



Core Skills and Competencies Essential for Agricultural Extension Workers to Meet Present Day Challenges

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Agricultural extension contributes significantly for improving the welfare of farmers and others living in rural areas. Extension advisory services and programs strengthen the farmer's capacity to innovate by facilitating farmers to access latest agricultural knowledge and adoption. The extension workers, therefore, not only advises farming families but also motivate them to use improved agricultural implements and adopt the modern agricultural technologies according to their socioeconomic status. The success of extension workers depends on the possession of skills and experiences gained in executing need based programs effectively. Hence, an attempt has been made in this study to assess level of importance of core competencies and skills required by extension workers to perform their job effectively. Mean index scores were calculated for each individual skills listed under twelve broad areas of skills and competencies selected for the study. The results revealed that, soft skills were ranked first followed by communication skills. Organizing/implementing agricultural development program, team building skills, formation and development of farmer organization and facilitation skills, use of modern communication methods

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and AV aids, use of computer applications, preparation of digital schedule/ questionnaire, knowledge on agricultural insurance policies and procedures, problem solving skills, proficiency on subject matter concepts, cultural intelligence, business planning and self-motivation are the individual skills ranked first respectively on the listed twelve broad areas of skills and competencies. Based on the findings of the study, it is recommended that the extension workers are required to be equipped with these skills during the undergraduate and postgraduate level itself by designing and reorienting the curriculum and enhance the competence of the agricultural graduates along with upgrading the skills of extension workers.

Keywords: Level of importance; core competencies and skills; extension workers; extension services.

1. INTRODUCTION

Globally the agricultural system is evolving and experiencing new opportunities and challenges on social, financial and environmental subsystems. Due to economic improvement of the people there is drastic improvement in lifestyle and consumption behavior which intern increasing the demand for high quality farm produce with value addition and finished products proved [1]. These changes are forcing the agricultural based development institutions to suitably modify their roles and responsibilities of extension workers. Improvement in agricultural production, productivity and sustainability of agricultural technologies will depend on farmers' willingness and access to new technologies. Agricultural extension services play a pivotal role in ensuring that the farmers have access to improved technologies and that their concerns and needs are properly addressed. Extension is a two-way channel in which the extension worker interprets both to the farmers and to the expert at the research centers, disseminating knowledge useful to address field problems [2]. The extension workers, therefore, not only advices farming family but also motivate them to adopt modern agricultural practices according to their socioeconomic status and need. Farmers generally need assistance regarding input provisions such as quality seeds, timely supply of inputs such as fertilizers, credit to buy inputs, cultivation techniques, farm management practices, harvesting, storage, and access to market information and marketing strategies. Furthermore, extension services are required to raise awareness and sensitivity on environmental issues, to improve public health and education, and to come up with solutions on gender-related issues and these services are to be responsive to satisfy the customers, [3]. To provide the agricultural education and the services and to solvethe problems of rural people in the most consistent way extension workers are expected to be more dynamic and must high degree of

expertness and skills to tackle the present-day challenges. The successful extension agents are expected to be the experts who correctly play their roles while serving the farmers under changed circumstances [4].

A core competency means the basic knowledge, attitudes, skills, and behaviors that helps extension professional to gain excellence in Extension Services. According to McClelland [5] effective and efficient extension worker being knowledgeable and intelligent executes successful programs. Extension worker's performance is a function of his/her knowledge plus skills and attitudes. Hence, extension professionals should not be evaluated solely on knowledge but on skills they have in delivering services to their client. It should however also be noted that core competency needs are only contextual, and extension workers' contexts affect their competency needs and competency levels. The overall purpose of this study is to examine the roles, responsibilities, and competencies of agricultural extension agents working within different extension systems, and to determine common strategies that maximize the impact of extension agents' efforts for agricultural and rural development. With this background an attempt has been made to study the level of importance of core competencies and skills required by extension workers to perform their job effectively to meet the demand of the present day job market. Broad twelve core skills and competencies considered for the study were ranked based on the mean index scores calculated.

2. METHODOLOGY

By reviewing the research articles published in India and abroad and also through participatory methods like focus group discussion and field workshops by involving all the stakeholders in extension education (Farmers, Extension Professionals, PG & PhD students and Teachers

in extension education) most important skills and competencies were listed for effective field extension work to accomplish the present day job market. The listed core skills and competencies were further analyzed to eliminate the unimportant ones and by retaining the most important skills for developing an interview schedule by adopting participatory methods.

