RÉPUBLIQUE DU BÉNIN

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MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE SCIENTIFIQUE

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UNIVERSITÉ DE PARAKOU

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ÉCOLE NATIONALE DE STATISTIQUE, DE PLANIFICATION ET DE DÉMOGRAPHIE (ENSPD)

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Master 1

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CONCEPTS ET TERMINOLOGIES STATISTIQUES, DEVELOPEMENT LOCAL ET SUIVI-EVALUATION EN ANGLAIS

:

RESUME DE COURS

Enseignant

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Année académique 2024 2025

RESUME DE COURS

Chapter I: Compendium of concepts and definitions in Statistics

1 What is statistics?

Definition (**Statistics**). Statistics consists of a body of methods for collecting and analyzing data. (Agresti & Finlay, 1997)

From above, it should be clear that statistics is much more than just the tabulation of numbers and the graphical presentation of these tabulated numbers. Statistics is the science of gaining information from numerical and categorical data

2 Population and Sample

Population and sample are two basic concepts of statistics. Population can be characterized as the set of individual persons or objects in which an investigator is primarily interested during his or her research problem. Sometimes wanted measurements for all individuals in the population are obtained, but often only a set of individuals of that population are observed; such a set of individuals constitutes a sample. This gives us the following definitions of population and sample.

Definition (Population). Population is the collection of all individuals or items under consideration in a statistical study. (Weiss, 1999)

Definition (Sample). Sample is that part of the population from which information is collected. (Weiss, 1999)

When population and sample is defined in a way of Johnson & Bhattacharyya, then it's useful to define the source of each measurement as sampling unit, or simply, a unit.

The population always represents the target of an investigation. We learn about the population by sampling from the collection. There can be many different populations, following examples demonstrates possible discrepancies on populations.

Example (Finite population). In many cases the population under consideration is one which could be physically listed. For example:

–The students of the University of Parakou,

–The books in a library.

Example (Hypothetical population). Also, in many cases the population is much more abstract and may arise from the phenomenon under consideration. Consider e.g. a factory producing light bulbs. If the factory keeps using the same equipment, raw materials and methods of production also in future then the bulbs that will be produced in factory constitute a hypothetical population. That is, sample of light bulbs taken from current production line can be used to make inference about qualities of light bulbs produced in future.

3 Descriptive and Inferential Statistics

There are two major types of statistics. The branch of statistics devoted to the summarization and description of data is called descriptive statistics and the branch of statistics concerned with using sample data to make an inference about a population of data is called inferential statistics.

Definition (Descriptive Statistics). Descriptive statistics consists of methods for organizing and summarizing information (Weiss, 1999)

Definition (Inferential Statistics). Inferential statistics consists of methods for drawing and measuring the reliability of conclusions about population based on information obtained from a sample of the population. (Weiss, 1999)

Descriptive statistics includes the construction of graphs, charts, and tables, and the calculation of various descriptive measures such as averages, measures of variation, and percentiles.

Inferential statistics includes methods like point estimation, interval estimation and hypothesis testing which are all based on probability theory.

4 Parameters and Statistics

Usually, the features of the population under investigation can be summarized by numerical parameters. Hence the research problem usually becomes as on investigation of the values of parameters. These population parameters are unknown and sample statistics are used to make inference about them. That is, a statistic describes a characteristic of the sample which can then be used to make inference about unknown parameters.

Definition (Parameters and Statistics). A parameter is an unknown numerical summary of the population. A statistic is a known numerical summary of the sample which can be used to make inference about parameters. (Agresti & Finlay, 1997)

Chapter II : General terms in Statstics

1- Few definitions

Population

–A statistical population is a set of data corresponding to the entire collection of units about which information is sought

–Population data has variable information from every individual of interest

Sample

–A sample from a statistical populations is the subset of a data that are actually collected in the course of an investigation

–Sample data has variable information from only some of the individuals of interest

- **Variable**

– Any characteristic or attribute of persons, objects, or events that can take on different numerical values

- **Observation**

– Is a record or notation made from observing a phenomenon

- **Datum**

– A single observation

- **Data**

– May be measurements or observations of a variable

- **Case**

– Typically a person being studied

Sampling

Sampling methods can be broadly categorized into different types based on their approach to selecting samples from a population. Here are some common types of sampling :

Random Sampling : Random sampling involves selecting individuals from a population entirely at random, where each member of the population has an equal chance of being included in the sample. This method helps to reduce bias and increase the likelihood of a representative sample.

