

NEGOTIATING REALITY: A pragmatic approach for conducting quality extension research



Extension scientists are often under stress due to the demotivating work environment and lack of technical guidance from the professional societies. But still one can conduct quality research in extension by following a pragmatic approach, argues, Dr P Sethuraman Sivakumar

INTRODUCTION

Research is the backbone for all disciplines and for the discipline of “extension”, research plays an important role in standardizing relevant interventions to facilitate equitable development. As a “field-oriented” professional discipline, the extension research differs significantly from other social science research in terms of its content and methods. The extension research is an “applied problem solving” enquiry, conducted in complex environments created by the interplay of natural, social and biological forces. Researching a complex environment is a cumbersome task, which needs identifying and executing sound methods and techniques with reasonable precision and control. However, the current research tools in extension are outdated and their continued use has resulted in stereotypic and insignificant outcomes. Due to lack of practical significance and stagnation in theory development, extension research is often criticized by other agricultural disciplines as a “non-performing discipline”. Extension scientists are often under pressure to deliver tangible outputs to show impact of technologies whereas the poor technology adoption is often the results of a number of factors including the weaknesses in field extension. Though there is no “magic wand” to deliver output in a short time, a systematic and pragmatic approach to extension research can contribute to development of relevant technologies and appropriate extension approaches. Only these can lead to enhanced credibility for extension discipline and at the same time contribute to better technology uptake.

Box 1: Evolution of extension research in India

The foundations for extension research were laid out in the 1960s by the scientists working with the ICAR (Indian Council of Agricultural Research) and SAUs (State Agricultural Universities). Extension research methods during the 1960-1980s were drawn mostly from the psychology and sociology, with a strong psychometric orientation. The leading extension science journals at that time published high quality research papers and a few of these attracted International accolades. The quantitative research paradigm dominated by multivariate statistical modelling, brought a new scientific outlook for extension discipline during that time. Several scales and indices like socio-economic status (Trivedi, 1963), economic motivation scale (Supe, 1969), etc were developed during that period. Teacher-made knowledge tests and several scales pertaining to different aspects of extension were developed subsequently. Since the beginning, the classical test paradigm has been used for scale construction. With the advent of participatory methods, use of Participatory Rural Appraisal (PRA) methods has also been used in extension research. .

The current extension research is mostly non-experimental or descriptive in nature. It consists of (i) field studies (exploratory/hypothesis-testing), (ii) ex-post-facto research, (iii) survey research, (iv) content and readability/ comprehension analysis, (v) case study, and (vi) ethnographic studies (MANAGE, 2007). Studies on training - need analysis and effectiveness; knowledge, perception and attitude assessment on specific aspects; communication / information processing behaviour; adoption behaviour; constraint analysis; farmer

involvement in extension programmes; gender mainstreaming and empowerment; and job satisfaction and productivity of extension personnel are widely undertaken now. Emergence of Information and Communication Technology (ICT), entrepreneurship, organizational management and impact assessment paradigms in the early 1990s have redefined the extension research. The extension research methods and tools which are currently in use are mostly borrowed from cultural anthropology, sociology, cognitive psychology, social psychology, educational psychology, marketing and computer science and engineering. The data generated by extension researchers is mostly ordinal or interval in nature, which cannot be analyzed through parametric statistical analyses. Thus, extension researchers depend heavily on descriptive statistics (frequencies, percentages, mean, standard deviation *etc*), non-parametric inferential methods (chi-square, Friedman ANOVA, *etc*), and parametric inferences (correlation and regression).

THE PROBLEM OF EXTENSION RESEARCH

Varying Perceptions and contradictory demands: While “field-extension” is a responsibility of the state (governments), the front-line extension system (mainly Krishi Vigyan Kendra’s and extension activities of ICAR and SAU centres) is expected to help the field functionaries by providing new approaches and “state-of-art” tools to improve the effectiveness of their extension work. While this is the accepted division of labour, many research managers have a different perception on the role of extension scientists. Many of them believe that the role of extension scientists is to promote technologies (developed at the respective research centres) in the field, rather than contributing to the effectiveness of the research projects through research and publications. The “field deliverables”, are viewed in terms of the quantity and coverage of extension interventions or stakeholder participation over a period of time. These perceptual differences have created a stressful working environment where the extension academicians/ scientists are overburdened to meet the immediate goals of their supervisors leaving aside their research ambitions.

