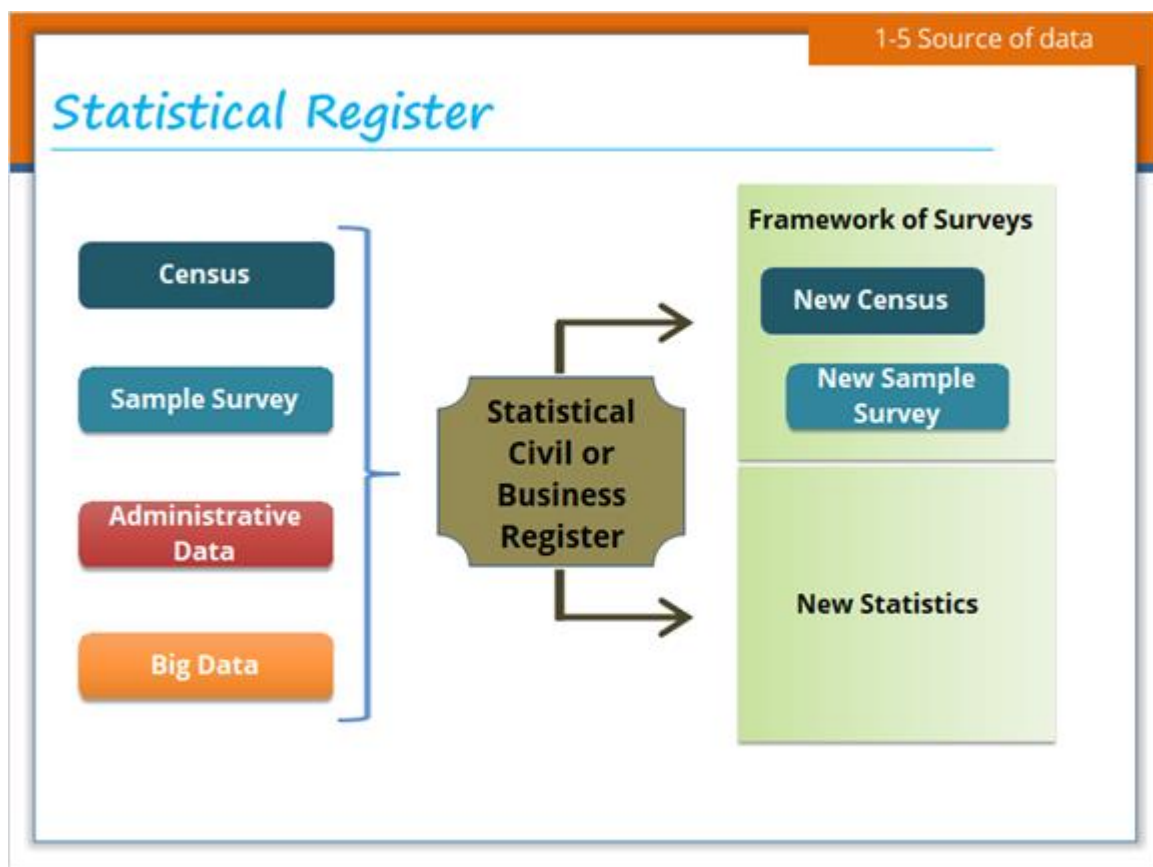
Notes:

Some data from surveys, administrative data and big data are arranged, combined, and accumulated in the same database called statistical register by individuals, households

or establishments. A typical example is the Civil Registration for individuals including birth, marriage, and death information. Another example is the Business Register for establishments including industry, employment and turnover information. These registers are used for the framework of surveys, providing lists for sampling units, and can be data sources for new statistics.