Stratified Sampling : In stratified sampling, the population is divided into subgroups or strata based on certain characteristics (e.g., age, gender, income). Then, random samples are taken from each stratum in proportion to their representation in the population. This ensures representation from each subgroup.

Systematic Sampling : Systematic sampling involves selecting samples at regular intervals from a list or ordered population. For example, every 10th person on a list is chosen as a sample. This method is efficient and easy to implement.

Cluster Sampling : In cluster sampling, the population is divided into clusters (e.g., geographic regions or schools), and then entire clusters are randomly selected. All members within the chosen clusters become part of the sample. Cluster sampling is useful when it is impractical to reach all individuals in the population directly.

Convenience Sampling : Convenience sampling involves selecting samples based on what is easiest or most convenient for the researcher. This method may introduce bias since it relies on readily available subjects rather than a systematic approach.

Median: The population median is the middle value of the data when it is arranged in ascending or descending order. It is the value that separates the lower 50% from the upper 50% of the population.

Mode : The population mode is the value that occurs most frequently in the population dataset.

Range : The population range is the difference between the maximum and minimum values in the entire population.

Correlation Coefficient (ρ): The population correlation coefficient measures the strength and direction of the linear relationship between two variables in the entire population.

2- Hypothesis

A common aim in many studies is to check whether the data agree with certain predictions. These predictions are hypotheses about variables measured in the study.

Definition (Hypothesis). A hypothesis is a statement about some characteristic of a variable or a collection of variables. (Agresti & Finlay, 1997)

Hypotheses arise from the theory that drives the research. When a hypothesis relates to characteristics of a population, such as population parameters, one can use statistical methods with sample data to test its validity.

A significance test is a way of statistically testing a hypothesis by comparing the data to values predicted by the hypothesis. Data that fall far from the predicted values provide evidence against the hypothesis. All significance tests have five elements: assumptions, hypotheses, test statistic, p-value, and conclusion.

Definition (Null and alternative hypothesis). The null hypothesis H0 is the hypothesis that is directly tested. This is usually a statement that the parameter has value corresponding to, in some sense, no effect. The alternative hypothesis Ha is a hypothesis that contradicts the null hypothesis.

This hypothesis states that the parameter falls in some alternative set of values to what null hypothesis specifies. (Agresti & Finlay, 1997)

The test statistics is a statistic calculated from the sample data to test the null hypothesis. This statistic typically involves a point estimate of the parameter to which the hypotheses refer.

Definition (p-value). The p-value is the probability, when H0 is true, of a test statistic value at least as contradictory to H0 as the value actually observed. The smaller the p-value, the more strongly the data contradict H0. (Agresti & Finlay, 1997)

Chapter III: Expressions used in probability

1 Probability distributions

We first define the term probability, using a relative frequency approach. Imagine a hypothetical experiment consisting of a very long sequence of repeated observations on some random phenomenon. Each observation may or may not result in some particular outcome. The probability of that outcome is defined to be the relative frequency of its occurence, in the long run.

Definition (Probability). The probability of a particular outcome is the proportion of times that outcome would occur in a long run of repeated observations.

Definition (Random variable). A random variable is a variable whose value is a numerical outcome of a random phenomenon.

Definition (Probability distribution of a discrete random variable). A discrete random variable X has a countable number of possible values.

2 Mean and standard deviation of random variable

Like a population distribution, a probability distribution of a random variable has parameters describing its central tendency and variability. The mean describes central tendency and the standard deviation describes variability of the random variable X. The parameter values are the values these measures would assume, in the long run, if we repeatedly observed the values the random variable X is having.

