



Research Article

DEVELOPMENT OF A SCALE TO MEASURE THE IMPORTANCE OF APPROPRIATE SKILLS AND COMPETENCIES TO PERFORM AGRICULTURAL EXTENSION WORK/JOB EFFICIENTLY

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Abstract: Present agricultural extension has become as an essential tool for delivering information and advice modern/ improved farming in order to meet the global and national demand. Understanding local culture, group dynamics, social power relations, gender roles, communication patterns and human motivations are essential skills. Therefore, to be effective, an extension educator must integrate technical skills with human-how skills (also referred to as soft skills or process skills). Hence extension services need to be strengthened and agents are to be provided with the necessary equipment's and logistics so that they can reach farmers more easily with agricultural technologies. A scale has been developed to analyze the importance of skills and competencies required to perform agricultural extension work/job effectively. The main purpose of this study is to find out competencies that help to explain extension workers' job performances. Items/statements having relevancy percentage of more than 75 per cent with relevancy weightage of 0.75 were considered for the final selection. By this process, 75 statements were retained after relevancy test and these statements were suitably modified and finalized. To improve the performance of extension workers competencies must be the most important aspect of the agricultural education system and SAUs should include the identified skills in the curriculum of the extension education.

Keywords: Extension Education, Extension services, Extension Personnel, Competencies, Skills, Reliability and Validity

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Introduction

Agriculture growth depends on various factors such as rainfall, creating irrigation infrastructure, agriculture research and development and prices stabilization, etc. The extension has been playing an important role in agriculture development for a long time especially during the early period of India's first Green Revolution [1]. With changing in government policies, demand and supply, characteristics of technology and marketing reforms, agriculture extension system is facing more opportunities together with challenges. For a long time since independence, extension services were being provided mainly by the public sector. At present also the public sector is a major extension service providers through a two-tier system. At the central level, Indian Council of Agriculture Research (ICAR) is the nodal agency for agriculture research and extension; while at the state level, the State Agricultural Universities (SAU) via the Krishi Vigyan Kendra (KVKs) and Agriculture Technology Management Agency (ATMA) at the district level facilitate execution of agriculture extension programs.

With the emergence of green revolution (1970s), importance of agricultural extension in the global continued to evolve. Agricultural extension with its focus on increasing farm production via technology transfer, participatory and demand driven approaches which accounted in accelerating towards end users i.e., farmers [2, 3]. But the major drawback in a country like India, agriculture is the home of small and marginal farmers.

Transfer of technology and development of clients' capacity and potential has been identified as two key factors in ensuring effectiveness of any extension service [4]. The transfer of technology aims to communicate effectively the result of research to clients and development of clients' capacity and potential through educational activities aims to nurture a self-motivated client who can act voluntarily in their society and able to make rational decisions and solve their problems.

The effectiveness of extension services is also highly dependent on the ability of extension workers who are competent as the whole extension process is dependent on them to transfer information from research and extension organizations to the clients. At present agricultural extension has become as an essential tool for delivering information and advice mode/ improved farming in order to meet the global and national demand. Agricultural Training Centres and Farmer Field Schools (FFS) emphasized method and result demonstrations. Extension followed teaching principles such as "seeing is believing" and "learning by doing." During the late 1980s and early 1990s, rural and agricultural development professionals recognized that technical know-how and do-how were necessary but not sufficient for effective teaching and learning in agriculture. Because social systems are complex and adoption of new ideas and innovation constitutes a change in human behavior, it was recognized that extension workers would need to develop skills about "human-how"-how to help people learn and change. Understanding local culture, group dynamics, social power relations, gender roles, communication patterns and human motivations are essential skills. Therefore, to be effective, an extension educator must integrate technical skills with human-how skills (also referred to as soft skills or process skills). Hence extension services need to be strengthened and agents are to be provided with the necessary equipment's and logistics so that they can reach farmers more easily with agricultural technologies. They should also focus on skill development and capacity building of extension agents in view of content development during the dissemination of information via social media are needed to achieve better results in extension activities that help in enabling farmers to help themselves in taking informed farm decision and improving the livelihood in an efficient way.

With this background, a scale has been developed to analyze the importance of skills and competencies required to perform agricultural extension work/job effectively.

The main purpose of this study is to find out competencies that help to explain extension workers' job performances. In relation to this, the present study addresses to provide answer to what competencies influencing extension workers' job performances. In developing summated rating scale, the method suggested by Likert,(1932)[5] and Edwards, (1969)[6] was followed in the construction of important skills and competencies required viz., identification of components, collection of items/statements, relevancy test, item analysis, reliability, and validity.