1.35 Characteristics of Big Data
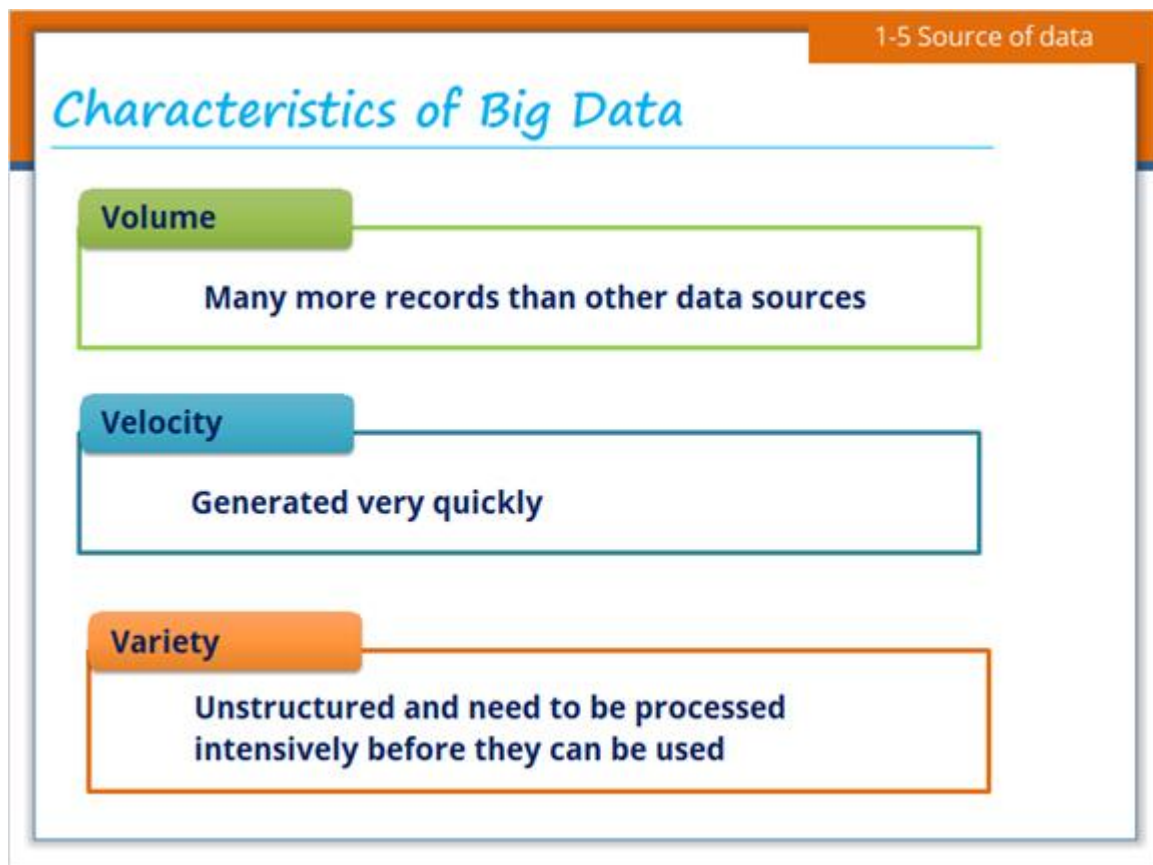
Notes:

There are three characteristics: high **volume**, high **velocity** and high **variety** for Big Data.　While veracity is sometimes included in the characteristics because of uncertainty of data, big data for official statistics need secure clarity.

The 2030 Agenda for Sustainable Development for the time period from 2016 until 2030 comprises 17 SDG Goals, subdivided into 169 targets and 232 indicators. In comparison, there were only 8 MDG Goals with 21 targets and 60 indicators for the previous period from 2000 until 2015. Not only do the SDGs cover a much broader range of issues, the SDG indicators are also very different from and more complex than the MDG indicators,

thus in many instances challenging for traditional statistics. Therefore, innovative approaches are required. The technological environment has continued to advance in recent years to a stage where it now appears promising to harness big data for both the achievement of SDG targets as well as the calculation of SDG indicators. Many of the new big data are passively emitted and collected as by-products of people's interactions with and uses of digital devices. Data coming from various sources provide unique insights about human behavior and beliefs, which could be harnessed to increase the quality of life of these people, thereby contributing ultimately to the achievements of the SDGs.

