

# *Introduction to Research*


**Pre-Phd Course Work-2019**  
**Paper-I-(Compulsory Paper-PCW01)**  
**Unit-I**

**Dr. Panchanand Mishra**

**Assistant Professor**

**University Department of Botany**

**BNMU, Madhepura**

**+91-7319715126** 

**+91-9438298518** 

**Email Id: [panchanand51@gmail.com](mailto:panchanand51@gmail.com)**

## **An Introduction to Research**

*Research is to see what everybody else has seen and think what nobody has thought.*

**– Albert Szent Gyorgyi**

The word research is combination of “re” and “search,” which means **a systematic investigation to gain new knowledge from already existing facts**. In other words, research is a scientific understanding of existing knowledge and deriving new knowledge that may be applied for the betterment of mankind. It is basically search for truth. Research contributes significantly to the progress of the nation as well as an individual with commercial, social, and educational advantages. Research is an important parameter to judge the development of any nation. Research is an important component of private and government sectors. Nowadays, interdisciplinary research is at high demand.

Research should always aim at providing efficient solutions to routine problems. Researchers should carefully choose the appropriate research method and follow a research process by referring to existing theories. Research differs from a traditional way of education, which is, learning concepts and writing the examination or performing activity. According to **Clifford Woody**, “Research comprises of defining and redefining problems, formulating the hypothesis for suggested solutions, collecting, organizing and evaluating data, making deductions and reaching conclusion and further testing the conclusion whether they fit into formulating the hypothesis.”

### **Aims and Objectives of Research**

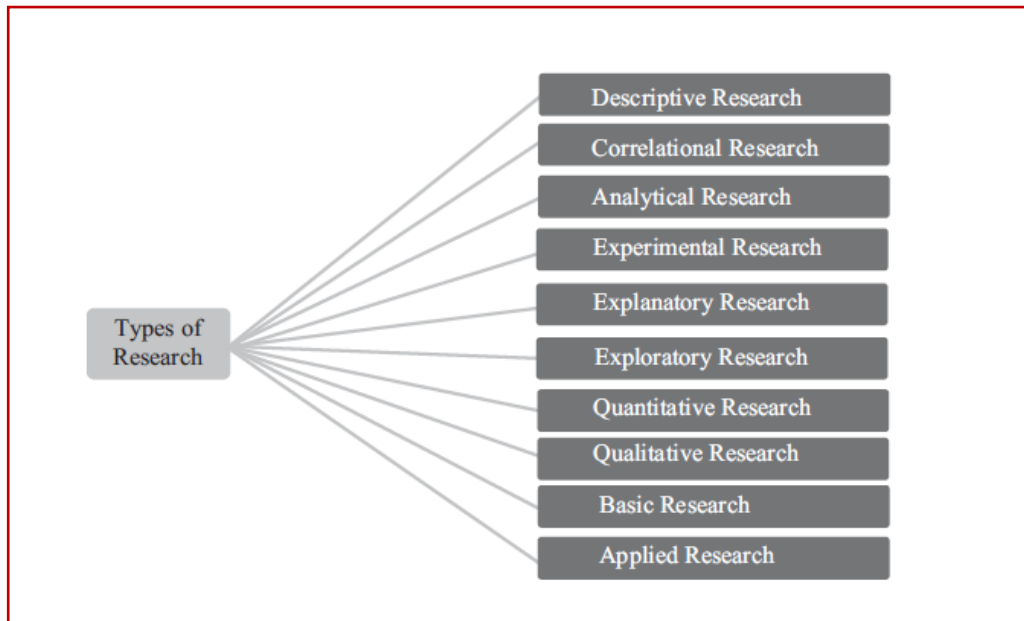
The main purpose of research is to find solutions to unsolved problems using scientific procedures and also to understand various phenomena scientifically. In addition, one of the major objectives of research is to find out a hidden,

undiscovered truth. There are various objectives behind undertaking research by individuals as well as various organizations. However, there are some identified purposes for each research work. Some general objectives behind research include:

- Propose and test certain hypotheses that provide causal relationships between variables
- Discover and establish the existence of relationship, association, and independence between two or more aspects of a situation or phenomenon. (Such studies are known as correlational studies)
- Understand different phenomena and develop new perceptions about it
- Study and describe accurately the characteristics of situations, problems, phenomena, services, groups, or individuals. (This type of study/research is known as descriptive research)
- Explain unexplored horizons of knowledge
- Test reported findings and conclusions on new data and novel conclusions on previously reported data
- Study the frequency of research that is connected with unspecified study. (This type of study/research is known as diagnostic research)

### **Types of Research**

Different research types are discussed throughout in this paper. They are basically classified in various categories including applicability, the mode of enquiry in conducting the study, and major objectives of the study. Selection of research method depends on the discipline of the research, objectives, and the expected outcomes. One research problem may use multiple research types. Main research types discussed in this section include basic research, applied research, descriptive research, analytical research, correlational research, qualitative research, and quantitative research.

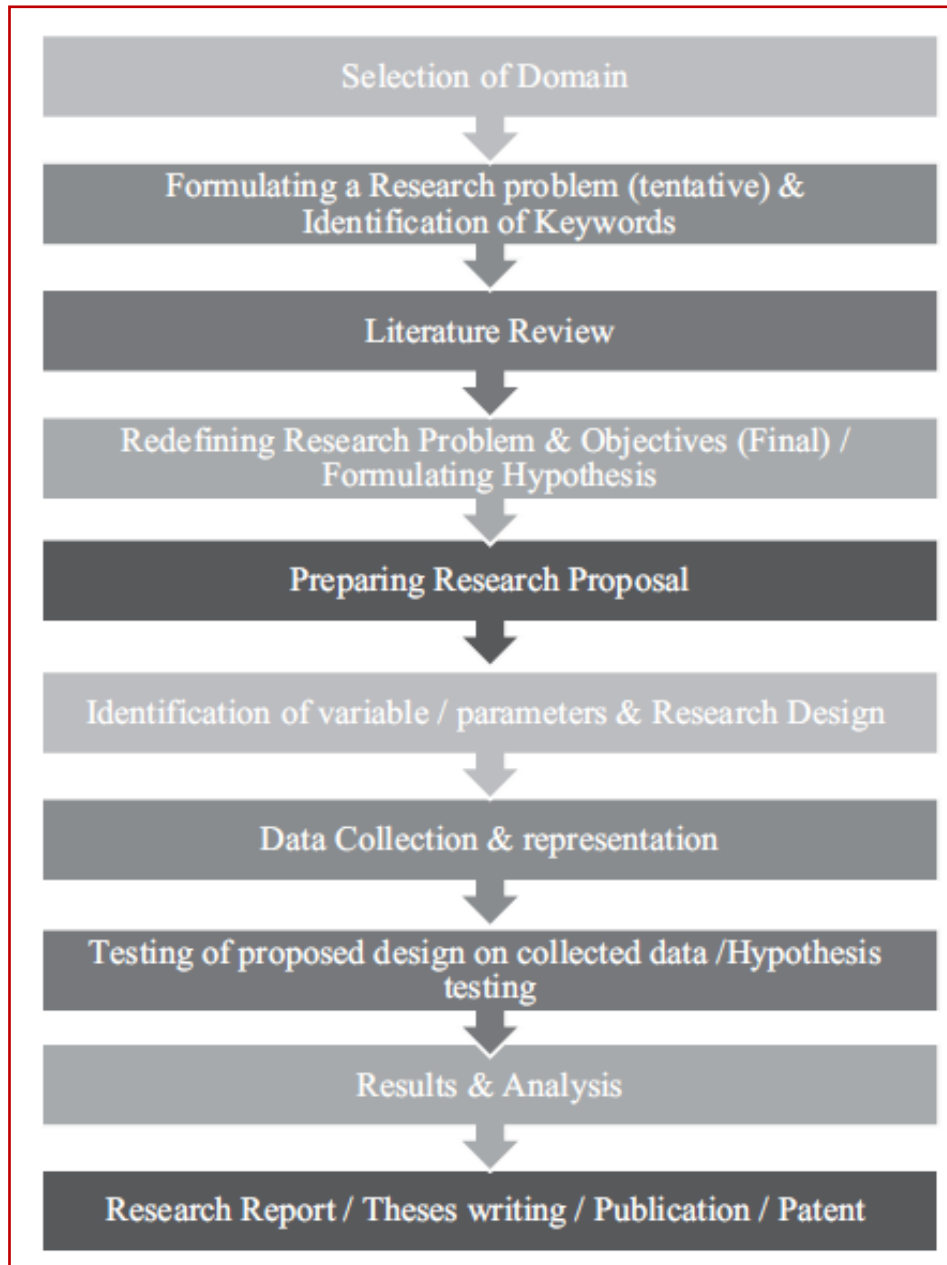


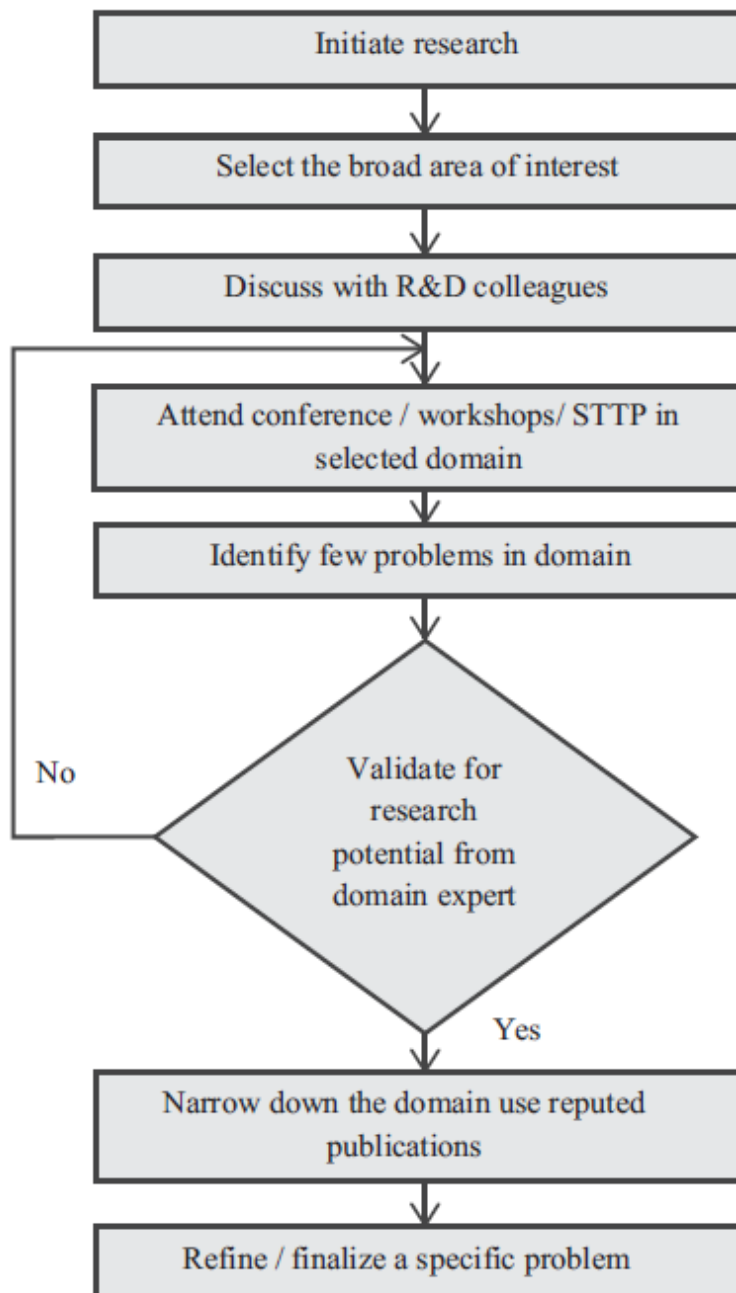
### **Phases of Research/Research Process:**

Efficient and well-planned activities always see success. Therefore, one needs to efficiently plan a research activity, execute it meticulously, and publish it for the outside world. In a house-building task, the first blueprint needs to be finalized and one has to visualize all minute details such as position and size of rooms, doors, windows, balconies, and so on. Estimation of all required material should be finalized along with quality and quantity. Improper planning and estimates may not be able to produce the expected dream house. Similarly, researchers should follow the research process to get optimized research outcomes. General steps in the research process are shown: General research process includes:

- Selection of domain
- Formulating a research problem (rough) and identification of keywords
- Literature review
- Redefining research problem, objectives (final) and outcomes/formulating hypothesis
- Preparing research proposal
- Identifying variable/parameters
- Data collection and representation

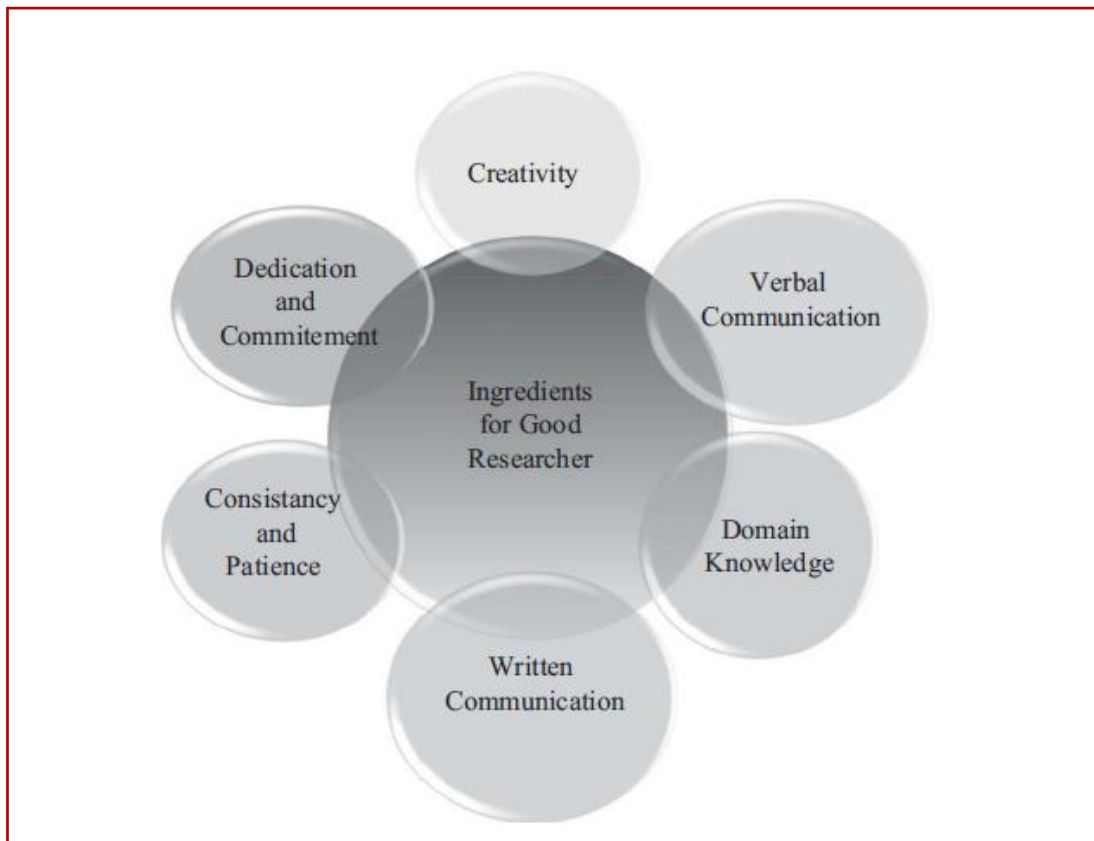
- Testing of proposed design on collected data/hypothesis testing
- Writing and comparing results
- Research report writing





## Important Ingredients for Research

Creativity, good written and verbal communication skills and in-depth knowledge of the subject are essential for successful completion of research work. A researcher should have sound fundamental knowledge of the domain to be undertaken. A querying attitude is one of the important factors. Anything and everything is questionable; this questioning attitude is essence of research and invention.



