# THE STEPS OF GEOGRAPHY RESEARCH METHODS

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## Introduction

One of the roles of geography as a field in research. That means someone with geography background should be mastered several things. This several things include field observation, create and use the maps, create and construct the documentation, use and construct the model, and so forth. In discussing the geography research methods will be explain the concept used. The concepts will be explained in geography research methods are about steps of research, formulation and statement of problems, formulation the goals of research, formulation hypotheses, data collection techniques, sample determination, data analyse and interpretation, and then conclusion.

## Discussion

### 1. The Steps of Geography Research

In order be able to carry the qualify geographical research, must be qualify minimum with regard to knowledge and geography, the ability to research techniques, data analyse and data interpretation. These abilities include the conceptual ability and research operational ability. With these abilities can be a step for do the geography research. The steps of geography research are:

1. Formulation and statement the research problem
2. Formulation the research goal
3. Formulation the research hypotheses
4. Population and sample determination
5. Data collection techniques
6. Data analyse and interpretation
7. Conclusion the result of research

There is some variation in sequence nor total concepts than used in geography research, but in generally that was explained above. The sequence and total concepts depend on the reality of the problem and the goal of research to be achieved. The steps above are one of the models than general used in geography research. Every concept or steps above will be described furthermore in this subsection.

#### a. Formulation and Statement the Research Problem

In this section will be explained the geography problem concepts, the examples of geography problem, formulation the problem research and question research. Before explain the problems research concepts, for the first this will be described flow chart about overall framework of research.

The research begins with assessment or observation to the problem topic than interests by researcher. To ensure that the researcher think is happened in the field and can be a research, so the researcher can conduct research occurs before observation as an assessment to the problems that will researched.

As shown in Figure 1, in determining and formulating the research problem should through the deep process to make sure the problem to be researched. After finding what happened “problem”, for the next must test the suitability of problem formulations. If the formulate is still unsuitable, then you have to make observations again to ascertain what exactly the research problem. After determined what the research problem it can move to the next step.

Furthermore, what exactly is the problem of geography, and what kind of geography problem can be used as an object in research. It can be seen in the next description.

The flow chart in research is:

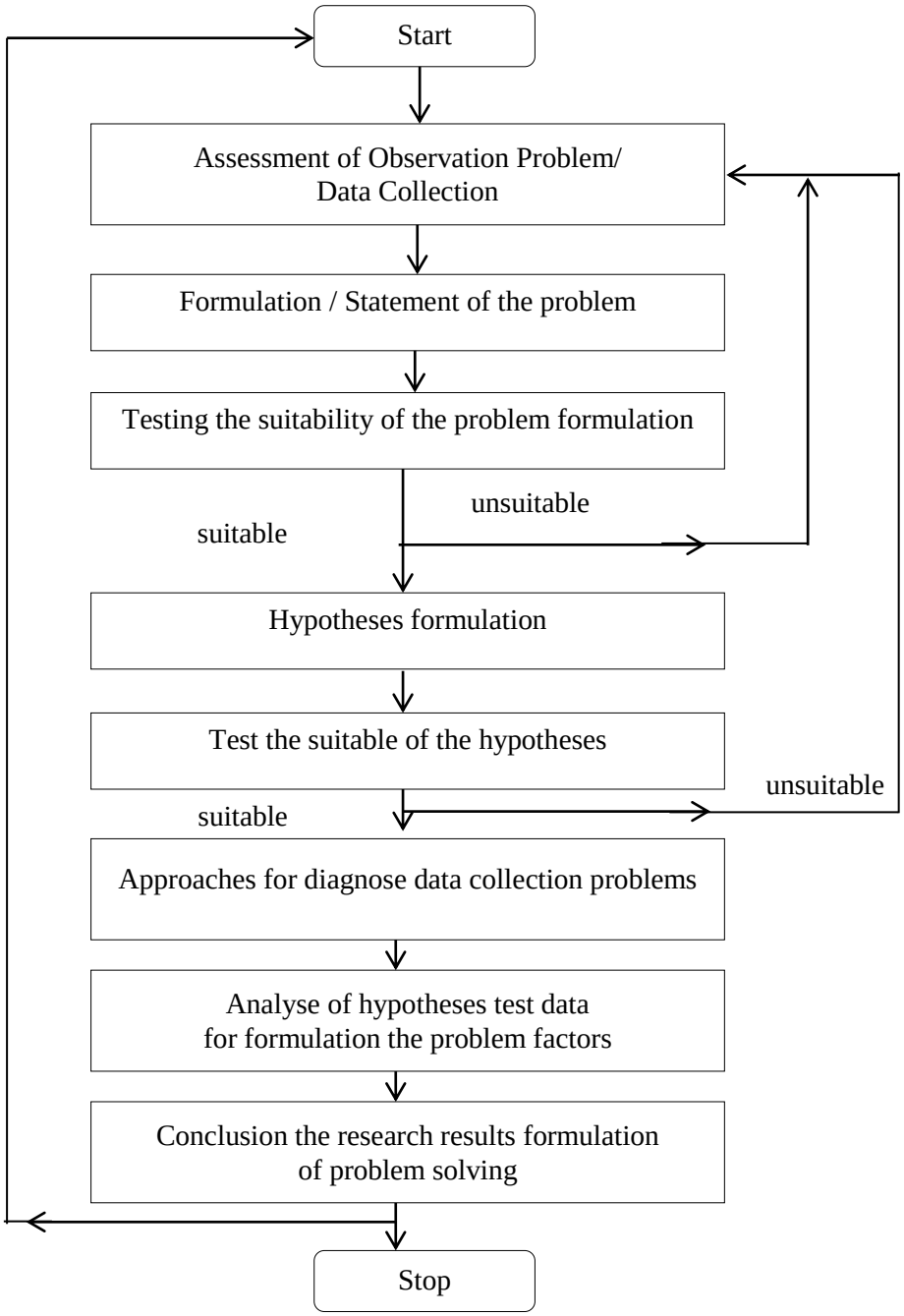


Figure 1. Flow Chart of Research Framework

**b. Geography Problem**

The problem is something that contains the issues that requires a solution. That means not all things contain a problem or not all things can be a problem.

So, the problem is a difficult situation to solve or mastered. Some said the problem is an unanswered question. What is the problem of geography? Regarding about the problem of geography, L. Lloyd Haring & Jhon Lounsbury (Sumaatmadja, 2008) stated as follows:

Geographical problems include at least three main question or issues, namely regarding what is related to the symptoms, about where is related to its location and space, and about the question of why regarding the relationship-interrelation-interaction of these symptoms with other

phenomena. The essence of the problem of geography cannot be separated from the nature of geography itself, the problem of geography is related to geographical phenomena, concern the space, and concern the association of related phenomena with other phenomena in the spatial system.

If turn to the limitations of the problem stated first, which is situation that is difficult to solve, then the situation is an imbalance of associations (relations, interrelations, interactions) of the symptoms that exist in a certain space. Pollution problems, lack of food (starvation), erosion, flooding, juvenile delinquency and so on. We can define it as a geographical problem if the review is emphasized on the imbalance of the symptoms related to the problem that exists in a certain space.

From the example of geographical problems that have been stated, some of them will be described about "why" can be defined as a geographical problem, the explanation is as follows: first, let us take the pollution problem which we define as a geographical problem based on what has been stated, the problems of pollution must be able to be expressed from three criteria that answer the questions include what, where and why.

- What? The answer is pollution
- Where? The answer should reveal the location and room in which it occurred. Here is where one of the characteristics of geography and geographical problems. Symptoms and problems concern the space and its location. This location and space have been able to reveal the characteristic of the symptoms and the problem
- Why? The answer must reveal why the space or the area is polluted. The answer must reveal the association of the pollution symptom or problem with other symptoms or variables in the area concerned.

For the next, we will reveal the starvation as a geographical problem as follows:

- What? The answer is starvation
- Where? The answer should reveal the area or space where the starvation was occurred.
- Why? The answer must disclose or further examine the association of symptoms or variables that caused starvation in the concern area. In described of number three that need requires careful attention to assumptions, techniques and hypotheses with the deep analyse.

That will happen to another problems. Then next, how problem can be used as an object in geography research? Therein lies our ability to apply the theories, concepts, principles and methodologies of geography to reveal what problems can be researched geographically.