1.36 Big Data Sources

Notes:

Main Big data sources are administrative sources, commercial or transactional sources, sensor network sources, tracking device sources, behavioral data sources and opinion data sources.

Partnerships with commercial organizations are likely to become more prevalent as statistical agencies venture into Big Data and crowdsourcing. In most cases, private

sector partners are both data providers and data users.

One promising avenue is the use of private sector administrative data for the purposes of constructing official statistics - for example, using credit card company information or utility company records to yield information about residency or lifestyle.

1.37 Satellite Imaging for Agriculture Statistics in Australia
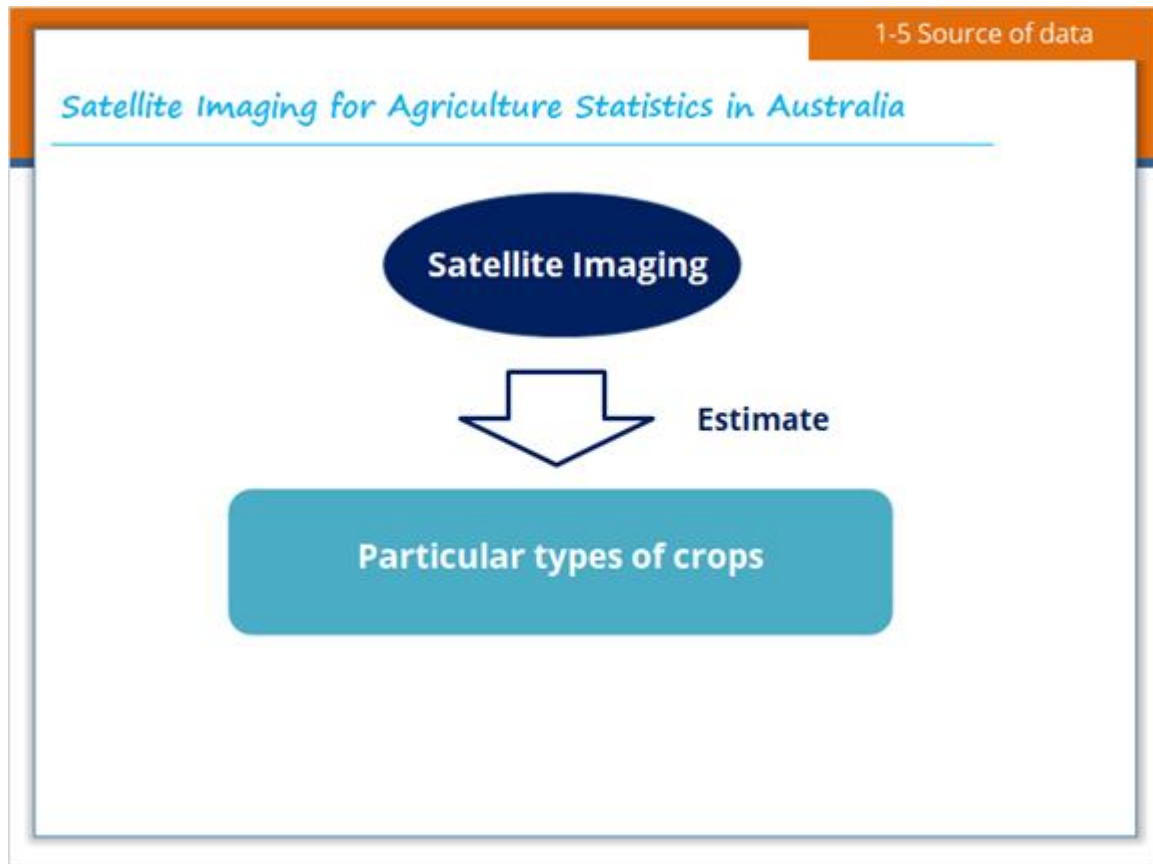
Notes:

Satellite imaging is being used in the area of land-cover and in research programmes where agricultural land-use features are employed to estimate particular types of crops. The spatially generated features are utilized as input into statistical models created to perform calculations in the compilation of agriculture statistics. Potentially, they can also be applied to the compilation of fisheries and forestry as well as environment statistics. The raw data are accessed and processed on a cloud server of the supplier's system outside the statistical organization's computing environment. The image analysis algorithms for extracting spatial land-use features are developed in joint research with university collaborators. This involves the development of algorithms, spatial and time-series models, geo-coding systems and statistical estimation processes.