Material and Methods

Collection and editing of items: A list of 87 statements pertaining to the knowledge, skills, abilities, and behaviors that agricultural extension professionals require to perform their tasks was prepared based on the available literature and discussion with agriculture extension workers and other experts from selected areas. The items/statements so identified were carefully edited in the light of 14 criteria suggested by Edwards (1969)[6], and Thurstone and Chavue (1929)[7].

Relevancy test

Eighty Seven statements were mailed to 130 experts in the agricultural extension and other related fields working in SAUs and ICAR institutions to critically evaluate the relevancy of each statement viz, Not important (NI), Somewhat important (SWI), Average(A), Important(I) and very much important(VI) with the score of 1,2,3,4 and 5, respectively. The judges were also requested to make necessary modifications, additions or deletion of statements, if they desire so. A total of 68judges returned the questionnaires duly completed were considered for further processing. From the data gathered, 'relevancy percentage', "Relevancy Weightage" and "Mean Relevancy Score" were worked out for all the 87 statements

$$\text{Relevancy Percentage} = ((VI \times 5 + IX4+AX3+ SWI \times 2 + NI \times 1)) / (\text{No.of judges responded} \times \text{Maximum score}) \times 100$$

$$\text{Relevancy weightage} = (VI \times 5 + IX4+AX3+ SWI \times 2 + NI \times 1) / (\text{No.of judges responded} \times \text{Maximum score})$$

$$\text{Mean Relevancy Score} = (VI \times 5 + IX4+AX3+ SWI \times 2 + NI \times 1) / (\text{No.of judges responded})$$

Using these three criteria the individual statements were screened for their relevancies. Accordingly, items/statements having relevancy percentage of more than 75 per cent with relevancy weightage of 0.75 were considered for the final selection. By this process, 75 statements were retained after relevancy test and these statements were suitably modified, added the suggestions recommended by judges and written as per the comments of the judges wherever applicable.

Item analysis

For carrying out item analysis, two types of scores were usedand these were the item score, referring to the score of an individual on an item and the total score referring to the summation of the item scores of an individual. These scores were used to arrive at the discrimination index. This index indicates the power of an item to discriminate the low effectiveness category from the high effectiveness category of the judge's 25 percent of the subjects with the highest total score is compared with 25 percent of the lowest total scores. These two groups provided the criterion group for which item analysis was conducted and critical ratio was calculated by using the following formula.

$$t = \frac{\overline{X_H} - \overline{X_L}}{\sqrt{\left[\sum X^2_H - \frac{(\overline{X_H})^2}{n} \right] \left[\sum X^2_L - \frac{(\overline{X_L})^2}{n} \right] / n(n-1)}}$$

Where

$\sum X^2_H$ =sum of the square of the individual scores (high group)

$\sum X^2_L$ =sum of the square of the individual scores (Low group)

X_H =mean score for the given item for high group

X_L =mean score for the given item for low group

Based on the item analysis ('t' value), 75 statements which were statistically significant at 5 per cent and 1 per cent were finally retained in the scale to

measure the importance of skills and competencies required by extension professional.

Skills and core competencies considered for present study were operationalized as the basic sets of knowledge, skills, abilities, and behaviors that agricultural extension professionals require for effective performance on the following twelve broad areas:

Program Planning Skills

Program Implementation Skills

Enhancing Efficiency and Effectiveness of Extension

Communication Skills

Information & Communication Technologies (ICTs) Skills

Program Evaluation Skills

Professional Development Skills

Personal Skills

Technical expertise and Marketing

Leadership and Management Skills

Entrepreneurship development skills

Soft Skills

Standardization of scale

Reliability

The developed scale was administered to analyze reliability in non-sampling area. The split-half method was employed to test the reliability of the importance of skills and competencies scale ie., whether the developed scale provide the consistent results and whether it measures what it is actually intended to measure. In the present scale it was found 0.733, this clearly indicates that the developed scale is highly reliable. The reliability co-efficient of the scale after applying spearman brown prophecy formula was found to be 0.84593, which is higher than the standard of 0.70, indicating higher reliability of the scale.