Low quality of academic research: In the case of SAU extension research, which contributes more than 60% of the total research conducted / papers published in extension journals, most of it focus on the “subject” of extension of as a field of academic enquiry and thereby contributing very little to improve the field extension activities. The academic research conducted at the SAUs is time-bound and repetitive, with both guides and students not-willing to venture into innovative topics/ methods fearing rejection at the viva-voce or at the review meetings. The extension journals too focus on the “volume” of publishing rather than improving the quality of research papers. In many journals, the



peer-review process is carried out haphazardly with little focus on innovation and utility. Due to this most of the extension journals are rated low (<5.0) in the journal ratings determined by the National Academy of Agricultural sciences, New Delhi (NAAS, 2014). This trend is also similar for extension journals of International repute. With this limitation, the extension scientists and students face innumerable difficulties in applying for higher

positions for their professional growth including scholarships and awards from reputed societies.

Lack of professionalism among professional societies: In the absence of motivating environment at the workplace, talented extension scientists often look for innovative ideas and methods from professional extension societies. But the extension professional societies in India are mostly divided on the personal interests of few individuals, who consider bright young extension scientists as “threats” to their position. Extension is probably the only discipline in agricultural sciences, where the professional societies organize at least four specialised meetings every year, where the

participants comprise mostly of extension scientists from a particular region or lobby. The “award syndrome”, where over 50 extension scientists are awarded for best paper, best poster, best presentations etc or as promising young scientists in these meetings has also lowered the professional standards. A vast majority of the awards are given to “known people” based on personal relationships and the research quality takes a backstage in these events. Recognising an average or poor research worker creates frustration among promising extension scientists who loose motivation to do innovative research.

NEED FOR A PRAGMATIC APPROACH

In general, extension research is conducted in 6 different settings:

- research project in a research Institute or college,
- student project in a college or research Institute,
- field research in a Krishi Vigyan Kendra,
- field research in a NGO,
- field research in a state extension department and
- field research in a agri-input/ marketing/ credit agencies,

The number and volume of extension research vary among these settings. While the first three settings have a compulsive environment to deliver quality research output, the pressure to deliver is low among others.

In either case, the Indian extension scientist is under stress due to the demotivating environment within his organisation and due to lack of technical guidance from the professional societies to improve his/her research quality. He/she should normally belong to the following categories:

- a researcher who is burdened with field extension
- a researcher frustrated with too much documentation
- a researcher/academician overloaded with teaching
- a student who is under compulsion to complete his/her MSc or PhD within the prescribed duration or
- a subject matter specialist in a KVK or an NGO extension staff burdened with demonstrations and trainings

In this context, there is a need to look at some of the potential ways of conducting quality research at the individual level, without disturbing the routine schedule of activities expected within the organisation. Some of the potential ways forward are as follows:

Explore opportunities to conduct research in any mandated activity

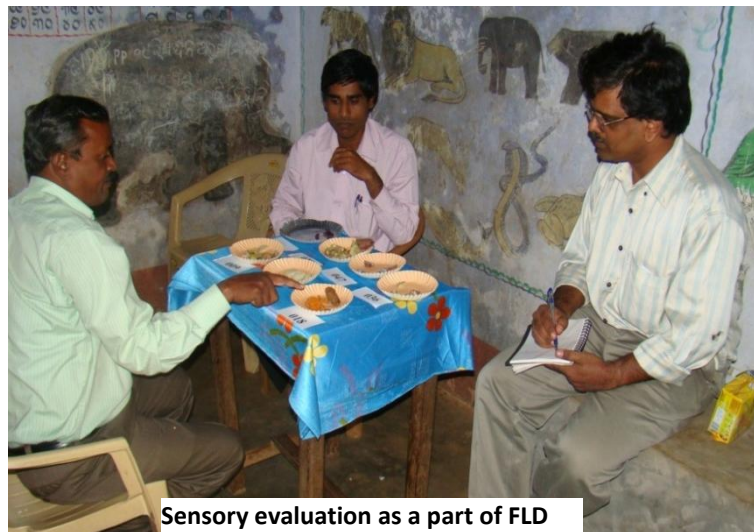
Any mandated activity can produce quality research output. If someone is continuously engaged in teaching/ training/ exhibitions, they can concurrently do research on their routine activity. In case of exhibitions, high quality research were conducted on the contextual model of learning – learning in a free-choice settings (Falk and Storksdieck, 2005), exhibit labelling and visitor concept development (Falk, 1997) and impact of prior knowledge on learning at an exhibition (Falk and Adelman, 2003).