2.1 Development of Interview Schedule

Taking into consideration of the scope and objectives of the study, an interview schedule was prepared by including the items from scale developed to measure the level of importance of the skills and competencies that an agricultural extension professionals have to possess to perform their tasks effectively. Suitable changes were incorporated in the formation of items, questions and their sequences. Adequate caution was exercised to make the schedules unambiguous, clear, complete, comprehensive and understandable. Considering the importance of contemporary extension roles, responsibilities, the scale was developed with twelve broad areas of skills and competencies required for effective performance of agricultural extension professionals at the field level. Under each of the twelve broad areas specific skills and competencies were identified and grouped. Skills and core competencies considered for the present study were operationalized as the basic sets of knowledge, skills, abilities, and behaviors that agricultural extension professionals are required to acquire for effective performance. Most important twelve skills and competencies were finally selected for analysis through discussion with field extension workers, administrators and experts in the field of agricultural extension.

2.2 Selection of Respondents

The extension professionals presently working in Government line departments, Farm Universities, ICAR institutions, NGOs and private firms working in the state of Karnataka were considered as respondents in order to check and analyze the level of importance of skills and competencies required by extension professionals to be incorporated in the curriculum of extension education for effective performance of agricultural extension work at the field level.

The developed instrument was sent by post as well as by google survey method and email to all the Agriculture and Horticulture departments of Karnataka state (30 Districts) out of which 261

extension workers were responded with complete information as mentioned in the Table below. With regard to Coffee Board Junior and Senior Liaison Officers working in different areas of Karnataka were considered as respondents to collect the data.

Keeping in mind their experience in agricultural extension work, respondents were requested to rate the level of importance of the twelve skills and competencies on the following criteria:

2.2.1 Level of importance

The listed skills & competencies were rated by the respondents to analyze the importance of skills and competencies required by extension professionals to improve their job performance at the field level. Five-point continuum scale and weight age given for each response as suggested by Likert [6] was used to measure the level of importance as Not important-1, Slightly Important-2, Moderately Important-3, Important-4 and Very Important-5.

2.2.2 Operationalizing core skills and competencies

2.2.2.1 Program planning skills

“Program planning skills and competencies” is operationalized as direction and intensity of agricultural extension efforts to bring about desirable change among farmers in view of national agricultural development strategies, programs, and policies. Nine items were included and assessed this area of competency.

2.2.2.2 Program implementation skills

“Program implementation skills and competencies” is operationalized as ability of agricultural extension professional to coordinate extension programs, demonstrate teamwork and negotiation skills, engage diverse local stakeholders, delegate responsibilities, and follow participatory decision making in extension work. Eight items were considered and assessed under this competency.

2.2.2.3 Efficiency and effectiveness of extension skills

Efficiency and Effectiveness of Extension Skills are required by agricultural extension professional to perform certain activities effectively to enhance the efficiency like linkages with other areas, coordinating with other firms, integrating with private firms and facilitating

entrepreneurship etc., Nine items were considered and assessed under this competency.

2.2.2.4 Communication skills

Communication Skills are operationalized as ability of agricultural extension professionals to respect local culture, prepare reports of their work, share success stories and lessons learned, use various communication channels to disseminate information about important extension activities and programs, and possess good listening and public speaking skills. Four statements were administered to assess this competency.

2.2.2.5 Information & Communication Technologies (ICTs) skills

Information & Communication Technologies (ICTs) skills are operationalized as ability of extension professionals to use computers, audio visual aids, mass media, mobile phones, and social media for communication, teaching, and learning. Six items were used to assess this competency.

2.2.2.6 Program evaluation skills

Program Evaluation Skills are operationalized as ability of agricultural extension professionals to understand monitoring and evaluation concepts, conduct monitoring and evaluation of extension programs, develop data collection instruments, apply qualitative and quantitative tools to collect and evaluation of data, write evaluation reports, and share results with stakeholders. Four items were administered to assess this competency.

2.2.2.7 Professional development skills

Professional Development skills are required for learning to maintain professional credentials such as practice principles of good governance, show commitment to career advancement, apply professional ethics in work, follow organizational policies & directives, and

demonstrate positive attitudes toward extension work. Seven items were administered to assess this competency.

