

**Workshop on  
GOOD PRACTICES IN QUANTITATIVE SOCIAL SCIENCE RESEARCH:  
A Journey from Conceptualization to Research Application  
ICAR-Central Tuber Crops Research Institute, Thiruvananthapuram  
August 7-12, 2017**



*ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), in collaboration with the Centre for Research on Innovation and Science Policy (CRISP), Agricultural Extension in South Asia (AESA) and National Institute of Agricultural Extension Management (MANAGE) organised a first-of-its-kind self-sponsored workshop aimed at equipping social scientists and research scholars on critical skills in conducting quality social science research and to develop them into master researcher-trainers in disseminating these good practices. Mr. D.R.K. Saikanth, Dr. S. Subash, Dr. P. Mooventhan and Dr. Nisha Verma, who participated in this workshop, share their experiences here.*

## CONTEXT

In the recent years, social science research in general and quantitative extension research in particular has witnessed a rapid transition owing to technological changes in agriculture and a demographic shift in the user system.



The emerging social research paradigm focuses on developing sound methods to improve field practice, while simultaneously advancing the theory. This approach demands quantification of research processes and outcomes to develop and apply rigorous and sound methods and tools in an objective and controlled manner. As the social science research in India is still evolving, it is essential to develop a “package” of good practices to enable the researchers to understand and use them easily in the field. Keeping these in view, this workshop on “Good Practices in Quantitative Social Science Research: A Journey from

Conceptualization to Research Application” was organized at ICAR-CTCRI campus during August 7-12, 2017.

## THE PROGRAMME

### DAY-1

#### INAUGURAL SESSION

The workshop was inaugurated by an eminent scholar and development planner Prof. Sunil Mani, Director, Centre for Development Studies, Thiruvananthapuram, on August 7, 2017.



Prof. Mani, in his inaugural address, appreciated the efforts of the organisers in designing training on quantitative social science research, which is timely address to answer emerging concerns of research quality in social sciences. During his vibrant address, Prof. Mani gave deep insights into the “practice” of quantitative social science research and gave valuable tips for visual representation of data by using an open source of software R-program.

Dr. James George, Project Coordinator – AICRPTC and Director (Incharge), ICAR-CTCRI, delivered the presidential address. He explained the need for conducting quality social science research to design sound approaches for technology transfer and commercialisation. Dr. Sheela Immanuel, Head – Extension & Social Sciences, ICAR-CTCRI, was the Guest of Honour at the inaugural and narrated the intentions and motivations behind this collaborative workshop.



While Dr. P. Sethuraman Sivakumar, Senior Scientist & Programme Director, welcomed the participants with a brief note on AESA and its collaborators, Dr. D. Jaganathan, Scientist & Programme Coordinator, proposed the vote of thanks. A total of 38 participants comprising 17 practising professionals and 21 research scholars from seven states representing diverse domains like agricultural extension, agricultural economics, rural management, agribusiness management, home science, library science and social work participated in the workshop.

#### TECHNICAL SESSIONS

The six-day workshop was conducted using a progressive learning approach with a combination of technical lectures and hands-on sessions. The training was imparted through

21 technical sessions following the sequential stages in developing a research proposal, ranging from research topic, research problem to data analysis and interpretation. The participants were divided into seven teams in the first day of the workshop and each group was assigned a specific topic to develop the research proposal. The learning process was structured in a way that the teams developed the proposal using a step-by-step approach and the guidelines learned from every class. The idea was to continue the learning process in the post-training phase to help participants transfer their new learning in their workplace and produce at least one research output – research paper, technical bulletin, policy paper etc.

### **Session: Good practices in quantitative social science research – An overview of the programme**

The introductory session was handled by Dr. Sethuraman. He highlighted the need to follow good practices in social science research for developing theories that help in solving on-field problems, for creating scientifically validated research methods, tools and techniques, for developing sound field practices and evidence-based policy formulation to facilitate use of technologies for development. He further highlighted that the programme is aimed at following the good practices in social science research right from research conceptualization to its applications using a progressive learning approach and develop skilled master researchers in various domains of social science research.



### **Session: Scientific social research – Philosophical foundations and paradigms**

This session was handled by Dr. D. Jaganathan on Scientific Social Research – Philosophical Foundations and Paradigms. He explained the concept of scientific research, various methods of knowing – theoretical and empirical, cycles of research – inductive and deductive, functions of science, approaches and the common mistakes in research.



His session provided a bird's eye view on the epistemology and philosophical foundations of scientific social research.