If someone works for a KVK or other field extension agency, he/she can conduct quality research while conducting FLD or method demonstrations. Method demonstrations can be researched using traditional media/ method comparison techniques (Crouch et al., 2004) or its effect on learning motor skills (Ishikura and Inomata, 1995). The extension personnel engaged in capacity building work have wide array of choices from need analysis to ICT applications. Skill learning with sensory and motor tasks is a vital component of any training programme. Skill learning research (Scully and Newell, 1985; Willingham, 1998) can be conducted for farm machinery and other equipment studies.

Explore opportunities for collaborative multi-disciplinary research



Extension research conducted as part of a multi-disciplinary enquiry can solve problems much better. If an extension scientist is posted in a crop or animal / aspect specific Institute, it is good to get the mastery over the mandated subject before beginning any empirical enquiry. Understanding the mandated aspect will help to get deep insights into the forces that determine progress in the specific area. For instance, a post-harvest scientist develops a technology to produce functional pasta from any starchy crop; the extension scientist can help to determine its sensory acceptability by the potential consumers. Besides sensory testing, the extension scientist can test the product on a larger consumer sample and identify the potential market segments, estimate the market demand based on hedonic model and provide several market insights to the technology producer (Sivakumar et al., 2008, 2010). This work can satisfy both the post-harvest scientist and research managers besides helping the extension scientist to get few research papers in high-impact International journals.



In a participatory plant breeding research, the extension scientist can help the breeders to decide on the varietal attributes using preference studies (Sivakumar et al., 2009). The conjoint analysis is a widely used preference or utility estimation method which has been successfully used to identify cattle attributes in West Africa (Tano et al., 2013), Apple varietal preferences in UK (Manalo, 1990), and groundnut varietal attributes in Niger (Baidu-Forson et al., 1997). These results will help the breeders to decide on the breeding objectives and develop varieties that can cater to the needs of the farmers. In a multi-disciplinary team, the extension scientist will also be credited with developing varieties/ products along with biological scientists. There are several engineering or biology or chemistry or other discipline journals that publish extension research. Since these journals are rated high (Impact factor over 7.0), multi-disciplinary team work will provide high quality research publications. An exhaustive list of



journals where extension scientists could publish has been compiled by AESA (Agricultural Extension in South) Network and this could be accessed at <http://www.crispindia.org/Where%20we%20can%20publish%20extension%20research%20-%20Final%20Note%20%281%29.pdf>

 Centre for Research on Innovation and Science Policy		 Agricultural Extension in South Asia <small>Sharing, learning and Networking for innovation</small>		Details of Journals where extension research could be published																																				
<p>Where can we publish extension research?-A Note</p> <p>The following questions bother many who are keen to publish their research on extension.</p> <ul style="list-style-type: none"> • Can we publish our papers only in journals having "extension" in their title? • Which are the other journals where we could publish findings of extension research? • Why many other social science journals that publish articles related to extension not being considered for career advancement purpose by organizations like ICAR and SAUs (in India)? • As professionals, should we do something to include many more professionally rated-high impact social science journals in indices which are used for judging professional achievement? • But are we sufficiently aware of the wide range of available journals where we could publish our work? 		<table border="1"> <thead> <tr> <th>S.N</th> <th>Jrnl ID</th> <th>ISSN</th> <th>Name of the Journal</th> <th>NAAS¹ Rating</th> <th>Other Rating</th> <th>Publisher Details</th> </tr> </thead> <tbody> <tr> <td colspan="7" style="background-color: #f4a460;">Extension Journals</td> </tr> <tr> <td>1.</td> <td>A222</td> <td>0971-3115</td> <td>Asian Journal of Extension Education (Maharashtra Journal of Extension Education)</td> <td>2.93</td> <td></td> <td></td> </tr> <tr> <td>2.</td> <td>1041</td> <td>0537-1996</td> <td>Indian Journal of Extension Education</td> <td>3.26</td> <td></td> <td>Indian Society of Extension Education, Division of Agricultural Extension, IARI, New Delhi Website : www.isee.org.in</td> </tr> <tr> <td>3.</td> <td>1082</td> <td>0972-2181</td> <td>Indian Research Journal of Extension Education</td> <td>3.92</td> <td></td> <td>Dr. Jitendra Chauhan Secretary, Society of Extension Education, Agra 810, Paschim Puri, Agra (UP.)- 242007, India Web: http://www.sseea.org.in/rijee.html</td> </tr> </tbody> </table>		S.N	Jrnl ID	ISSN	Name of the Journal	NAAS ¹ Rating	Other Rating	Publisher Details	Extension Journals							1.	A222	0971-3115	Asian Journal of Extension Education (Maharashtra Journal of Extension Education)	2.93			2.	1041	0537-1996	Indian Journal of Extension Education	3.26		Indian Society of Extension Education, Division of Agricultural Extension, IARI, New Delhi Website : www.isee.org.in	3.	1082	0972-2181	Indian Research Journal of Extension Education	3.92		Dr. Jitendra Chauhan Secretary, Society of Extension Education, Agra 810, Paschim Puri, Agra (UP.)- 242007, India Web: http://www.sseea.org.in/rijee.html		
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Using alternate research methods to study an established phenomenon