**1) Formulation of Geographical Problem**

If the expression of understanding the geography problem is still stated in outline about what, where and why, then the problem formulation must be explained more detail. In this formulation problem, the phenomenon that be the main issues should be explained more detail until to the types of problem. As an example, if we are throwback to the pollution problem, we need to explain the types of that pollution. If that will be enable the explanation should be more detail.

Next, regarding with location and space, it is necessary to disclosed the distribution in the space and their density. Through this approach, we will be able to reveal the area differentiation of the pollution. Thus, we have to formulated the relevant problem based on the sector or concern space zone.

Finally, about the association (relations, interrelations, interactions) of symptoms or variables that causes the pollution have been reveal and formulated with concern to the physic, social, economic, culture, politic and so forth factors. The intensity of that variable association should be able to explained.

From the three of main criteria above, it should be able to formulate what exactly is the problem and what is the importance of geographical research on the problem. To direct the formulation of the problem to a more operational problem, we must to state the problem. Thus, we must make a problem statement regarding the research we will carry out.

**2) Research Problem Statement**

According to Haring and Louns Bury (Sumaatmadja, 2008), explain that "the success or failure of the research project may depend upon the proper statement of the problem" it is accuracy and perfection of the composing research question than will carry out. So, how should reveal or explain the problem?

The geographical problem regarding with imbalance association of symptoms or geographic variables that exist in the spatial system. In this case, it means in the space concerned there is unfair competition, disconnect association or unstable exploitation between the symptoms or variables are in the concern space. For more detail, can be explain that if in a space or a region have the unstable growth between an aspect, symptoms or industry sector with the settlement, agriculture and so forth sectors, that can cause many kinds of inequality or problems. As the result from imbalance association, can cause the flood, unemployment, congestion, and so on. If the activity of association and population needs there unstable with the forest or plants growth and recovery in concern area can cause the erosion problem, drought in dry season and flood in rainy season etc. That things are the problems that can disclosed through geography research.

Then was becomes an important part is "how to state or formulate the problem?" stating or formulating a problem means detailing the problem until to be some parts. For this reason, the research problem can reveal or formulate in questions form.

When confronted with a problem that must be investigated or usually namely as a problem research, then must submit many of questions regard with the main problem. In this geography research that will carry out, these questions must be based by theory, concept and principle that apply in geography. A least reflect the spatial location of distribution also the density and reflection the association (relations, interrelations and interaction) of symptoms in the spatial system. Looked from their questions can find some question that not easy to answer except should through the research, statement and formulation of the problem that can be proven.

## 2. The Research Purposes

As shown a Figure 1 about Flow Chart of Research Framework, the goal is not shown explicitly in that chart. Actually, which one called as a research is deeds and actions carried out to reach the certain goal. A good research must have the obvious target (about what) then must have an obvious purpose (for what and for whom). A scientific research in geography research must be real for what or for whom the research is carried out in the other means that must have an obvious purpose.

In essence, a scientific research must be based at least with two purposes there are theoretical purposes and practical purposes. Theoretical purposes are primarily directed at obtaining theoretical conclusions from the research concern, which can then be directed to the development of the science concern. While the practical purpose is a purpose to apply the research result for the benefit in everyday life and also for the sake the social problem.

The fulfilment both of purposes by a scientific research that caused the research stated can fulfil its mission as a "natural science". Geography research also formulate the research purposes accordance with which that want to achieved in the research are theoretical and practical purposes.

**a. Theoretical Purposes in Geography Research**

Looking for an outline, the theoretical purposes in geography research state as follows:

1) Get an objective data about the problem or symptom under the research
2) To examine the truth of hypotheses that applied to the problem under the research
3) Contribute the new concept, theory and principle that found in the research for benefit the developing in the geography scientific.

**b. Practical Purposes in Geography Research**

The practical purposes from geography research are:

1) Applying the result of geography research for purpose of solving social problems in the research area in particular and all experiences area with the same problem in generally.
2) Applying the result of geography research for the benefit in human life for now and in the future.
3) Contribute the result of geography for regional planning and development and for their benefit of life planning and development in general.

## 3. Formulation the Research Hypotheses

After formulation and describe the problems, next step is to propose the theory of the problem that have been proposed to make assumptions about the problem. Based on the theory stated, the hypotheses can be conducted to the variables and association cause the problem under the research.