1.38 Examples of Big Data for Statistics in Netherlands
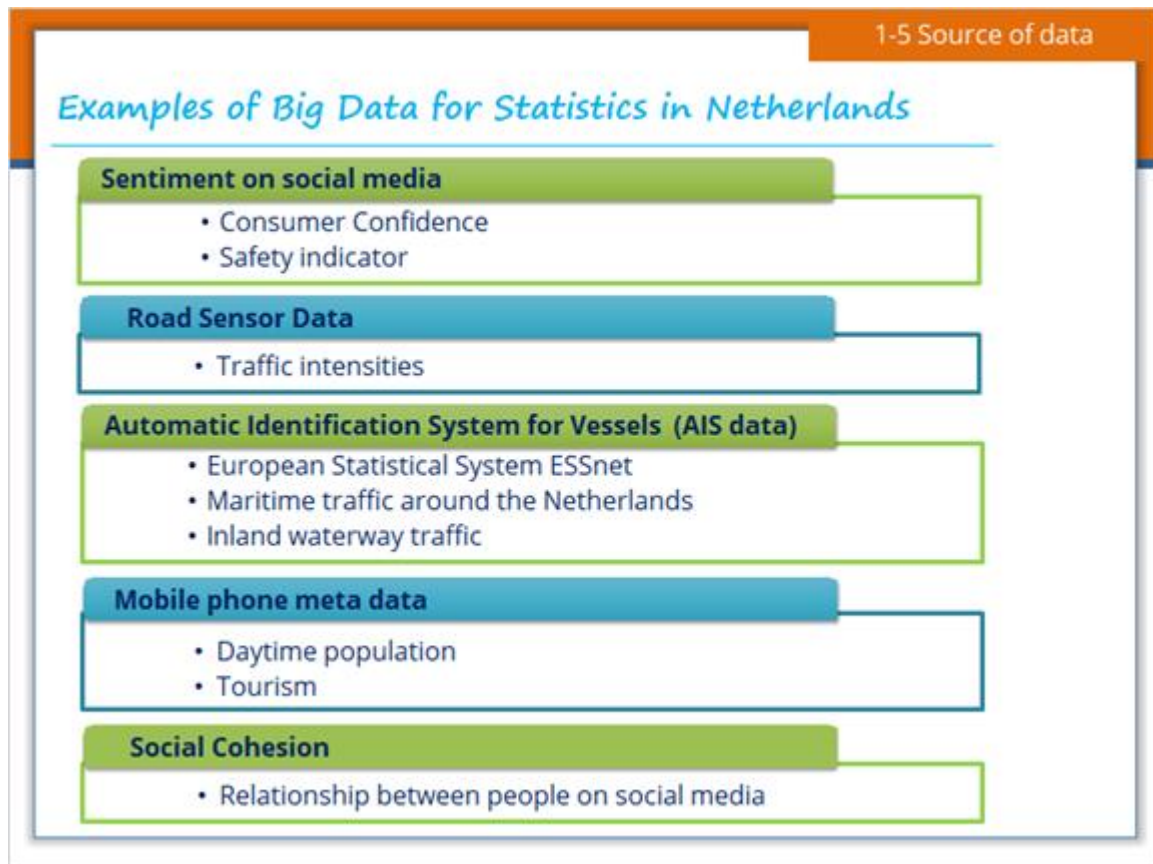
Notes:

An increasing number of people are active on social media. Here, people voluntarily share information, discuss topics of interest and contact family and friends. Since the responses to the questionnaires of Statistics Netherlands continue to decline, the potential usability of the messages created and shared voluntarily in social media as a data source for official statistics was investigated. For this purpose, publically available social media messages created on various social media platforms, such as Twitter and Facebook, as well as the public messages posted on news sites, web forums and blogs, were studied. The messages were obtained from a commercial company that routinely harvested all publically available messages written in Dutch on the Dutch-language part of the web. Both the content and the sentiment of the messages were studied.

