

A Biswas, Professor

SH SERIAL PUBLISHING HOUSE

B.C. Agricultural University, Mohampur, Hadia, West Bengal

403, Express Tower, Commercial Complex, Azedpur, Delhi

Phone: 811-27672852, Fax: 91-11-27672046

E-mail - info@satishaerial.com, hkjain1975@yahoo.com

Wobsite: www.satishsertial.com

Research is a complex process of thinking, analysis, application and drawing

inferences, precisely and effectively, out of the entire inquires and experimentation. It needs design, tools and techniques. A well organized research process trains up

mind for logical thinking, meaningfully correlating cause with effect, process with product, and hypotheses with empirical results. The book has gone deeper into the designing of research to high end non-linear programming, sampling to multivariate analytical tools, and also includes participatory research and techniques. We are hugely optimistic that the book will cater a wide spectrum of post graduate students

and Ph D scholars, candidates for ICAR/UGC NET, and also a genre of professionals in

College of Fisheries, Central Agricultural University (I), Lembucherra, Tripura-799210

Department of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya

The Design, Process and Application

multi-disciplinary pursuits and scholastic practices.

Dr. Prasenjit Pal Assistant Professor (SS) Department of Extension and Social Sciences

Department of Agricultural Extension, Director, Extension Education Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, West Bengal

Prof. (Dr.) S K Acharya Head

METHODOLOGY

RESEARCH

HODOLOGY Application

S K Acharya Prasenjit Pal A Biswas

METHODOLOGY

The Design, Process and Application



TOP OF AVIAN SCIENCES & MANAGEMENT

| Acc. No2303 | | (| Call No | | | | |
|---------------------|--------------|-------------|---------|-------|--------|-----|--|
| T date last give | his book sho | uld be retu | rned | on or | before | the | |
| | | | | | | | |
| | | | | | | | |
| Ng. | | | | ī.v | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | 4 | | | | |

Research Methodology : The Design, Process and Application

Research Methodology:

The Design, Process and Application

Prof. (Dr.) S. K. Acharya

Head

Department of Agricultural Extension Director, Extension Education Bidhan Chandra Krishi Viswavidyalaya Mohanpur, West Bengal

Dr. Prasenjit Pal

Assistant Professor (SS)
Department of Extension and Social Sciences
College of Fisheries, Central Agricultural University (I)
Lembucherra, Tripura-799210

A. Biswas

Professor

Department of Agricultural Extension Bidhan Chandra Krishi Viswavidyalaya B.C. Agricultural University Mohanpur, Nadia, West Bengal



SATISH SERIAL PUBLISHING HOUSE

403, Express Tower, Commercial Complex Azadpur, Delhi-110033 (India)

Phone: 011-27672852, Fax: 91-11-27672046 e-mail: info@satishserial.com, hkjain1975@yahoo.com

Website: www.satishserial.com

Published by:

SATISH SERIAL PUBLISHING HOUSE

403, Express Tower, Commercial Complex, Azadpur, Delhi-110033 (INDIA)

Phone: 011-27672852 Fax: 91-11-27672046

E-mail: info@satishserial.com, hkjain1975@yahoo.com

© Publisher

ISBN: 978-93-53870-22-5 E-ISBN: 978-93-53870-23-2

© 2021. All rights reserved, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher and also the copyright, rights of the printing, publishing, e-book of this edition and subsequent editions will vest with the publisher. All Computer floppies, CD's, e-book and in any other form relating to this book will be exclusive property of the publisher.

This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The publisher have attempted to trace and acknowledge the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission and acknowledgements to publish in this form have not been obtained. If any copyright material has not been acknowledged please write and let us know so that we may rectify it.

Composed, Designed & Printed in India

About the Authors



Prof. (Dr.) S.K. Acharya, former Head, Dept. of Agril Extension and Director, Extension Education, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, WB, born on 6th October, 1960, started his career as Assistant Professor at BCKV in 1988 and has been in teaching, research and