Half test reliability formula

$$r_1 = \frac{N(\sum XY - (\sum X)(\sum Y))}{\sqrt{N\sum X^2 - (\sum X)^2}(N\sum Y^2 - (\sum Y)^2)}$$

Where,

$\sum X$ = sum of the scores of the odd number items

$\sum Y$ =sum of the scores of the even number items

$\sum X^2$ = sum of the squares of the odd number items

$\sum Y^2$ =sum of the squares of the even number items

Validity

It refers to how well a scale measures what it is supposed to measure. The validity of the scale was tested by content and statistical validity methods which were tested by content and statistical validity methods, which ensured during judges rating and statistical formula.

Content validity

According to Kerlinger, (1966) [8] it is representatives or sampling adequacy of the content- the substance, matter and the topics of a measuring instrument. The item included in the scale was based on exclusive review of literature and experts' judgments. Therefore, it was assumed that the scale developed was valid with reference to inclusion of relevant contents of concepts under study.

Statistical validity

While construction of scale, statistical validity was worked out by relating importance of the score for 30 respondents. The validity co-efficient for scale was 0.9197. Which was also statistically significant at one percent level of probability indicating the higher validity of the developed scale [9-16]. Thus, the developed scale was confined to its validity to use in the sample area.

The validity formula is as follows.