In the context of research, theory or assumption about the problem is conceptualized as a hypothesis. Furthermore, this hypothesis can be used as a research basic to be carried out. Observing to the flow chart in Figure 1, formulation and determination of the hypothesis as a research basic, can't be finished only in one time. The formulation of the hypothesis must be adjusted in a several time until becomes a relevant theoretical basis.

The preparation of a good and precise research hypotheses, is not an easy and simple work. To the formulate an adequate hypothesis, need a theoretical ability, practical ability and operational ability regarding with the research scientific and the grand theory that used in the concern research at this opportunity of course about theoretical, practical and operational ability in geography scientific. A good hypothesis must be qualified by:

1) Trusted (plausible) and reasonable,
2) It is an expression of regularity of mind (consistency) and
3) Provide opportunities for empirical testing (chance of empirical testing).

Therefore, before the hypothesis can be used as a good research basic, its suitability must be tested in a several times until the researcher gets the result in accordance with the purposes research that have been set before.

The hypothesis is main basic research then called the working or exploratory hypothesis. The level of usefulness of working hypothesis in research depends on: (1) the sharpness of the researcher's observations (observation), (2) Imaging an orderly and creative thinking from the

researcher (disciplined imagination and creative thinking) and (3) Some the frameworks that formulated by researcher (some formulated theoretical framework). So, in formulation and determination of the hypothesis, our accuracy and thoroughness have been demanded in carry out the research. The fulfilment of these demands is the basis for the success of concern research.

Basically, the hypothesis that we state about a research problem can be expressed in three form, there are; 1) in the form of questions such as "is the change in air temperature associated with the elevation?" 2) can be expressed in a negative form such as "is the chance in air temperature is not associated with the elevation?". This kind of hypothesis called the null hypothesis, and 3) the hypothesis stated in a form that can stimulate the answer with some choice like "yes", "no" or "maybe". Determining which form is most suitable for the basis of the research that will be carry out, depends on the problem and research purposes to be achieved. It is possible to use the three forms of hypothesis at once, which is important the formulation of the hypothesis must be:

The formulation and preparation of hypothesis avoids data searching that is not relevant with the research problem. In short, through the formulation and preparation of accurate hypothesis, it can save energy, funds and time. The research is the essence of the formulation and preparation of hypothesis.

The formulation and preparation of hypothesis from geography research must be relevant with the geographical problem that will be occurs. Therefore, in its formulation must reveal the answer to the questions of what, where, and why so in the formulation of the hypothesis it must be obvious, what is being hypothesized, it must be obvious where the location and distribution of the symptom or problem that will be hypothesis, and must be obvious the intensity and degree of association of the symptoms to be measured or tested through the hypothesis. So, the hypothesis that we formulate must reveal the symptoms, the space or location and the spatial association of the symptoms in the concern spatial system.

If throwback to the pollution problem that was exampled when explain the research problem, in the research problem must be revealed the degree of pollution, the location of pollution in a space and association all various of the symptom in a concern space that causes the pollution. If according to the assumption or theory that the flood event can be associated with the development of settlements, the we must put forward the hypothesis of the association of flood with the development of settlements. According to the theory, the flood is associated with land use, the location of the source of the flood, then the associated degree of flood with land use that must revealed in hypothesis. Even, maybe based on the results of temporary observations and our reasoning that the degree of flood in the space or our research area is not only associated with one or two the symptoms or variables but there are possible to associated with more than three. That must be stated in our hypothesis research. From the next, how to state that hypothesis?

According what we explained before, we can reveal in the question form, hypothesis null and hypothesis that can stimulate the answer with "yes", "no" or "maybe".

**Hypothesis in question form:**

"Does the flood condition in some area have a relation with the settlement development in that area?".

For accept or refuse even to neutralize that hypothesis above, we must collect relevant data. Then analyse it, so that we get the conclusion for accept-refuse-neutralize that concern hypothesis.

**Hypothesis null:**

The hypothesis null is neutral or impartial to one of dominance variable or symptom that be our main issue under the research. So, if want the research is not biased, we can propose another different hypothesis with hypothesis null that can strongest the research will be occurs. Another revealed hypothesis to offset the null hypothesis called the alternative hypothesis. If the null hypothesis of the flood problems is stated as follows:

The degree of flood in X area is unrelation with settlements development in the concern area.