Determination of the sentiment in all messages created on all available platforms revealed a highly interesting potential use of these data for statistics. The sentiment in these messages was found to be highly correlated with Netherlands consumer confidence, in particular with sentiments regarding the economic situation. The latter relation was stable on a monthly and on a weekly basis. Daily figures, however,

displayed highly volatile behavior suggesting that it is possible to produce monthly and weekly sentiment indicators comparable with consumer confidence. The latter indicators can be produced on the first working day following the week studied, demonstrating the ability to deliver results quickly.

1.39 1-6 Fundamental Principles of Official Statistics
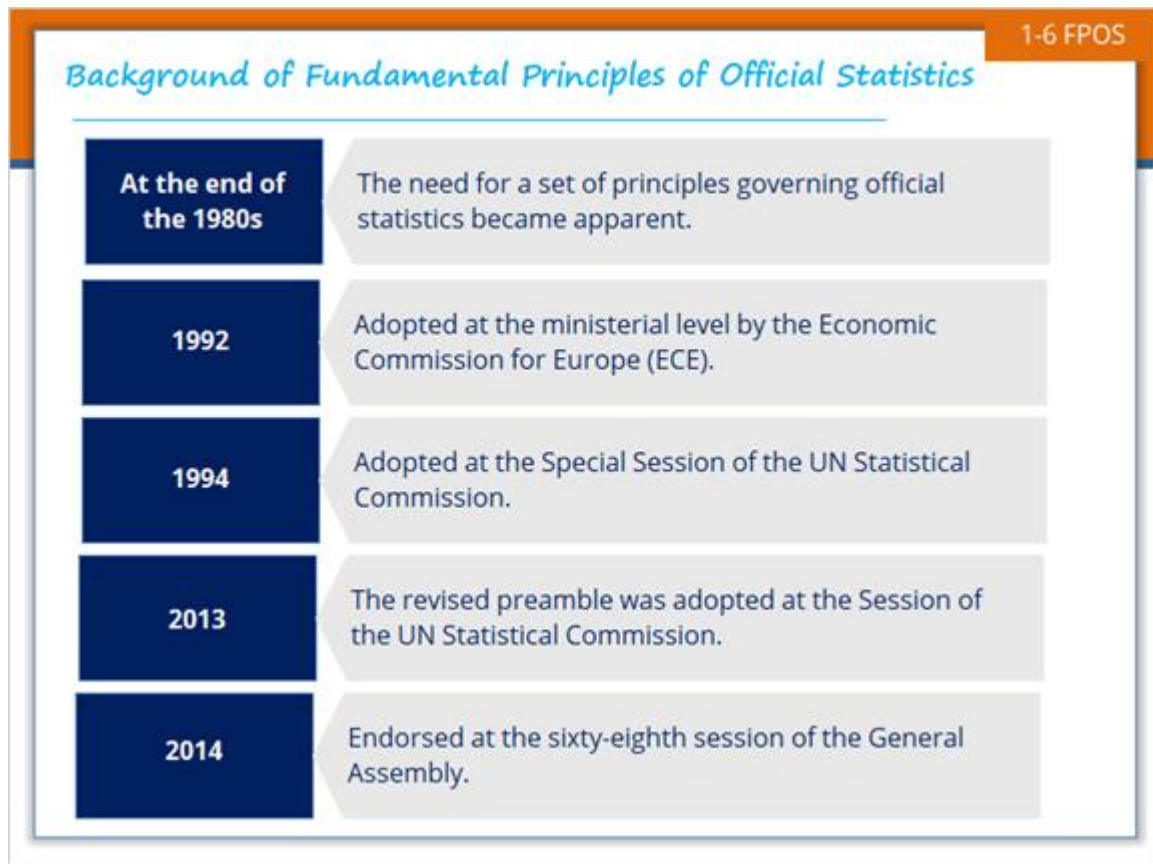