### **Session: Methods of Identifying research problem, constructs, variables and hypothesis – Part 1**

In this session, Dr. Sethuraman discussed the methods of identifying research problem, constructs, variables and hypothesis. In this session, he explained the meaning of research topic, research problem, research purpose and research questions and the differences among these concepts. He explained various types of research problems and techniques of preparing a problem statement. The participants had a hands-on experience in writing the problem statement using five basic elements – research topic, research problem, justification for problem, deficiencies in evidence and the audience. He also explained the concept of 'narrative hooks' in developing the research topic and their importance in capturing attention of the readers. His session was braced with several practical examples.

Later Dr. Sethuraman explained the role of theory in social sciences research and provided examples of various theories used in extension, a few of which are: theory of planned behaviour (technology adoption), protective motivation theory (consumer preference for functional foods), farmers preference for varietal attributes (Lancaster theory of demand) etc. He narrated how theory and research complement each other. The theory and its elements such as domain, concepts and constructs, variables, definitions (theoretical and practical), premises, propositions and hypotheses were explained lucidly. Understanding these concepts, their differences and how they are interlinked with each other to provide theoretical foundations to the empirical research are essential to develop a good research proposal.

### **DAY 2**

On day 2, Dr. Sethuraman and Dr. Jaganathan reviewed the previous day's sessions and participants clarified their doubts.

### **Session: Sampling methods**



This session was handled by Dr. J. Sreekumar, Principal Scientist (Agricultural Statistics), ICAR – CTCRI (Fig 4). In this session, Dr. Sreekumar explained the importance of sampling in conducting systematic and controlled empirical research to produce valid and generalizable results. He provided an overview of the sampling process including the selection of sample, types of sampling, estimation of sample size, sampling errors and ways to minimise the errors. He also showed

statistical software like SAS package and R.

### **Session: Methods of estimating sample size and hands-on exercise on sampling and sample size estimation**

The session was handled by Dr. Sethuraman. He elaborated the methods of estimating sample size correctly and the participants performed a hands-on exercise on sampling and sample size estimation using Excel macro.

### **Session: Research designs, methods and tools**

The session was handled by Dr. N. Kishore Kumar, Professor (Agricultural Extension), Kerala Agricultural University. He spoke about all the aspects of research design and explained the ways of selecting appropriate research designs based on objectives. He also enlightened the participants on the use of psychometric tools, PRA methods and tools, log frames, Delphi technique, Q-Sort, etc.



### **Session: Hands-on exercise in selection of research designs, methods and tools**

This session was handled by Dr. Sethuraman and Dr. Jaganathan for familiarising the participants with hands-on exposure in selection of research designs, methods and tools by forming groups based on the team research proposals.

### **DAY 3:**

Before the start of Day 3, we had a recap of the Day 2 sessions by Dr. Sethuraman and Dr. Jaganathan who discussed the queries and clarifications on previous two days' sessions.

#### **Session: Best practices in data collection – Errors and Biases**

Dr. Sheela narrated the best practices in data collection for avoiding errors and biases. She presented an outline of errors and biases in data collection and imparted a clear understanding on two types of errors like sampling and non-sampling errors, inaccuracies etc.

#### **Session: Data Exploration and Preparation – Missing data, outliers, testing assumptions**

The session was handled by Dr. Sethuraman, who emphasised data preparation methods like correct data entry and coding for specific statistical analyses. He clearly explained the steps in data exploration and preparation. He also elaborated the handling missing data, data extraction from MS Excel/SPSS sheets, treatment of missing data using deletion and imputation methods. Outliers – meaning, types, how to detect outliers using SPSS was also demonstrated and clearly explained by the trainer. Testing of statistical assumptions like normality, linearity and multicollinearity were also demonstrated using SPSS.

#### **Session: Statistical Designs in data analysis – Descriptive to inferential statistics (Descriptive, correlation, regression, t-test, chi-square, ANOVA)**

This session was handled by Dr. Sreekumar, who elaborated on why and when we need statistics. He talked about variables and levels of variables, normality distribution by histogram, box-and-whisker plot and other common statistical tools; one/two tailed tests, chi-square test, and ANOVA by using SPSS. He also emphasised the use of R-program and R-studio in social sciences research.

#### **Session: Hands-on practice on statistical analysis**

This session was conducted by Dr. Sethuraman and Dr. Jaganathan to familiarise the participants with the various statistical tools used for analysis like SPSS-21, AMOS-22 and STATA- 12. Using SPSS, Dr. Sethuraman demonstrated some tests like t-test, chi-square, correlation analysis and ANOVA. The procedures of data entry, analysis, interpretation and writing outputs were demonstrated.