Most of the research methods used in extension science are borrowed from other social science disciplines such as psychology, cultural anthropology, sociology, economics, marketing and communication. Though the research practices in these disciplines witnessed a sea change in the last two decades with the emergence of state-of-art techniques, the extension researchers continue to use out-dated methods from these disciplines. Though the extension research themes became diverse over the years with wider scope, the research methods continue to be old and obsolete. This phenomenon resulted in poor quality research as indicated by stereotypical publications and duplicating results. For a more detailed discussion on new methods and approaches in extension research, see the AESA blog on this theme (Sivakumar, P.S 2013).

Master the field of statistics

The goal of scientific research is to identify the hidden patterns in the observed data to make generalisations on the phenomenon under study. The knowledge and use of statistics helps in this. Quantification of relationships among a social phenomenon will provide several leads for further research, besides explaining the research questions under the study. In simple words, the mastery of statistics will not only improve the quality of the output, but also help in conducting a sound empirical research and enhancing the probability of getting the output published in peer-reviewed high impact journals.

There is a widespread perception among extension scientists that quantitative studies using statistics are theoretical in nature and that they do not lead to any meaningful interpretation. Using statistics is often perceived as a "suffix" phenomenon i.e. performing the statistical analysis after collecting the data. However, statistics provides us with the knowledge and tools for assessing complex natural phenomenon in a systematic and objective way.

With the advent of multivariate statistical methods, the social science research has witnessed a radical transformation. Traditionally, the data analysis is performed after collecting the data. These multivariate methods are not merely tools of data analysis, but they form integral part of every stage in data collection. For example, structural equation modelling, which is a combination of correlations, confirmatory factor analysis, path analysis and goodness-of-fit tests, provides detailed steps in constructing an attitude scale beginning from collection of statements to assessing reliability

and validity. It is an integrated tool where all the analyses related to constructing an attitude scale are inbuilt and it reduce the researchers' effort and time considerably. Limited dependent models like logistic regression can be used to assess the effect of nominal and ordinal independent variables on a nominal dependent variable. For example, adoption studies (adopted/ not adopted) or acceptance of a food product (accepted/ not accepted) etc can be well-researched using these models. Multi-nominal and ordinal regressions can add one more category i.e. partially adopted into the logistic model.

Though extension scientists are increasingly using multivariate methods to increase the probability of their paper acceptance in journals, it is not sufficient to ensure quality. The statistical methods



Our previous blogs on this theme

1. **RESEARCH IN EXTENSION: NEW TOOLS TO REINVENT ITS FUTURE**, Dr P Sethuraman Sivakumar. (March, 2013). (available at <http://aesagfras.net/Resources/file/Blog%204%20Enhancing%20the%20potential%20of%20quality%20vide%20os%20for%20farmers.pdf>)
2. **RESEARCH IN EXTENSION: IT IS TIME TO INTROSPECT**, Dr R. M. Prasad. March, 2013. (available at <http://aesagfras.net/Resources/file/Blog%205Research%20in%20Extension%20It%20is%20time%20to%20i%20ntrospect.pdf>)
3. **EXTENSION RESEARCH AND TECHNOLOGY DEVELOPMENT**, Dr M J Chandra Gowda, Dr Sreenath Dixit, Dr R Roy Burman & Dr P N Ananth. February, 2014. (available at http://aesagfras.net/Resources/file/FINAL-M_J_Chandre%20Gowda-13-FEB.pdf)
4. **EXTENSION RESEARCH: RANDOM THOUGHTS FROM A WELL WISHER**, Dr R M Prasad. September 2014. (available at <http://aesagfras.net/Resources/file/Prasad%20Sir-%20Blog%2039-FINAL.pdf>)
5. **SCIENTIFIC PUBLISHING IN EXTENSION: ARE WE DOING ENOUGH AND ARE WE DOING WELL?** (Dr S V N Rao, Dr K Natchimuthu and Dr S Ramkumar. October 2014. available at <http://aesagfras.net/Resources/file/Blog%2040.pdf>)

should be chosen based on the research problem, and there are several research papers published in high rated journals using simple statistics (Sharma and Joshi, 1995; Sivakumar et al., 2009). Since most statistical analyses are based on the nature of data, precautions should be taken to use the right method for analysing the observed data.