Alternative hypothesis that can submitted to hypothesis null above are as follows:

1) The degree of flood in X area is closely related to the development of settlements in the concern area.
2) The development of settlements in X area is positively correlated with the degree of flood in the concern area.
3) The development of settlements in X area is one of the factors that causes an increase in the degree of flood in concern area.
4) And so forth.

That hypothesis can give the answer "yes", "no" and "maybe".

The degree of flood in X area is a function of the development of settlements in the concern area.

The growth of certain types of settlements, becomes the basic for increase the degree of flood in concern area, and so on.

Accordance to the example above, then next to possible for formulate a hypothesis with various associate variables based on to the problem that we must be examined. After the hypothesis are suitable, then can choose and determine the data collection techniques tools for examination the hypothesis.

## 4.Data Collection Techniques and Tools

From the problems, purposes and hypothesis research can be a conclusion, but that must be supported by relevant data. Relevance of data with variables research based on relevant problem approach methods. Here is it where the various approach and methods are located. Before formulation and determination which techniques and tools will be used, first you must determine the most suitable approach method. The approach method that will be used as a framework is than poured into data collection techniques and tools.

### a. Data Collection Techniques in Geography Research

Data collection techniques that used in geography research is field observation, interview, questioner, documentation study and literature study. Applied that techniques are depends to data collections needs. Maybe in geography research there are some techniques only. In generally, the fifth of that techniques can be used together, even can completely in each other.

#### 1) Field Observation

Basically, the knowledge of geography is result from collected the data, fact and reality in field. Practically, the geographical symptoms and problems are direct happened in field. Therefore, to obtain the actual and direct geography data, that must do the field observation. Field observation is the main data collection technique in geography research.

In generally, observation have two types there are controlled observations and uncontrolled observations. For the purposes of geography research will be better to use controlled observations because the data can process and analyse by quantitative approach (statistic).

To make controlled observations in accordance with the problems in research and hypothesis examined, we must have a planning regard with that observation. This planning includes the approach planning and tools to be used.

In accordance with the research problem and hypothesis to be examined. Can determine which approach is most suitable (regional, topic, human activities approach, historical approach, etc.). The predetermined approach is expressed in the observation steps that will be carried out. While the variables or items that will be examined, are poured into the data collection tool that will be used. So, the approach method that has been used can be said to animate the steps or processes carried out in the observation, while the variables to be measured or the data to be collected are poured into the data collection tools.

Data collection tools that can be used to cover data during observations are: checklist, base maps, photographic tools and blank tables. However, it should be stated that the preparation and use of data collection tools must be as effective so there is no wastage of funds and times.

Controlled field observations with great planning are adapted to the research problem, which are in accordance to the hypothesis examined, that means they are arranged in such a way. So that the analysis can also be measured in a target manner. In this case, both the variables and the items have been arranged in such a way. Make it easier to analyse used the statistical methods.

#### 2) Interview Technique

Interview technique is a data collection technique that helps and completes data collected in uncomplete data causes cannot be revealed by observation technique. In geography research, this technique is not a primary data collection technique, but only a complementary technique.

Based on the observation result, completely data has not been obtained, especially regarding data in the form of opinions or attitudes from the population toward the symptoms or problems in research, then we can use interview technique. An interview technique can guarantee our needs in a target manner, is a closed interview. In the implementations of closed interview uses an interview guide (interview guide). In this interview guide, the approach method, variables and items to be obtained are outline. With the variables and items that have been compiled and selected, the data analyse can be carried out properly. In this case, the interviewer should be direct face to face with the interviewee.

#### 3) Questionnaire Technique

If the data in the opinions or attitudes form of people or residents is needed a very large quantities, it can be ineffective when using interview technique. Therefore, we have to use the questionnaire technique.