### **DAY 4:**

Before the start of Day 4, we had a recap of Day 3 by Dr. Sethuraman and Dr. Jaganathan involving the participants in discussion about the clarifications sought on the previous day's sessions.

### **Session: Modelling human decisions in adoption of agricultural technologies – LOGIT, PROBIT and TOBIT**

Dr. N. Sivaramane, Senior Scientist (Agricultural Economics) ICAR-NAARM, Hyderabad, elaborated on the basics of sample and population values, TOBIT, PROBIT and LOGIT modelling analysis for predicting human decisions in adoption of agricultural technologies. He provided both the theoretical view and practical applications of these models. He also demonstrated the analysis using SPSS.



### **Session 2: Reliability and validity assessment**

In continuation with the previous session, Dr. Sethuraman explained methods of assessing reliability and validity of the scales. The method of estimating Cronbach Alpha was demonstrated using SPSS.

### **Session: Conjoint Analysis**

In this session, Dr. Sivaramane elaborated three different conjoint analysis methodologies using practical examples.

### **Session: Publishing research outputs/outcomes – Research papers**

Dr. Sheela elaborated on the factors to be kept in mind at the time of publication: author's responsibility, misconduct, ethical violation, retraction, handling of problematic papers, copyright issues and citation. Further, she discussed the process of research paper peer review, steps followed at the editorial desk, and how researchers should respond to reviewers' comments. She also cautioned the participants not to quote too many own works as a references and avoid retaliating to reviewers' comments.

### **DAY 5:**

Before the start of Day 5, there was a recap of the previous day's sessions by Dr. Sethuraman.

### **Session: Principal component Analysis (PCA) and Exploratory Factor Analysis (EFA)**



This session was handled by Dr. Upendra Kumar Maurya, Assistant Professor, Department of Management Studies, IIT Madras. Dr. Upendra conducted the session on Principal Component Analysis (PCA), Exploratory Factor Analysis and Confirmatory Factor Analysis. Further, during the hands-on practice session, he clearly demonstrated

the steps involved in factor analysis and elaborated on interpretation of the results.

### **Session: Structural Equation Modelling (SEM)**

This session was handled by Dr. Sethuraman who elucidated the basics of SEM and provided a bird's-eye view about the analysis and interpretation of various goodness-of-fit measures and regression coefficients of SEM analysis. He demonstrated the process of using AMOS Graphics in designing path diagram, estimating the coefficients and their interpretation.

### **DAY 6:**

Before the start of Day 6, Dr. Sethuraman and Dr. Jaganathan did a quick recap of Day 5. Participants were guided to apply the learning of previous sessions in their respective project proposals.

### **Session: Publishing research outputs/outcomes – technical publications**

This session was handled by Dr. Saravanan Raj, Director (Extension), MANAGE, Hyderabad. He emphasised the importance of publishing social science research outputs for influencing



policy making, and a passion for writing in good journals. He gave an overall exposure on publishing research outputs/outcomes in good journals. This session started with a discussion on issues in publication in order to understand the participants' experiences in publishing research outputs. Lack of awareness about social science journals, poor rating of extension journals by NAAS, long processing time taken by journal editors, and poor response from reviewers were some of the major issues pointed out by the participants during the discussion. Later, Dr. Raj discussed several other options to publish research outputs beyond journal articles; these include

policy papers, policy briefs, working papers, blogs research reports, etc., He gave several examples of extension research findings published in these different formats.

### **Session: A special session on Scale Construction – Modern approach**

The special session on scale construction was conducted by Dr. Sethuraman as a continuation of his session on SEM the previous day, on the request of participants. Dr. Sethuraman discussed structural equation modelling in detail. He explained scale construction in two parts: in the first part, he focussed on item generation through thematic analysis, content adequacy assessment, questionnaire administration and factor analysis. He demonstrated factor analysis step by step using SPSS with his research data. He showed the difference between Exploratory Factor Analysis (EFA) and Principal Factor Analysis (PFA). In the second part of his presentation he elaborated on structural equation modelling through

Confirmatory Factor Analysis by using AMOS interface step-wise with practical demonstration. The participants had good hands-on experience in using AMOS software.

### Session 3: Presentation by participants

During this session, all the groups presented their group project proposals reflecting their learning experience during the entire workshop.