2.2.2.8 Personal skills

Personal skills are the qualities that can be considered as strengths, be it in professional life or personal life. Any individual with excellent personal skills is reliable and contributes to a work culture positively. Four items were administered to assess this competency.

2.2.2.9 Technical expertise and marketing skills

Operationalized as ability of agricultural extension professionals to demonstrate basic disciplinary knowledge, understand the innovative technologies, educate community members about risks and uncertainties, use of publications, demonstrate agribusiness management, and facilitate entrepreneurship development. Eight statements were included and assessed under this competency.

2.2.2.10 Leadership and management skills

Operationalized as the capacity of an agricultural extension professionals behavior which emphasizes the quality of work, clarifies everyone's responsibilities, offers new approaches to problem solving and encourages decision making through groups. Five statements were administered to assess this competency.

2.2.2.11 Entrepreneurship development skills

Operationalized as the ability and readiness to develop, organize and run a business enterprise, along with any of its uncertainties in order to make a profit. Entrepreneur should be able to plan business, ready to take risk, innovative, manage finance etc., Developing these entrepreneurial skills is one of the most important competencies considered in extension education. Seven statements were administered to assess this competency.

List 1. Extension professionals selected for the study

Institutions addressing nations of the respondents	Number responded
Karnataka State Department of Agriculture (Agriculture Officer, Assistant Agriculture Officer, Assistant Director of Agriculture and Joint Director of Agriculture)	107
Karnataka State Department of Horticulture (Assistant Horticulture Officer, Assistant Director of Horticulture and Senior Assistant Director of Horticulture)	120
Coffee board Liaison officers	34
Total	261

2.2.2.12 Soft skills

Soft Skills are personal attributes that supports situational awareness and enhances an individual's ability to perform the job effectively. Four statements were considered and assessed under this competency.

3. RESULTS AND DISCUSSION

The most important twelve areas of skills and competencies suggested by the field extension professionals, experts and based on the reviews were listed and requested the field extension workers to rate and rank them based on the level of importance and the results were presented in Table 1. Mean, Standard deviation and mean index scores were calculated to rank the skills and competencies and the results found that, soft skills were ranked first followed by communication skills as second. Personal skills and entrepreneurship development skills were found to be ranked third followed by the importance of ICTs skills as fourth. Program planning skills, Professional Development Skills and Technical expertise and Marketing skills were ranked fifth by the respondents, then Leadership and Management Skills were ranked sixth. The remaining Program Implementation Skills, Enhancing Efficiency and Effectiveness of Extension and Program Evaluation skills were ranked together as seventh by the respondents.

Today's agricultural extension and advisory services are being challenged to serve as the connecting actor in complex agricultural innovation systems. Extension workers should remain current with emerging technologies, be able to handle challenges, tap opportunities and demonstrate competency in their services. They need to possess a set of core competencies. Besides sound technical knowledge, they must possess adequate knowledge and skill in participatory tools and techniques for planning, implementation, and evaluation of extension programs. They must be able to systematically identify, analyze and resolve existing and anticipated problems in order to reach optimum solutions in a timely manner (ability to conduct needs assessments with clients and stakeholders leading to desired outcomes, including the ability to design, develop and execute specific programmes or projects. This requires extension functionaries to be well versed with new emerging areas to serve the client needs and aspiration. Hence, there is a need to integrate the identified important core

skills and competencies in extension education curricula. Providing education and training on these core skills and competencies strengthens the work performance of extension worker at field level. These findings support Suvedi and Sasidhar [7], Ghimri et al [1]

The importance of individual programme planning skills were ranked using mean index scores and the results from Table 2 shows that Organizing/ implementing agricultural development programme and agricultural development strategies, programs, and policies ranked first followed planning and designing need based programmes and Need assessment and prioritizing local needs as second.

It can be observed from Table 3 that building teamwork skills, execution of Central and State Government programs followed by motivating and engaging local stakeholders in implementing extension programs as first, second and third rank respectively as important with respect to programme implementation skills.

From the Table 4 it could be seen that individual skills of Enhancing Efficiency and Effectiveness of Extension were ranked for its importance where Farmer organization development and Facilitation skills ranked first followed by Collaboration with other extension services and Convergence of different stakeholders as second and third respectively.