Questionnaire technique as a data collection technique that different with interview technique. The difference between these techniques, must be thoroughly understood, to avoid misapplication so that the research carried out can achieved the result in accordance with the purposes research. The following table is an outline of the differences in the implementation of both

**Table 1. Comparison between the Interview and Questionnaire Techniques**

| Interview Technique | Questionnaire Technique |
|---|---|
| Data collection/interviewers must deal directly with respondents | Data collection does not deal directly with respondents. |
| If there is an item or question that the respondent does not understand, the interviewer can explain it to the respondents. | Data collection does not provide an opportunity to explain items or questions that respondents may not understand. |
| Questions or problems can be submitted to respondents, both those who can read and those who cannot read. | Questions or problems can only be submitted to respondents who can read and write. |
| Between the expected total of respondents and the actually total of respondents who can be interviewed, there will be no big difference. Maybe the total is same. | Between the total of respondents who were confronted with the total who filled out the questionnaire list, the difference may be enormous. So, it must be taken into account how many lists of questionnaires will actually return. |

That some differences between the interview and questionnaire techniques than should be attend. Therefore, for determine the total of respondent and which whom to be a respondent, it must be detailed beforehand. For launch the list of the questionnaire in to the respondent, you must attend this instruction:

a) The questions, items and possible answers listed in a questionnaire list must be so obvious that it does not become a problem for the respondents. Instructions should be obvious, as much as possible provide examples of how the respondent should answer.
b) The total of questionnaire that are circulated must be calculated in such a way that the total of possible returns is in accordance with the number we can expect. The total of questionnaire circulated = expected total of around 40%.
c) It must be taken into account that the respondents to the questionnaire given are people who can read. Not every people can fill the questionnaire list.
d) On the list of the questionnaire there must be obvious instructions when the list should be returned or sent back to the data collector (researcher). Therefore, it must also be explained where and to whom the questionnaire must be returned.
e) If the list of questionnaire has to be returned to the interested parties (data collectors, researchers) by post, the cost of sending it back must be at the expense of the data collectors. So, the names of the data collectors must be obvious stated on the list of the questionnaire accompanied by sufficient stamps.

**4) Documentation Study Technique**

To complete data for problems analysed in the researching, then needs information from the documents that have a relation with object being studied. For this purpose, we have to do the documentation study. Historical approach regarding to some symptoms such as social, economic, culture and demographic phenomena are more related to documentation resources.

To read, select, use and study the documentation sources need a particular skill. In geographical research, we should have this particular skill. We don't need used all the documentation existed. The researcher no need to visit all of archive institution for get the data from documentation resources. With the particular skill, we will be able to select documents that are relevant to the interests of geography research.

In the documentation literature, researcher need have a knowledge about terms in documents language. The researcher must be skilled in divert and rearrange the data from a document in to the table with appropriate for analyse need. For ease the divert in this data, researcher have to arrange a blank table (document schedules). The arrangement of the items in this blank table such in accordance with the needs and listed to the document resources. Through the table used, the occurrence of data transfer error can be avoided and at the same time in accordance with the analysis process to be carried out.

**5) Literature Study Technique**

The great geography research than qualify will not happen without mastering the theories, principles, concepts and laws that apply to the field of geography and research science. We need theoretical data to fulfil this need, the researcher must study which appropriate literature for researching.

The opinions of experts in various fields relevant with the study, theoretical and operational concepts about research terms and so on, that obtained from literature. Without study literature, researcher cannot get the great result from that research.

Studying the literature, besides being required to be diligent, that also to have skills in selecting and using the relevant literature. In this case, the researcher must have the readiness mental to visit and met some people than have a literature we need

## 5.Data Collection Tools

The data collection tools commonly used are a checklist, base map, blank table (document schedule), interview guide, list of questionnaires and photographic equipment. In the context of geographic research, all these tools are very helpful. Equipment in the form of paper, besides we must be able to use it, researchers must also be able to arrange it themselves. For this purpose, researchers must train themselves and study the papers that have been made and used by others. In this way, researchers become rich in knowledge and skills when conducting research.

The main requirement for compiling and using research equipment in the form of paper is that the formulation and preparation must be in accordance with the research needs and the data analysis method to be used. This is the basic essence of the importance of data collection tools

## 6.The Population and Sample in Research

### a. Population in Research

In the nature and scope of geography, geography researchers have gained an understanding of the concept of what is the object of geographic research. All off the phenomenon, individual, case and problem to be studied, which is in the research area, becomes the object of geographic research. All cases, individuals and symptoms in the research area, called the population in research or universe. The geographic research population includes cases (problems, certain events), individuals (humans either as individuals or as groups), and symptoms (physical, social, economic, cultural, political) that exist in certain geographic spaces.