3 Normal distribution

A continuous random variable graphically described by a certain bell-shaped density curve is said to have the normal distribution. This distribution is the most important one in statistics. It is important partly because it approximates well the distributions of many variables. Histograms of sample data often tend to be approximately bell-shaped. In such cases, we say that the variable is approximately normally distributed. The main reason for its prominence, however, is that most inferential statistical methods make use of properties of the normal distribution even when the sample data are not bell-shaped.

A continuous random variable X following normal distribution has two parameters: the mean μ and the standard deviation σ.

Definition (Normal distribution). A continuous random variable X is said to be normally distributed or to have a normal distribution if its density curve is a symmetric, bell-shaped curve, characterized by its mean μ and standard deviation σ. For each fixed number z, the probability concentrated within interval $[\mu - z\sigma, \mu + z\sigma]$ is the same for all normal distributions.

Definition (Standard normal distribution). A continuous random variable Z is said to have a standard normal distribution if Z is normally distributed with mean $\mu = 0$ and standard deviation $\sigma = 1$, i.e., $Z \sim N(0,1)$.

5 Sampling distributions

Statistical inference draws conclusions about population on the basis of data. The data are summarized by statistics such as the sample mean and the sample standard deviation. When the data are produced by random sampling or randomized experimentation, a statistic is a random variable that obeys the laws of probability theory. The link between probability and data is formed by the sampling distributions of statistics. A sampling distribution shows how a statistic would vary in repeated data production.

Definition (Sampling distribution). A sampling distribution is a probability distribution that determines probabilities of the possible values of a sample statistic. (Agresti & Finlay 1997)

Each statistic has a sampling distribution. A sampling distribution is simply a type of probability distribution. Unlike the distributions studied so far, a sampling distribution refers not to individual observations but to the values of statistic computed from those observations, in sample after sample.

Sampling distribution reflect the sampling variability that occurs in collecting data and using sample statistics to estimate parameters. A sampling distribution of statistic based on n observations is the probability distribution for that statistic resulting from repeatedly taking samples of size n, each time calculating the statistic value. The form of sampling distribution is often known theoretically. We can then make probabilistic statements about the value of statistic for one sample of some fixed size n.

Chapter IV : Conventions

1 Definitions

- According Larousse dictionnary Convention is : Agreement between persons, groups, subjects of international law (States, organizations), intended to produce legal effects and which is in principle binding on those who adhere to it; writing intended to formalize the reality of this agreement.

- So **Statistical conventions** refer to the standard practices and guidelines followed in the field of statistics to ensure consistency, accuracy, and meaningful interpretation of data. These conventions help statisticians and researchers make reliable inferences and draw valid conclusions from their analyses. Here are some essential statistical conventions :

- Rule of conduct adopted within a social group (usually plural);

- What is agreed, tacit or explicit.

2 Differents statiscals conventions

1- Significance Level (α): The significance level, often denoted by α, is the predetermined threshold used to assess the statistical significance of results. Commonly used values are 0.05 (5%) and 0.01 (1%). If the p-value (probability value) calculated from the data is less than the significance level, the results are considered statistically significant.

2- Hypothesis Testing: Hypothesis testing is a fundamental statistical convention used to make inferences about population parameters based on sample data. It involves formulating null and alternative hypotheses and testing them using statistical tests (e.g., t-tests, chi-square tests, ANOVA) to determine if there is enough evidence to reject the null hypothesis in favor of the alternative hypothesis

3- Confidence Interval (CI): A confidence interval is a range of values that provides an stimate of the true population parameter with a certain level of confidence. For example, a 95% confidence interval for a mean indicates that we are 95% confident the true population mean lies within that interval.

4- Central Limit Theorem: The Central Limit Theorem states that, under certain conditions, the sampling distribution of the sample mean (or other sample statistics) will be approximately normally distributed, regardless of the distribution of the underlying population. This theorem justifies the use of many statistical methods, especially those related to hypothesis testing

5- Outliers: Outliers are data points that deviate significantly from the rest of the data. It is essential to identify and handle outliers appropriately, as they can influence statistical analyses and conclusions

6- Data Visualization: Presenting data visually through graphs and charts is an important convention to gain insights and communicate findings effectively. Common types of graphs include histograms, bar charts, scatter plots, and box plots.