The study reveals in the Table 5 that the individual skills like Use of modern communication methods and AV aids was ranked first followed by understanding local culture while sharing success stories and lessons and Public speaking and rapport building as second and third respectively as important with respect to communication skills.

The study conferred that the level of importance with respect to information and communication technologies (ICT) skills were ranked in Table 6 where it shows Use of computer applications as first followed by Documentation of information using ICT tools, Skills in conducting Webinar/ videoconferencing as second and Application of cyber extension was ranked third based on its importance.

A glance at the Table 7 reveals that Preparation of digital Schedule/ questionnaire was ranked first for its importance followed by Impact assessment and Digital data collection

techniques and analyzing, interpretation and respect to importance of programme evaluation writing reports as second and third with skills.

Table 1. Ranking based on level of importance for skill & competencies n=261

SI no	Skills & competencies	Mean	SD	Mean index scores	Rank
1	Soft skills	18.06	2.81	0.90	I
2	Communication Skills	17.65	2.74	0.88	II
3	Personal skills	17.36	2.61	0.87	III
4	Entrepreneurship Development skills	30.32	4.93	0.87	III
5	Information & Communication Technologies (ICT) Skills	25.82	3.71	0.86	IV
6	Programme planning skills	38.17	5.74	0.85	V
7	Professional Development Skills	29.84	4.67	0.85	V
8	Technical expertise and Marketing skills	34.03	5.22	0.85	V
9	Leadership and Management Skills	20.84	3.42	0.83	VI
10	Enhancing Efficiency and Effectiveness of Extension	36.72	6.20	0.82	VII
11	Programme Evaluation skills	16.46	2.95	0.82	VII
12	Programme Implementation Skills	32.96	5.37	0.82	VII

Table 2. Level of Importance expressed by respondents with respect to programme planning skills

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Organizing/implementing agricultural development programme	4.32	0.84	0.88	I
2	Agricultural development strategies, programs, and policies	4.30	0.89	0.88	I
3	Planning and designing need based programmes	4.42	0.83	0.86	II
4	Need assessment and prioritizing local needs	4.39	0.86	0.86	II
5	Resource planning for proper implementation	4.30	0.83	0.86	II
6	Administrative and financial management and regulations	3.95	1.01	0.86	II
7	Visualizing strategic planning for effective implementation	4.16	0.90	0.83	III
8	Critical analysis of the steps involved in programme implementation	4.02	0.94	0.80	IV
9	Goals of extension service and extension work	4.31	0.82	0.79	V

Table 3. Level of importance expressed by respondents with respect to program implementation skills n=261

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Building teamwork skills	4.38	0.87	0.87	I
2	Execution of Central and State Government programs	4.26	0.91	0.85	II
3	Motivating and engaging local stakeholders in implementing extension programs	4.21	0.89	0.84	III
4	Negotiation skills and its application	4.17	0.89	0.83	IV
5	Main streaming gender and supporting minority groups in extension works	3.97	1.03	0.83	IV
6	Risk Mitigation and Adaptation in Extension	4.13	0.89	0.81	V
7	Participatory decision making in extension work	4.07	0.96	0.79	VI
8	NGOs integration with extension	3.78	1.09	0.76	VII

Table 4. Level of Importance expressed by respondents with respect to Enhancing Efficiency and Effectiveness of Extension Skills n=261

SI No	Skills and Competencies	Mean	SD	Mean index scores	Rank
1	Farmer organization development and Facilitation skills	4.31	0.90	0.88	I
2	Collaboration with other extension services	4.02	0.98	0.86	II
3	Convergence of different stakeholders	4.16	0.92	0.85	III
4	Integrated and inclusive extension	3.97	0.93	0.83	IV
5	Community mobilization	4.10	1.03	0.82	V
6	Conduct rapid rural appraisal (RRA) and participatory rural appraisal (PRA)A	3.93	1.01	0.80	VI
7	Integration of private extension service providers	3.61	1.15	0.79	VII
8	Agricultural value chain extension	4.39	0.89	0.79	VII
9	Total Quality Management in extension	4.23	0.86	0.72	VIII

Table 5. Level of importance expressed by respondents with respect to communication skills n=261