In a research, including the geographic research, if the population is too large, the researcher will not be able to examine all cases, all individuals and all symptoms. Therefore, in the research concerned, the researcher can take a part or sample from the population. Taking a part of population is called sampling.

### b. Sample in Research

The sample is part of the population (snippet, examples) that represent the population concerned. This representative criterion is taken from the overall characteristics or generalizations that exist in the population, which must be owned by the sample. Therefore, before being able to take a sample from a population, the researcher must have knowledge of the population. First, the researcher must make an estimate (mean of trait) of the population that we will take the sample.

The mean value of a population is called a parameter. A good sample, at least equal to 95% of the parameters. To meet such demands is of course difficult, especially if the character of the population is heterogeneous. For a homogeneous population, take a sampling is not too difficult.

Based on the fact that the geographical condition of a research object or a geographic research population is rarely homogeneous but more heterogeneous, this sampling techniques are many kinds. Provisions for this type of sampling, besides having to meet the requirements to represent the population, are also influenced by the character of the population (the level of homogeneity and heterogeneity of the population). Therefore, there are known random samples, systematic samples, area samples, stratified samples, quota samples, and so forth.

The criteria for the type of sample and its determination, apart from being influenced by the character of the population, are also influenced by the type of data analysis needed to examine the hypotheses and determinate conclusions from research results. Another provision on sampling is about the total of sample. What is the percentage of the sample size when compared to the population? Even this sample size, there is no definite number provision. The total of sample can range from 10 to 25%. The larger population, can make smaller total sample size and vice versa. The important point is the sample must represent the characteristics of the population.

In geographic research, sampling can be done on a space or area (sampled area) and can also be done on cases, individuals or symptoms. This depends on the symptom or problem being researching. In geographic research, the total, distance, area, height (elevation), fertility rate, and so on can be used as traits or characters for sampling criteria. Anyway, qualitative and quantitative measures in geography, can be used as a measure of the characteristics of the population and its sample.

Furthermore, the data collection techniques and tools that have been compiled and formulated will be applied to a carefully calculated sample. Based on the analysis of the data obtained from this sample, researcher will be able to determine the conclusions about the population or object under research

## 7.Data Analyse Methods

Symptoms, facts and geographical facts are essentially qualitative facts. But, because the conclusions of geographic research can be in the form of exact and objective decisions, qualitative facts can be transformed into numbers. Therefore, in the analysis of geographic data, not only using the qualitative analysis methods but also using quantitative analysis methods.

In the framework of a geographic research, data analysis is the data processing and interpretation to examine the truth of the hypothesis and to determine conclusions from research results. Therefore, if the research hypothesis is based on a certain formulation and logic, then the same case with data analyse.

**a. Qualitative Analyse Methods**

Qualitative analysis methods in geographic research process and interpret verbal data and information. The data analyse are the types of qualitative symptoms and problems. The provisions of analysis are based on logic and laws of logic to determinate the conclusions from the logic research results.

The information contained in the form of pictures, charts, diagrams, portraits, and maps is helpful for qualitative analysis of geographic research. Comparative, relation, interrelation, and interaction analyse were carried out based on qualitative categories of data, facts and geographic reality that had been collected. The results of the analysis are the conclusions, hypothesis examined and problem assessment, in the form of qualitative verbal models.

**b. Qualitative Analyse Methods**

Qualitative analysis methods that process and interpret data in the form of numbers and with mathematical calculations, are also known as statistical analysis methods. Statistical analysis that can be applied to geographic research including measurement of central values, chi square analysis, analysis of variance and correlation analysis. The used of these analytical methods, in addition to being adapted to the character of the data collected, and also should be matched the research hypotheses to be verified.

The measurement of the central value in geographic research is used to analyse the average value of a phenomenon, the average deviation from the phenomenon, and to analyse the growth of a phenomenon from the past to the present and its future trends. Population phenomena, economic phenomena, weather phenomena, and erosion trends can be analysed using this central value measurement method.

The chi square method can be used to analyse the different relationships of various variables from various geographical phenomena in different areas. Differences in the productivity of a type of agriculture in different areas with different irrigation conditions can be analysed using this chi square method. The relationship between the variables of soil type and elevation on the distribution of a plant species, the difference can also be analysed using the chi square method. And so are the symptoms with the same types.