$$V=\sqrt{r}$$

V = validity and r = reliability

	Competencies	RW	RP	MRS	t' Value
I	Program Planning Skills				
1	Goals of extension service and extension work	0.90	90.45	4.52	2.02*
2	Agricultural development strategies, programs, and policies.	0.90	90.00	4.50	1.99*
3	Needs assessment and prioritizing local needs	0.94	93.64	4.68	2.12*
4	Administrative and financial management and regulations	0.79	79.09	3.95	2.04*
5	Planning and designing need based programmes	0.92	92.27	4.61	2.16*
6	Organizing/Implementing agricultural development programme	0.78	78.18	3.91	2.34*
7	Visualizing strategic planning for effective implementation	0.80	80.45	4.02	2.58**
8	Critical analysis of the steps involved in programme implementation	0.86	86.36	4.32	2.27*
9	Resource planning for proper implementation	0.73	73.18	3.66	1.99*
II	Program Implementation Skills				
10	Building teamwork skills	0.90	90.00	4.50	2.41*
11	Execution of central and state government programs	0.83	82.73	4.14	2.60**
12	Motivating and engaging local stakeholders in implementing extension programs	0.95	95.00	4.75	2.08*
13	Negotiation skills and its application	0.85	85.00	4.25	2.63**
14	Participatory decision making in extension work.	0.92	92.27	4.61	2.61**
15	Mainstreaming gender and supporting minority groups in extension works.	0.82	82.27	4.11	2.35*
16	Risk mitigation and adaptation in extension	0.86	85.91	4.30	2.16*
17	NGOs integration with extension	0.81	80.91	4.05	2.01*
III	Enhancing Efficiency and Effectiveness of Extension				
18	Integrated and inclusive extension	0.86	86.36	4.32	2.12*
19	Agricultural value chain extension	0.88	87.73	4.39	2.38*
20	Integration of private extension service providers	0.82	82.27	4.11	2.25*
21	Total quality management in extension	0.86	85.91	4.30	2.67**
22	Community mobilization	0.90	89.55	4.48	2.02*
23	Farmer organization development and facilitation skills	0.86	85.91	4.30	2.12*
24	Convergence of different stakeholders	0.74	74.09	3.70	2.15*
25	Collaboration with other extension services	0.88	88.18	4.41	2.07*
26	Conduct rapid rural appraisal (RRA) and participatory rural appraisal (PRA)	0.75	75.00	3.75	2.29*
IV	Communication Skills				
27	Use of modern communication methods and AV aids.	0.89	88.64	4.43	2.14*
28	Understanding local culture while sharing success stories and lessons	0.87	86.82	4.34	2.03*
29	Public speaking and rapport building	0.89	89.09	4.45	1.99*
30	Effective communication skills with different kinds of clients and stakeholders	0.90	89.55	4.48	2.05*
V	Information & Communication Technologies (ICTs) Skills				
31	Use of computer applications	0.86	85.91	4.30	2.28*
32	Use of social media & Mobile phone services(SMS service, WhatsApp, Facebook, Instagram, Research gate etc.,)	0.87	87.27	4.36	2.39*
33	Application of cyber extension	0.85	85.45	4.27	2.41*
34	Documentation of information using ICT tools	0.88	87.73	4.39	2.07*
35	Development and Use of publications—journals, research reports, etc	0.84	83.64	4.18	2.26*
36	Skills in conducting webinar/ videoconferencing	0.75	74.55	3.73	2.17*
VI	Program Evaluation Skills				
37	Monitoring and evaluation of extension programs	0.89	89.09	4.45	2.65**
38	Preparation of digital Schedule/ questionnaire	0.85	84.55	4.23	2.28*
39	Digital data collection techniques and analyzing, interpretation and writing reports	0.70	70.45	3.52	2.15*
40	Impact assessment	0.90	90.45	4.52	2.62**
VII	Professional Development Skills	RW	RP	MRS	t' Value
41	Understanding good governance (i.e., participation of clients, accountability to clients, transparency).	0.85	85.00	4.25	2.38*
42	Commitment to career advancement (In-service training programs, professional meeting and conferences)	0.83	82.73	4.14	2.40*
43	Application of professional ethics in works, honesty and integrity.	0.91	90.91	4.55	2.39*
44	Understanding diversity within and among clients and stakeholders.	0.82	82.27	4.11	2.31*
45	Engaging various social and marginalized groups including women and youth in extension programs.	0.81	80.91	4.05	2.66**
46	Knowledge on agricultural insurance policies and procedures	0.82	82.28	4.12	2.14*
47	Designing training programmes	0.80	80.45	4.02	2.20*
VIII	Personal Skills				
48	Adaptability skill	0.85	84.55	4.23	2.08*
49	Group formation and support	0.87	87.27	4.36	2.15*
50	Guiding and supervising skills	0.87	87.27	4.36	2.19*
51	Problem solving skills	0.89	88.64	4.43	2.20*
IX	Technical Expertise and Marketing				
52	Knowledge on subject matter concepts	0.85	84.55	4.23	2.59**
53	Knowledge of agribusiness management.	0.81	80.91	4.05	2.22*
54	FPOs linkage with extension	0.84	83.64	4.18	2.62**
55	Linkage with Co-operative societies	0.81	81.36	4.07	2.31*
56	Agribusiness companies	0.79	78.64	3.93	2.29*
57	Market-oriented agricultural extension education	0.86	85.91	4.30	2.43*
58	Public Private Partnership opportunities	0.81	80.91	4.05	2.21*
59	Linkages and coordination with development departments	0.83	82.74	4.13	2.29*
X	Leadership and Management Skills				
60	Delegating responsibilities to subordinates	0.85	85.45	4.27	2.11*
61	Social and cultural upliftment	0.77	77.27	3.86	2.19*
62	Conflict management	0.84	84.09	4.20	2.25*
63	Cultural intelligence	0.80	80.00	4.00	2.20*
64	Motivating farmers	0.81	80.91	4.05	2.32*
XI	Entrepreneurship Development Skills				
65	Business planning	0.84	83.64	4.18	2.68**
66	Finance management	0.85	85.00	4.25	2.37*
67	Risk bearing ability	0.87	87.27	4.36	2.55**
68	Innovativeness	0.90	90.45	4.52	2.61**
69	Resilience	0.89	89.09	4.45	2.37*
70	Strategic management	0.88	88.18	4.41	2.33*
71	Promoting group entrepreneurship	0.86	85.91	4.30	2.19*
XI	Soft Skills				
72	Positive thinking	0.88	88.18	4.41	2.03*
73	Time Management	0.92	91.82	4.59	2.18*
74	Self motivation	0.91	90.91	4.55	2.11*
75	Stress Management	0.88	87.73	4.39	2.06*

Conclusion

Extension is not merely about educating rural people to attain physical and economic prosperity; it involves a holistic development of the people in rural, suburban, and urban areas. Extension service today is not limited to providing information on crop or animal production. It involves education and technical assistance to achieve local food security, production, processing, marketing, and distribution of safe and nutritious food for all consumers. The list of specific roles and qualities of extension education can go a long way in achieving these. At the core of all endeavors of an extension worker, however, should be helping the rural people attain economically and environmentally sustainable livelihoods. Hence to improve the performance of extension workers competencies must be the most important aspect of the agricultural education system and SAUs should include the identified skills in the curriculum of the extension education.

Application of research: In view of technological advancement and application at farm level. Present day farmers are facing several challenges in the adoption of advanced technologies due to climate change, uncertainties in the market price and demand, rapid deterioration, and declining resources. This necessitates extension workers to support farmers with newer skills and knowledge to face the challenges. Therefore, there is a need to provide newer competencies to the extension workers to work with full confidence by reorienting the present extension curriculum accordingly.

Research Category: Extension education and training

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