extension over 30 years. An erudite teacher and an elegant speaker as he is, Prof. Acharya, was the topper in his MSc (Ag) academic career in Agril. Extension, is internationally acclaimed for his unique research domain of Social Entropy and Energy Metabolism, Social Ecology and Environmental Sociology, Enterprise Ecology Framework, Farm Stewardships: The Transition from Conservation, Technology Socialization Process, and The Social Ecology of Livelihood, which have got tremendous policy as well as scholastic importance. Research Publication: 180 in National and International Journals. Book Publication:83 books authored / co-authored, covering topics Participatory Extension Planning and Management; Value addition and quality management, Extension Strategy for Natural Resource Management; Horticulture Management with Quality Issues, Technology Socialization Process; Fish bio-diversity; Income and Livelihood; Enterprise Management and Entrepreneurship Building; Women's participation in Panchayat; Gender Issues in Floriculture; Technology gap in Floriculture; Enterprise Synergy in Agriculture; Disaster Management; Social Metabolism, Farm Energy Metabolism, Community Perception on Climate Change, Social Entropy and Chaos, Research areas of Publication: Community Forest Management and Role performance by EDC and FPC; Social forestry and community participation (paper published in Indian Forester); Technology Diffusion and Socialization, Primary Education: Dropout Problem, Nutrition and Livelihood; Fish Ecology and Community Indexing of Fish Biodiversity; Indigenous Knowledge and Wisdom Analysis; Development Communication; Diffusion Approach in Forestry and Animal Enterprise; PRA, PLA, BME etc. Membership of Distinction: Chancellor Nominee on selection committee; Member of Agriculture Commission; Marketing and Extension Sub Committee, Govt. of West Bengal; Expert member WWF projects in BTR (Buxa Tiger Reserve Project); Expert member; DFID project on Primary Education (DPEP); REIA, Visited Italy, France, Germany, China, Sri Lanka and Bangladesh. Delivered 13 Key note addresses in International Congress, Chaired 17 Sessions in International conferences, Editors of a score of national and international journals. He has so far been awarded with 9 best paper awards in National and International Conferences, Organizing Secretary of two International Conferences, held in the years,

2016 & 2018, Jointly Organized by Department of Agricultural Extension, BCKV, WB and Krishisanskriti, New Delhi.

He has also been honored to be selected as the Convener of Panel (PE-32) entitled the hunger, poverty and silence, of IUAES, University of Manchester, UK, 2013 .Co-PI of ICAR and World Bank funded project CAAST on Conservation Agriculture. So far he has successfully guided 15 Ph D scholars from BCKV, CU, KU, Vidyasagar University.

E-mail: acharya09sankar@gmail.com



Dr. P. PAL, born in 1981, is presently working as Assistant Professor in Statistics at College of Fisheries, Central Agricultural University, Imphal. He has been in teaching, research and extension for the last eight years in the Department of Extension and Social Sciences, College of Fisheries. CAU (I). He obtained his M.Sc degree in

Agricultural Statistics from Indian Agricultural Research Institute (IASRI), New Delhi, in 2006 and Ph.D degree in Agricultural Statistics from Bidhan Chandra Krishi Viswa Vidyalay (BCKVV) in 2011. He is associated with many professional organizations. He authored 44 research publications in reputed National and International Journals, 1 Book and good number of popular articles/chapters/bulletin as on date. Besides this, he is associated with many administrative responsibilities.

E-mail: prasenjit3agstat@gmail.com, Web: www.cofcau.nic.in



Dr. Amitava Biswas, born in 1964, Professor, Department of Agricultural Extension, BCKV, is an eminent personality in the domain of Extension Science. He has been in teaching, research and extension for the last twenty years in the Department of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya (B.C. Agricultural University),

Mohanpur, Nadia, West Bengal. He has built up an incredible acumen in Participatory Extension Methods, Indigenous Technical Knowledge, Rural Entrepreneurship and Developmental studies. So far he has authored 31 research papers in national and International Journals, 13 books and a good number of popular articles. He is a good trainer in multidiscipline area and regular speaker in TV and Radio. He rendered administrative services as Deputy Director of Extension Education and Editorial Works as Editor of University farm Journal 'Krishi Bidhan'. For the last couple of years he has been with popular Science movement. He has also been involved in some ACRP, NAIP, RK.VY and ICARBA Projects.

E-mail: amiiavabckv2013@gmail.com

Preface

The excellence of research depends on the quality of research design and tools to be followed in organizing a research process, may be applied or basic in nature. In recent times, there has been a sea change in the approaches of research in social science. The entry of data analytics, bioinformatics, artificial neural network (ANN), big data analysis, multi criteria decision analysis (MCDA), Non linear programming, Neuro linguistics programming (NLP) and so on are making the research scenario more interesting and diverse. With up-scaling complexity in social and development process, and also, with escalation of demand in application of more multivariate and non-linear mathematics, algorithm and statistics in research, we need to go for creating a book on research methodology that would cater to this modernity of research. The importance of participatory action research is also increasing like anything, The application of participatory rural appraisal, participatory learning and action, ethnography are equally relevant in social science research as well. Hope, the book, Research Methodology: The Design, Process and Application, shall pave the way for new age researchers, faculties and analysts for organizing high end social science research, designing and empirical studies.

Date: 20.02.2020

S K Acharya BCKV, Mohanpur

Contents _____

| | ut the Authorsvii |
|-----|--|
| , | |
| 1, | Research: The Meaning, Approaches and Typology1 |
| 2,, | Analytical Methods in Social Science |
| 3, | Sampling Methods67 |
| 4. | Multivariate Techniques in Social Sciences |
| 5. | Introduction to Nonlinear Programming113 |
| 6. | Measurement and Scaling Techniques in Research123 |
| 7 | Participatory Approaches in Community Based Observation (CBD) and Researches |
| 84 | Reference Writing |
| 9. | Statistical Analysis and Software |
| 10. | Grounded Theory207 |