The analysis of variance method can be used to study the difference in the mean value of the relationship between two geographic variables, both under the same conditions and under different conditions. The difference in the average value of the relationship between different soil types with the use of the same type of fertilizer or vice versa, in various agricultural areas, can be analysed by the method of analysis of variance. Likewise, the difference in the average value of pollutant levels in various industrial sectors with different distances and water irrigation can be analysed by applying this method. Many variable associations of geographical phenomena that show things as exemplified above, can be analysed by this method with analysis of variance.

The correlation method can be used to examine the correlative association between two or more than two variables that occur in geographic phenomena. The correlation between elevation and the distribution of a plant species, the correlation between the distance from the source of pollution and the level of pollutants, the correlation between the amount of fertilization and soil productivity, and so on, that can be analysed using this correlation method.

Many things related to the distribution, diffusion and spatial interaction that can be analysed by various methods and mathematic models. All of that can prove the truth of the research hypothesis and provide an objective conclusion about the results of geographic research. The results of this quantitative analysis or statistical analysis will eventually be transformed back into qualitative conclusions

## 8.Conclusion of Research Result

The conclusion of a research result, including the results of geographic research, is a product of data analysis based on research problems and hypotheses. The conclusion must be in accordance with the purposes research that have been outlined at the beginning of this research design. The conclusion of this research should be able to express its theoretical and practical aims. Theoretical conclusions must find the relevant scientific findings. These scientific discoveries provided the basis

for the further development of geography. Discoveries that enriched the theoretical repertoire of geography.

Conclusions from practical geography research are findings that can be applied to the interests of life. This practical conclusion, some have been final results and some are not yet final. The conclusion of the result research in the form of models and alternative problem solving or regional development models with the lives of their inhabitants. Conclusion its mean as a final result. However, if the geographical research is in the form of conclusions that still contain problems that must be investigated further, then the incomplete results can be a start for further research.

## Conclusion

Geography as a discipline science that studies the differences and similarities of geosphere phenomena, that is a theoretical science and can be applied practically as a research. In generally, the stages of developing the research methodology are the same as those of other disciplines, especially those that are closely related. However, in geographic research, phenomena in the field become one of the sources of heterogeneous research.

In this practical geography research, it can produce a final conclusion that can be applied, problem solving, and also being as the basic research results that require further research. The final results of the researched can be the beginning for further research.

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**Author's Brief Profile**

Dr. Siti Fadjarajani, MT. was born in Bandung on April 6, 1966. Educational history at SDN Gumuruh VI Bandung, SMPN 4 Bandung, SMAN 7 Bandung, S1 Geography Education from IKIP Bandung Graduated in 1990, S2 PWK ITB Graduated in 2001, Doctoral Degree in Social Studies Education UPI Bandung Graduated in 2009. Work experience as a Lecturer in Department of Geography Education FKIP Siliwangi University since 1990 and Lecturer at Siliwangi University Postgraduate since 2001 until now. Currently serves as the Chair of the Postgraduate Geography Education Study Program at Siliwangi University, Tasikmalaya. The subjects taught include Geography Research Methods, Regional Planning, Tourism Development, Rural and Urban Geography (S1), Population Geography in Development, and Advanced Regional Geography (S2). Various scientific researches were carried out related to education, geography, regional planning and development. Collaborative writing experience on the Bunga Rampai Revolusi Pendidikan Books, Referensi Manajemen Sumberdaya Manusia Books, Bookchapter Metodologi Penelitian, Model-Model Pembelajaran Berbasis Digital, Perencanaan Sumberdaya Manusia, Evaluasi dan Supervisi Pendidikan, Media Pembelajaan Trasnformatif, Era Baru Manajemen Pendidikan, Penguatan Tridharma Dosen Era Pandemi Covid-19 dan New-Normal, Bookchapter Research on Cyber Pedagogy in The Covid-19, Merdeka Belajar Books, and MBKM Lecturer. Experience as an Editor for the Riset-Riset Pembelajaran Berbasis Project Era Covid-19 Books and the Kamus Geografi Edisi Tematik dan Visual Books.