## Research Methods versus Methodology

Researcher should understand the difference between research method and research methodology. **Research methodology explains more about the research process whereas research methods aim at finding answers to research questions.** All of the methods, approaches, processes and techniques used by researcher during research process can be referred as research methods. It can be methods applied during dataset creation, data pre-processing, and data collection to decide

sufficiency of data. Researcher has to use different analytical tools and techniques at the time of statistical analysis and to check accuracy of obtained results. Examples of methods applied during dataset creation are survey methods, interview method, questionnaires, thorough observations, and input through mechanical/electrical devices. Some of the examples of statistical analysis methods are mean, mode, median, mean deviation, standard deviation, skewness, kurtosis, and histogram. Methods such as finding precision, recall, f-score, and t-test are used in result analysis.

Researchers should be able to identify appropriate relevant methods applicable at each step. For researchers, along with an understanding of different research methods, design of methodology for his/her research problem is very important and it may differ from problem to problem. Similarly, in research researcher is expected to prepare plan of research from problem definition, that is, methodology for research process. At the time of deciding on a specific methodology, researchers should look at different available methods, analyse them and should choose the appropriate one for his/her research. In short, different research methods are part of research methodology.

### **Features of a Good Research Study**

Related state-of-the-art literature should be studied in depth to avoid reinvention of wheel. Good research should clearly define the methodologies used, which should be replicable. It should be time-bound and realistic. Good research should have systematically chosen methodologies and datasets to prove the proposed hypothesis. Validity and reliability of data should be checked and researchers should consider an adequate amount of data. Good research should be creative and valid in the longer term. Some of the important features of good research are:

- Research purpose should be clearly defined
- Procedure for the research should be detailed sufficiently which should help the other to continue the work by referencing our work
- Research work should be carefully planned to get the results in related to the



specified objectives

- Reports should be created by a researcher stating that what was the procedure adopted for completing the work which should also include errors in their findings.

### **Problems Encountered by Researchers in India**

Researchers in India, particularly those engaged in empirical and scientific research, are facing several problems.

Some of the important problems are as follows:

1. The lack of a scientific training in the methodology of research
2. There is insufficient interaction between the university research departments on one side and business establishments, government departments and research institutions on the other side.
3. Most of the business units in our country do not have the confidence that the material supplied by them to researchers will not be misused and as such they are often reluctant in supplying the needed information to researchers.
4. Research studies overlapping one another are undertaken quite often for want of adequate information. This results in duplication and fritters away resources.
5. There does not exist a code of conduct for researchers and inter-university and interdepartmental rivalries are also quite common.
6. Many researchers in our country also face the difficulty of adequate and timely secretarial assistance, including computerial assistance. This causes unnecessary delays in the completion of research studies.
7. Library management and functioning is not satisfactory at many places and much of the time and energy of researchers are spent in tracing out the books, journals, reports, etc., rather than in tracing out relevant material from them.
8. There is also the problem that many of our libraries are not able to get copies of old and new Acts/Rules, reports and other government publications in time.
9. There is also the difficulty of timely availability of published data from various government and other agencies doing this job in our country.
10. There may, at times, take place the problem of conceptualization and also problems relating to the process of data collection and related things.

### Summary:

Research inculcates scientific, curious and inductive thinking. It is an important component of the development of nation and individual. Research has special significance in deciding government policies in economics, in solving various operational and planning problems of business and industry, and in seeking answers to various social problems. Research opens different avenues in particular domain for the betterment of mankind and world. Research activity develops critical thinking about the problem, systematic examination, developing and testing new theories, and draw important meaningful conclusions.

Ability of in-depth analysis and understanding a topic helps researcher to explore in many domains around. Research also helps researcher to sharpen the dimensions of his/her own personality in many folds.

### *REFERENCES & Bibliography :*

1. Vinayak Bairagi and Mousami V. Munhot. Research Methodology-A Practical and Scientific Approach. CRC Press, Taylor & Francis Group, New York.
2. Chakravanti Rajagopalachari Kothari, "Research Methodology: Methods and Techniques", New Age International Publishers, New Delhi 2004.
3. Ranjit Kumar, "Research Methodology- A Step-by-Step Guide for Beginners", 3rd ed., SAGE Publications India Pvt Ltd, New Delhi, 2011.

### Assignment Questions:

- ❖ Describe different types of research methods applied to plant science research.
- ❖ What makes people to undertake scientific research? Discuss briefly aims and objectives of research.