CONCLUSIONS

Extension is a unique discipline among social sciences as it has evolved from “field practices” that are implemented to improve the quality of life of rural communities. Extension research needs a face-lift to increase its impact and restore its credibility among research managers and other discipline scientists. The outputs from extension research should contribute to improve the efficiency of an existing practice. As extension science is an applied, problem-oriented field the ‘scientific knowledge’ (which includes theory) within extension should exhibit both ‘scientific rigor’ and the ‘applied perspective’ of the extension work. A pragmatic approach consistent with the mandate of the organization can considerably help in producing quality output.

References

- Baidu-Forson, B.R. Ntare and F. Waliyar. (1997). Utilizing conjoint analysis to design modern crop varieties: empirical example for groundnut in Niger. *Agricultural Economics*, 16 (3): 219-226.
- Crouch, C. H., A. P. Fagen, J. P. Callan, & E. Mazur. (2004). Classroom demonstrations: Learning tools or entertainment? *American Journal of Physics*, 72(6), 835–838.
- Falk, J.H. (1997). Testing a museum exhibition design assumption: Effect of explicit labeling of exhibit clusters on visitor concept development. *Science Education*. 81(6), p. 679 – 687

- Falk, J.H. and Storcksdieck, M. (2005). Using the Contextual Model of Learning to Understand Visitor Learning from a Science Center Exhibition. *Science Education*, 89, 744-778.
- Falk, JH & Adelman (2003). Investigating the impact of prior knowledge, experience and interest on aquarium visitor learning. *Journal of Research in Science Teaching*, 40, 163–176.
- Ishikura, T., & Inomata, K. (1995). Effects of angle of model-demonstration on learning of motor skill. *Perceptual and Motor Skills*, 80: 651-658.
- Manalo, A.B. (1990). Assessing the importance of apple attributes: An agricultural application of conjoint analysis. *Northeastern journal of agricultural and resource economics*, 19(2), 118-124
- NAAS (2014). NAAS score from scientific journals 2013. Avl in: <http://naasindia.org/documents/journal2013.pdf>
- Sharma, VP. & Joshi PK. (1995). Performance of rice production and factors affecting acreage under rice in coastal regions of India. *Indian Journal of Agricultural Economics* 50(2): 153-167
- Sivakumar, P. S., Panda, S.H., Ray, R.C., Pradhan, D.C., and Sivaramane, N. (2008). Modeling consumer acceptability of β -carotene rich sweet potato curd. *Journal of Sensory Studies*.23, 791-803
- Sivakumar, P.S., Panda, S.H., Ray, R.C., Naskar, S.K., and Bharathi, LK. (2010). Consumer acceptance of lactic acid fermented sweet potato pickle. *Journal of Sensory Studies* 25, 706-719
- Sivakumar, P.S., Nedunchezhiyan, M., Paramaguru, S., and Ray, R.C. (2009). Production system-specific differences in farmers' demand for greater yam (*Dioscorea alata*) varietal attributes in Orissa State, India. *Experimental Agriculture* 45, 1–14.
- Sivakumar, P. S. (2013) Extension Research: New tools to reinvent its future, AESA Blog 4, Agricultural Extension in South Asia, March 2013 <http://aesa-gfras.net/Resources/file/Blog%204%20Enhancing%20the%20potential%20of%20quality%20videos%20for%20farmers.pdf>
- Supe, S.V. (1969). Factors related to different degrees of rationality in decision making among farmers. Ph.D. thesis (unpub.), Division of Agril. Extension, I.A.R.I., New Delhi.
- Tano, K., Faminow, M.D., Kamuanga, M. and Swallow, B. 2003. Using Conjoint Analysis to Estimate Farmers' Preferences for Cattle Traits in West Africa. *Ecological Economics* 45: 393-407.
- Trivedi, G.(1963). Measurement and analysis of socio-economic status of rural families, Ph.D. Thesis, Division of Agril. Extension, I.A.R.I., New Delhi.
- Willingham, DB. (1998). A neuropsychological theory of motor skill learning. *Psychological Review*, 105(3): 558-584.

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