1-6 Fundamental Principles of Official Statistics
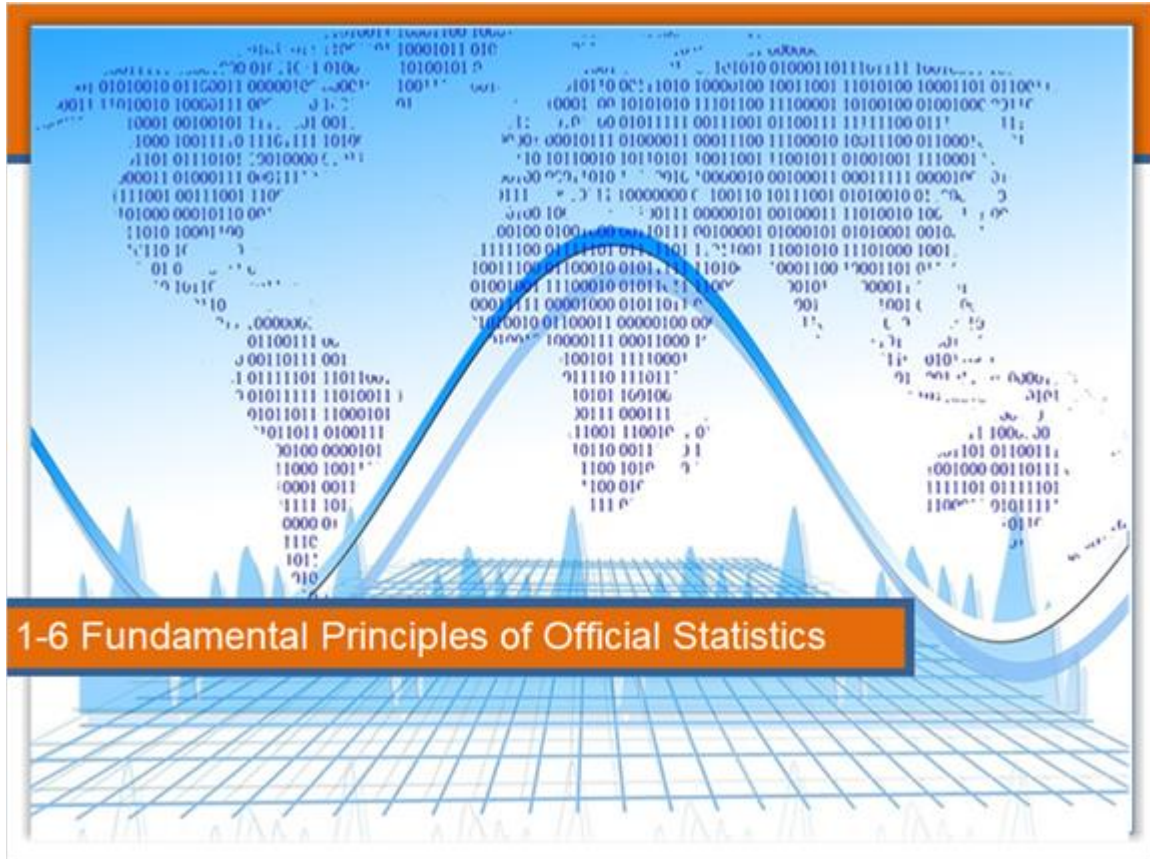
Notes:

1.40 Fundamental Principles of Official Statistics
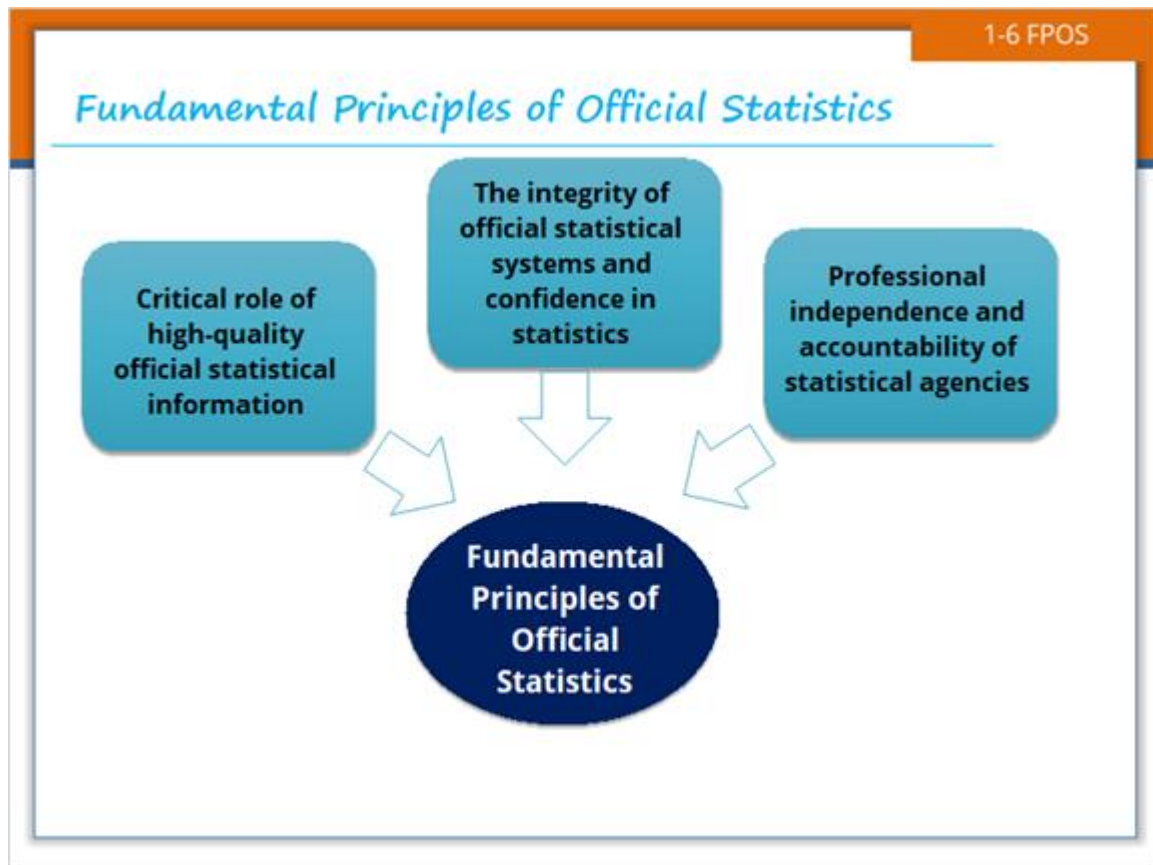
Notes:

The Fundamental Principles of Official Statistics are principles for official statistics, endorsed by the UN General Assembly, that govern the production and dissemination of official statistics all over the world.

Fundamental Principles of Official Statistics are established bearing in mind the critical role of high-quality official statistical information in analysis and informed policy decision-making in support of sustainable development, peace and security, as well as for mutual knowledge and trade among the States and peoples of an increasingly connected world. This world demands openness and transparency, that the essential trust of the public in the integrity of official statistical systems and confidence in statistics depend to a large extent on respect for the fundamental values and principles that are the basis of any society seeking to understand itself and respect the rights of its members, and in this context that professional independence and accountability of statistical agencies are crucial, stressing that, in order to be effective, the fundamental values and principles that govern statistical work have to be guaranteed by legal and institutional frameworks and be respected at all political levels and by all stakeholders in National Statistical Systems (NSSs).