### CLOSING SESSION

During the session, the six participants narrated their learning experiences, shared their feedback and thanked the organisers for arranging such a need-based timely workshop for the benefit of social scientists. The Chief Guest of the session, Prof. C. M. Nair, Advisor, Kerala Biotechnology Commission, while addressing the gathering, mentioned that the workshop was able to meet most of the participants' expectations with regard to new tools and techniques in extension research as well as on publishing papers. In her closing remarks Dr. Archana Mukherjee, Director, ICAR-CTCRI, appreciated the partnership of four



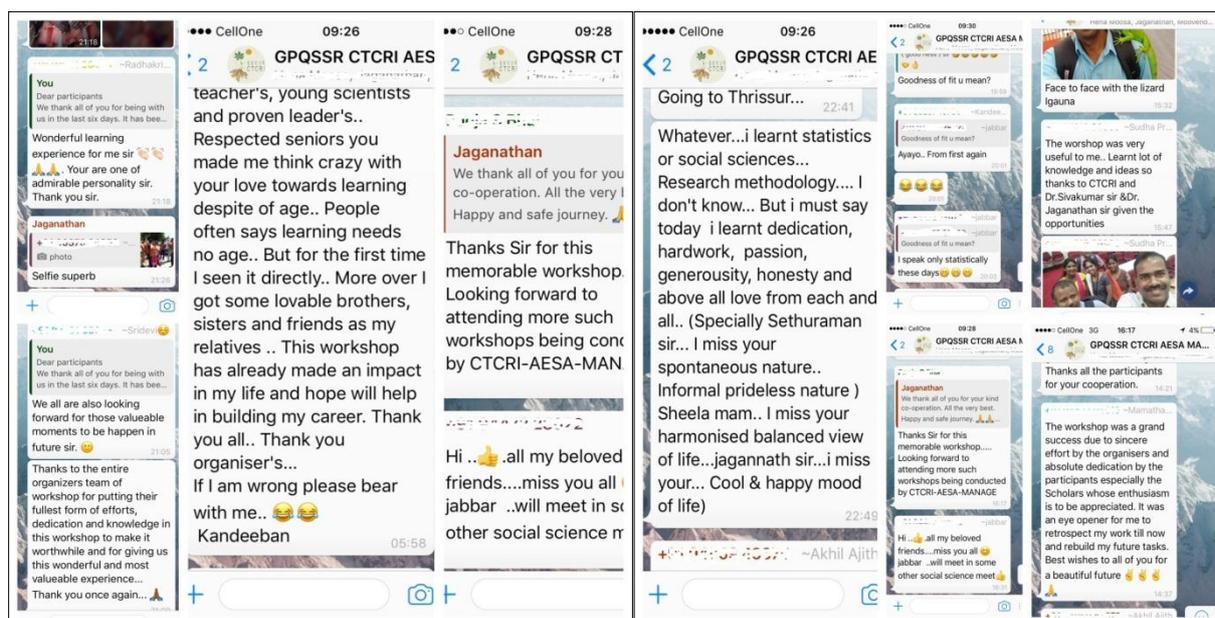
organizations in organizing this workshop and the diversity of participants representing PhD scholars, university faculty and young scientists at the workshop. She assured the house about organising more such workshops by ICAR-CTCRI for enhancing capacities in undertaking quality extension research. Dr. Sheela Immanuel, Head, Section of Extension and Social Sciences, CTCRI and Dr. Saravanan Raj, Director (Agricultural Extension), MANAGE offered felicitations. Dr. Nair distributed certificates to the participants. The session ended with a formal vote of thanks by Dr. Jaganathan.

### WHAT WE LEARNT

At the end of the workshop, all participants had a great sense of new learning on several aspects of advanced social science research methods and selection of appropriate statistical analytical techniques. Apart from refreshing their knowledge on basics of statistics, to most of the participants it was an eye-opening workshop on various advanced research tools like PCA, EFA, CFA and SEM. The special session on scale development was very useful, especially for the young PhD scholars and faculty members, as it helped them relook at their methodologies and implement the learning in their ongoing research work and also in their new research endeavours.

## OUR IMPRESSIONS

The workshop was well thought by the course director and most experienced expert-resource persons who were hand-picked for the different sessions for adequately covered the given subjects with much emphasis on hands-on practical sessions. This workshop was unique in nature as it was a self-sponsored paid programme and accordingly the team has put their tired-less efforts in sensitizing the participants about the good practices in social science research. The entire team of participants express our sincere gratitude and indebtedness to the Course Director Dr. Sethuraman for his passion towards the subject,



deep understanding, concern for the social science research and above all for being a good teacher to all of us and taking us a step ahead in our professional endeavours. It was the unanimous feedback of all the participants that, such need based exclusive workshops on identified thematic areas viz, Scale Construction Techniques, Psychometric Analysis, Advanced Research Methodologies and Statistical Analysis for Social Science research needs be conducted at different intervals and at different locations in collaboration with other stakeholders for the benefit of young scholars and faculty members which would certainly improve the quality of social science research in the longer run.

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