7- Random Sampling: Random sampling is the process of selecting a representative sample from a population in such a way that each individual has an equal probability of being included. It helps ensure that the sample accurately reflects the characteristics of the entire population.

8- Ethical Considerations: When conducting statistical research involving human subjects, ethical considerations are crucial. Researchers must obtain informed consent, maintain confidentiality, and ensure participant safety throughout the study

9- Reproducibility and Transparency: It is essential to provide clear and detailed documentation of the data, methods, and analyses used in a study to ensure that results can be reproduced and verified by others

10- Avoiding Data Misinterpretation: It is essential to avoid misinterpreting statistical results, including making causal claims from observational studies or confusing correlation with causation Avoiding Data Misinterpretation: It is essential to avoid misinterpreting statistical results, including making causal claims from observational studies or confusing correlation with causation

3 Conventions used in tables

"-" data do not exist/data are not applicable

"." data are not yet available

"?" nil or negligible

"billion" 109

(p) provisional

s.a. seasonally adjusted

n.s.a. non-seasonally adjusted

Chapter V: Domains of application

1 Importance/ uses of statistics.

Statistics involve manipulating and interpreting numbers. The numbers are intended to represent information about the subject to be investigated. The science of statistics deals with information gathering, condensation and presentation of such information in a compact form, study and measurement of variation and of relation between two or more similar or identical phenomena. It also involves estimation of the characteristics of a population from a sample, designing of experiments and surveys and testing of hypothesis about populations.

Statistics is concerned with analysis of information collected by a process of sampling in which variability is likely to occur in one or more outcomes.

Statistics can be applied in any field in which there is extensive numerical data.

Examples include engineering, sciences, medicine, accounting, business administration and public administration.

2 Major fields of application

Some major areas where statistics is widely used are discussed below.

(a) Industry: - Making decision in the face of uncertainties is a unique problem faced by businessmen and industrialist. Analysis of history data enables the businessman to prepare well in advance for the uncertainties of the future. Statistics has been applied in market and product research, feasibility studies, investment policies, quality control of manufactured products selection of personnel, the design of experiments, economic forecasting, auditing and several others.

(b) Biological Science: - Statistics is used in the analysis of yield of varieties of crops in different environmental conditions using different fertilizers. Animal response to different diets in different conditions could also be studied statistically to ensure optimum application of resources. Recent advancement in medicine and public health has been greatly enhanced by statistical principles.

(c) Physical Science: - Statistical metrology has been used to aid findings in astronomy, chemistry, geology, meteorology, and oil explorations. Samples of mineral resources discovered at a particular environment are taken to examine its essential and natural features before a decision is made on likely investment on its exploration and exploitation. Laboratory experiments are conducted using statistical principles.

(d) Government: - A large volume of data is collected by government at all levels on a continuous basis to enhance effective decision making. Government requires an up-to-date knowledge of expenditure pattern, revenue, estimates, human population, health, defense and internal issues. Government is the most important user and producer of statistical data.

3 Other fields of application

Statistics are used in a wide variety of areas such as:

▪ In geophysics: for weather forecasting, climatology, pollution, river and ocean studies;

▪ In demography: the census allows a photograph of a population at a given time and will subsequently allow surveys in representative samples;

▪ In the economic and social sciences, and in econometrics: the study of the behaviour of a population group or an economic sector is based on statistics. Environmental issues are also based on statistical data;

▪ In sociology: statistical sources are survey materials and statistical methods are used as data processing techniques;

▪ In marketing: the opinion poll becomes a tool for decision or investment;

▪ In physics: the study of statistical mechanics and statistical thermodynamics (see Statistical Physics) allows to deduce from the behavior of individual particles a global behavior (passage from microscopic to macroscopic);

▪ In metrology, for all aspects of measurement systems and measurements themselves;

▪ In medicine and psychology, both in terms of disease behaviour and the frequency or validity of treatment or screening;

▪ In archaeology, applied to remains (ceramics...)

▪ Ecology (study of plant communities and ecosystems)

▪ Insurance and finance (calculation of risks, etc.)