1.41 Background of Fundamental Principles of Official Statistics

Notes:

The need for a set of principles governing official statistics became apparent at the end of the 1980s when countries in Central Europe began to change from centrally planned economies to market-oriented democracies. It was essential to ensure that NSSs in such countries would be able to produce appropriate and reliable data that adhered to certain professional and scientific standards. Towards this end, the Conference of European Statisticians developed and adopted the Fundamental Principles of Official Statistics in 1991, which were subsequently adopted in 1992 at the ministerial level by the Economic Commission for Europe (ECE). Statisticians in other parts of the world soon realized that the principles were of much wider, global significance. Following an international consultation process, a milestone in the history of international statistics was reached when the UN Statistical Commission at its Special Session in 1994 adopted the very same set of principles - with a revised preamble - as the UN Fundamental Principles of Official Statistics.

In 2011 the Statistical Commission discussed the Fundamental Principles of Official

Statistics and acknowledged that the Principles were still as relevant today as they had been in the past and that no revision of the 10 Principles themselves was necessary. The Commission recommended, however, that a Friends of the Chair group revise and update the preamble of the Principles in order to take into account new developments since the time when the Principles were first formulated. In 2013 the Statistical Commission adopted the revised preamble.

At the same session the Commission recommended to the Economic and Social Council the adoption of a draft resolution on the Fundamental Principles of Official Statistics. In accordance with that recommendation, the Council endorsed the Fundamental Principles in its resolution 2013/21 of 24 July 2013. In the same resolution, the Council recommended the Fundamental Principles to the General Assembly for endorsement. Pursuant to the recommendation of the Economic and Social Council, the representative of Hungary, together with 48 co-sponsors, introduced a draft resolution on the matter at the sixty-eighth session of the General Assembly. After a short informal consultation process, the Assembly, in its resolution 68/261 of 29 January 2014, endorsed the Fundamental Principles of Official Statistics.

1.42 Principle 1 of Fundamental Principles of Official Statistics

Notes:

Principle 1 describes the responsibility of statistical offices to make official statistics available to everyone: "Official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honor citizens' entitlement to public information."

1.43 Principle 2 of Fundamental Principles of Official Statistics

Notes:

Principle 2 speaks of maintaining trust in statistics through the exercise of professional and scientific judgement in "the collection, processing, storage, and presentation of statistical data". Official statistics are significant to policy making but never influenced by policy.

1.44 Principle 3 of Fundamental Principles of Official Statistics

Notes:

Based on Principle 3, official statisticians must develop rational explanations whenever their statistics are criticized under lack of reasons. This principle strengthens the role of **metadata**: providing information on data and about processes of producing and using data.

1.45 Principles 4-6 of Fundamental Principles of Official Statistics

Notes:

Based on Principle 4 statistical agencies must check feedback from users on their statistics and comment quickly on their erroneous interpretation and misuse of statistics, since misunderstanding would mislead a lot of stakeholders. Principle 5 notes that "Data for statistical purposes may be drawn from all types of sources, be they statistical surveys or administrative records. Principle 6 states that individual data are to be kept "strictly confidential and used exclusively for statistical purposes", very clear on statistical confidentiality.

1.46 Principles 7 -10 of Fundamental Principles of Official Statistics

Notes:

Principle 8 strengthens the significance of coordination among statistical agencies within countries.

Principle 10 is rooted in the international roles of statistics. Lack of statistics in some countries would lead to lack of policy making in regions or in the world under globalization. Thus, cooperation and coordination in statistical activities are necessary at regional and global levels.

These factors will be elaborated on in the following lesson, Lesson 2.

This is the end of Lesson 1.

1.47 Summary of Lesson 1

Summary of Lesson 1

- Official statistics are statistics that are produced according to rigorous quality standards and released by government agencies to the public.
- Official statistics are evidences for decision by people as well as evidences for policy planning, implementation and monitoring by governments.
- The Generic Law provides a strong reference for developing a solid legal basis for the functioning of a National Statistical System (NSS) and the production of high quality official statistics.
- Data sources of official statistics are statistical surveys, administrative data and Big Data.
- The Fundamental Principles of Official Statistics are principles for official statistics, endorsed by the UN General Assembly, that govern the production and dissemination of official statistics all over the world.

Notes:

1.48 End of Lesson

Notes:

2. Menu

2.1 Menu