Chapter VI : Quantities and units

1 Definitions

- Quantity: property of a phenomenon, body, or substance, where the property has a magnitude that can be expressed as a number and a reference

The concept 'quantity' may be generically divided into, e.g. 'physical quantity', 'chemical quantity', and 'biological quantity', or base quantity and derived quantity.

- Kind of quantity: aspect common to mutually comparable quantities
- System of quantities: set of quantities together with a set of non-contradictory equations relating those quantities
- Base quantity : quantity in a conventionally chosen subset of a given system of quantities, where no subset quantity can be expressed in terms of the others
- Unit : A unit is a standardized and agreed-upon value used to express a specific

quantity.

- Base unit: measurement unit that is adopted by convention for a base quantity

derived unit: measurement unit for a derived quantity

- coherent derived unit: derived unit that, for a given system of quantities and for a chosen set of base units, is a product of powers of base units with no other proportionality factor than one
- System of units: set of base units and derived units, together with their multiples and submultiples, defined in accordance with given rules, for a given system of quantities

2 Types of quantities

We have two main types of quantities

a. Fundamental qualities

These are basic quantities that are not derived from any other measurement. They are the foundation of measurement system.

b. Derived quantities

Derived quantities are derived from the combination of two or more fundamental quantities. They are used in fields like physics, economics, social science.

3 International System of Units

International System of Unit: system of units based on the International System of Quantities, their names and symbols, including a series of prefixes and their names and symbols, together with rules for their use, adopted by the General Conference on Weights and Measures (CGPM). Note 1 The SI is founded on the seven base quantities of the ISQ and the names and symbols of the corresponding base units that are contained in the following table.

Base quantity	Base unit	
Name	**Name**	**Symbol**
Length	metre	m
Mass	kilogram	kg
Time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

Chapter VII : Tools and mesures

1 Definitions

What is to measure ?

It is an operation intended to provide numbers on which we will be able to apply athematical tools

Measuring scale

A measurement scale is a collection of statements that are supposed to indirectly account for the phenomenon underlying the construct that the researcher wishes to capture and measure (DeVellis, 1991)

Objective measurement – involves the measurement of physical quantities and qualities using measurement equipment

Subjective measurement – involves ratings or judgements by humans of quantities or qualities

• Reliability is the property of reproducibility of the results of a measurement procedure or tool

• Validity is concerned with accuracy of the test procedure

2 Different types of scales

There are four fundamental scales: Nominal, Ordinal, Interval and Ratio

1. Nominal Scales : names or categories

Examples include: gender, handedness, favourite colour, religion

- lowest level of measurement

When measuring using a nominal scale, one simply names or categorizes responses. Gender, handedness, favorite color, and religion are examples of variables measured on a nominal scale. The essential point about nominal scales is that they do not imply any ordering among the responses.

2. Ordinal Scales: names or categories and order is meaningful

Examples include: consumer satisfaction ratings, military rank, class ranking

3. Interval Scales: names or categories, the order is meaningful, and intervals have the same interpretation

Example: Celsius temperature scale

To sum up Interval scales are numerical scales in which intervals have the same interpretation throughout.

4. Ratio Scales: highest and most informative scale, contains the qualities of the nominal, ordinal, and interval scales with the addition of an absolute zero point

The ratio scale of measurement is the most informative scale. It is an interval scale with the additional property that its zero position indicates the absence of the quantity being measured.

Chapter VIII: Measure Disposition

Measures of center

[Agresti & Finlay (1997), Johnson & Bhattacharyya (1992), Weiss (1999) and Anderson & Sclove (1974)]

Descriptive measures that indicate where the center or the most typical value of the variable lies in collected set of measurements are called measures of center. Measures of center are often referred to as averages.

The median and the mean apply only to quantitative data, whereas the mode can be used with either quantitative or qualitative data.

1 The Mode

The sample mode of a qualitative or a discrete quantitative variable is that value of the variable which occurs with the greatest frequency in a data set. A more exact definition of the mode is given below.

Mode : Obtain the frequency of each observed value of the variable in a data and note the greatest frequency.

2 The Median

The sample median of a quantitative variable is that value of the variable in a data set that divides the set of observed values in half, so that the observed values in one half are less than or equal to the median value and the observed values in the other half are greater or equal to the median value.

To obtain the median of the variable, we arrange observed values in a data set in increasing order and then determine the middle value in the ordered list.

Definition of Median : Arrange the observed values of variable in a data in increasing order.

3 The Mean

The most commonly used measure of center for quantitative variable is the (arithmetic) sample mean. When people speak of taking an average, it is mean that they are most often referring to.

Definition (**Mean**). The sample mean of the variable is the sum of observed values in a data divided by the number of observations.

Chapter IX: Representations in statistics

Graph and diagram in Statistics

With a lot of data, it's very difficult for the human brain to figure out the configuration. A graph is a representation of statistical data. And if there are several types of data, there are also different types of graphs. Please note that graphs are not interchangeable.

- **Pie chart**

The circular diagram, commonly called «camembert», is preferred to represent series whose character is qualitative. The parts of the diagram have areas that are proportional to the frequency of each modality. It is sometimes represented in three dimensions (considered as more aesthetic in the context of some publications) or with a sector separate from the others (when one wants to highlight a particular modality).

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- **Bar graph**

Another form of statistical graph is the bar graph. It is the length of each bar that is proportional to the number or percentages. This type of graphic is perfect when the character is discrete quantitative. It is also used for qualitative characters. However, since the bars are on an axis, which implies a progression, it is preferable to reserve this diagram to represent a quantitative character. If necessary, it is possible to make this type of 3D graph to integrate a second character.

- **Histogram**

The histogram is used to visualize a series with a continuous character. It is made up of contiguous rectangles whose areas are proportional to the numbers. It is constructed from classes of values. These can have different amplitudes, which makes the histogram complicated. Moreover, the software that allows the automatic construction of such graphs are rare and the representations commonly called «histograms» are often simple graphs in enlarged bars.

- **The curve**

The curve is very often used but, contrary to the previous graphs, less to visualize the way in which statistical modalities are distributed than to represent a quantitative series in a changing situation, for example over time. It is not really a curve since it links in a straight line the points corresponding to the observations. It shows numbers, percentages, frequencies, an indicator or any measure. Mathematically, the curve represents a function for which there is often no algebraic expression. For some applications it is considered that a statistical curve can be approximated by an algebraic expression (for example the diffusion of a new product) in which case it is plotted in a curve. Its construction does not necessarily cross the x-axis with the level 0 of the vertical axis.

Thus, we speak of an increasing (or possibly decreasing) cumulative polygon of numbers (e.c.c) or frequencies (f.c.c). This does not represent an evolution but the distribution of a population, like the graphs listed above.

- **The whisker box**

It presents a synthesis of the dispersion of a statistical series. Not very difficult to build, it is however delicate to interpret. The interest of this type of graph is mainly to compare several populations (or samples).

- **The point cloud**

The point cloud, as it is presented in high school, is a kind of bar graph whose only edge appear. It is then the representation of a series according to a single criterion. However, it is not very interesting to replace bars with dots. In practice, the point cloud is ideal for representing individuals according to two quantitative criteria, materialized by two axes. It is therefore possible that several points are above each other (they do not represent a function). A third dimension can be introduced by replacing the points with discs whose diameter is proportionalto a third character (bubble chart) and even to add a third axis for a visualization in space in order to combine four criteria.

Chapter X: Local Development

Local development has become a major issue for communities around the world. The community profile is a summary of baseline conditions and trends in a community and study area. It establishes the context for assessing potential impacts and for project decision-making. Developing a community profile involves identifying community issues and attitudes, locating notable features in the study area, and assessing social and economic conditions and trends in the community and region that have a bearing on the project. Preparing a community profile is often an iterative process. Although some information can be collected early project development, other important information about the community may not be uncovered until later in project development or production

1. Definitions of Concepts

Development: it is the set of structural transformations (demographic, economic, social, mental, political, etc.) that make economic growth and the rise in living standards possible and accompany.

Development is a process that creates growth, progress, positive change in economic, environmental, social and demographic component without damaging the resources of the environment

Local development : a development related to a place, region, country. Which is limited to a determined, clearly circumscribed place.

Social change is a term used to describe variations or modifications of any aspects of the social processes, social patterns, social interactions or social organizations. Thus social change is a change in the social organisation.

2. Principles of Local Development

Local development is based on fundamental principles such as community participation, sustainability, the development of endogenous resources, the promotion of autonomy and the consideration of local specificities. These principles are essential to ensure a positive and sustainable impact.

3. Local Development Actors

Local development actors include local authorities, non-governmental organizations, local businesses, community groups, educational institutions, and other stakeholders. Their collaboration is crucial to carry out effective and inclusive local development initiatives.

4. Tools and Approaches to Local Development

Approaches such as participatory planning, public-private partnerships, microcredit, social entrepreneurship, and other innovative tools are used to promote local development. These approaches adapt to the specific needs of each community and promote the creation of sustainable opportunities.

Chapter XI: Monitoring and Evaluation

Monitoring and evaluation are the processes that allow policy-makers and programme managers to assess: how an intervention evolves over time (monitoring); how effectively a programme was implemented and whether there are gaps between the planned and achieved results (evaluation); and whether the changes in well-being are due to the programme and to the programme alone (impact evaluation).

1. What is M&E?

Monitoring is a continuous process of collecting and analysing information about a programme, and comparing actual against planned results in order to judge how well the intervention is being implemented. It uses the data generated by the programme itself (characteristics of individual participants, enrolment and attendance, end of programme situation of beneficiaries and costs of the programme) and it makes comparisons across individuals, types of programmes and geographical locations. The existence of a reliable monitoring system is essential for evaluation.

Evaluation is a process that systematically and objectively assesses all the elements of a programme (e.g. design, implementation and results achieved) to determine its overall worth or significance. The objective is to provide credible information for decision-makers to identify ways to achieve more of the desired results.

	What?		**Why?**
Monitoring	Ongoing gathering (and analysis) of information/data usually against targets and milestones)		Document results, rocesses and experiences and track progress as a basis for steering decisions and identifying issues early on to take corrective action.
Evaluation	Assessing data and information to establish a judgement on the success of a project. - Formative - Summative		To assess whether a project has achieved its intended goals/impact. But evaluation is not just for accountability reasons, but also learning to feed into future decisions

Monitoring is a continuous process, whereas evaluations are carried out at specific points of time in the course of the project (mostly at the end of the project or a project phase).

2. Theory Of Change (ToC)

A theory of change describes how an intervention will deliver the planned results. A causal/result chain (or logical framework) outlines how the sequence of inputs, activities and outputs of a programme will attain specific outcomes (objectives). This in turn will contribute to the achievement of the overall aim. A causal chain maps: (i) inputs (financial, human and other resources); (ii) activities (actions or work performed to translate inputs into outputs); (iii) outputs (goods produced and services delivered); (iv) outcomes (use of outputs by the target groups); and (v) aim (or final, long-term outcome of the intervention).

3. ToC v. Logframe

Theory of Change		Logframe
Usually presented as a diagram with narrative, but no standard format		Normally shown as a matrix called the Logframe
Shows the complexities of change : feedback loops, cyclical processes, and all the different pathways that might lead to change		Gives a detailed description of programme including monitoring data
Highlights the assumptions behind your intervention, evidence, and the drivers of change		Includes space for risks and assumptions, though basic, and doesn't include evidence
Gives the big picture describing how and why you think change happens		Criticised for being linear, all activities lead to outputs which lead to outcomes and the goal., no feedback loops, cyclical pathways etc.
If we do X, then Y will change because…		We plan to do X, and Y will happen as a result

4. Terminology

Inputs	The resources, both financial and human resources required to undertake your project.
Activities	Actions taken or work performed which should lead to outputs. e.g. the collection of data, the running of workshops, the organisation of meetings, the development of models etc.
Outputs	The immediate results of a grantee's activities – the processes, products, goods and services delivered through funded activities e.g. publications, manuals, dataset, models, workshops, stakeholder meetings etc. produced.
Outcomes	The short-term and medium-term effects of an intervention's outputs affecting policy or practice. Outcomes are observable behavioural, institutional or societal changes.
Impact	The long term sustained effects of a development intervention, direct or indirect. This is usually the goal of the programme/project.

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