SI No	Skills and Competencies	Mean	SD	Mean index scores	Rank
1	Use of modern communication methods and AV aids	4.48	0.83	0.89	I
2	Understanding local culture while sharing success stories and lessons	4.38	0.81	0.89	I
3	Public speaking and rapport building	4.46	0.82	0.88	II
4	Effective communication skills with different kinds of clients and stakeholders	4.35	0.81	0.87	III

Table 6. Level of importance expressed by respondents with respect to Information & Communication Technologies (ICTs) skills n=261

SI No	Skills and Competencies	Mean	SD	Mean index scores	Rank
1	Use of computer applications	4.54	0.66	0.91	I
2	Documentation of information using ICT tools	4.40	0.75	0.88	II
3	Skills in conducting Webinar/ videoconferencing	4.33	0.82	0.88	II
4	Application of cyber extension	4.03	0.93	0.87	III
5	Development and Use of publications—journals, research reports, etc	4.13	0.92	0.83	IV
6	Use of social media & Mobile phone services(SMS service, WhatsApp, Facebook, Instagram, Research gate etc.,)	4.38	0.91	0.81	V

Table 7. Level of Importance expressed by respondents with respect to program evaluation skills n=261

SI No	Skills and Competencies	Mean	SD	Mean index scores	Rank
1	Preparation of digital Schedule/ questionnaire	3.88	1.00	0.85	I
2	Impact assessment	4.25	0.89	0.84	II
3	Digital data collection techniques and analyzing, interpretation and writing reports	4.15	0.91	0.83	III
4	Monitoring and evaluation of extension programs	4.18	0.92	0.78	IV

Individual skills of professional development skills were ranked based on its importance where it is observed from the Table 8 that Knowledge on agricultural Insurance policies and procedures was ranked first followed by understanding diversity within and among clients and stakeholders and application of professional ethics in works, honesty and integrity as second and third respectively [8-10].

The present study concluded that the importance of individual personal skills were ranked where it shows in Table 9 that problem

solving skills followed by adaptability skills were ranked first and second respectively. Guiding and supervising skills was ranked third as important with respect to personal skills.

From the Table 10 it could be seen that skills like Knowledge on subject matter concepts was ranked first followed by Market-oriented agricultural extension education and Knowledge of agribusiness management as second and third respectively as important for technical expertise marketing skills.

Table 8. Level of Importance expressed by respondents with respect to professional development skills n=261

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Knowledge on agricultural Insurance policies and procedures	4.32	0.87	0.88	I
2	Understanding diversity within and among clients and stakeholders	4.06	0.88	0.87	II
3	Application of professional ethics in works, honesty and integrity	4.39	0.88	0.86	III
4	Commitment to career advancement (In-service training programs, professional meeting and conferences)	4.21	0.96	0.86	III
5	Engaging various social and marginalized groups including women and youth in extension programs	4.24	0.90	0.85	IV
6	Designing training programmes	4.33	0.82	0.84	V
7	Understanding good governance (i.e., participation of clients, accountability to clients, transparency)	4.28	0.81	0.81	VI

Table 9. Level of importance expressed by respondents with respect to personal skills n=261

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Problem Solving skills	4.47	0.78	0.88	I
2	Adaptability skill	4.42	0.71	0.84	II
3	Guiding and Supervising Skills	4.30	0.78	0.86	III
4	Group formation and support	4.19	0.90	0.89	IV

Table 10. Level of importance expressed by respondents with respect to technical expertise and marketing skills n=261

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Knowledge on subject matter concepts	4.54	0.71	0.91	I
2	Market-oriented agricultural extension education	4.36	0.84	0.87	II
3	Knowledge of agribusiness management.	4.34	0.82	0.85	III
4	FPOs linkage with extension	4.26	0.91	0.82	IV
5	Linkages and coordination with development departments	4.25	0.84	0.81	V
6	Public Private Partnership opportunities	4.13	0.92	0.87	VI
7	Agribusiness companies	4.09	0.89	0.83	VII
8	Linkage with Co-operative societies	4.08	0.89	0.85	VIII

The leadership and management skills were ranked based on level of importance where it is shown in the Table 11 that Cultural intelligence and Motivating farmers were ranked first and second respectively followed by Delegating responsibilities to subordinates as thirst rank for its importance [11,12].

It is noticed that from Table 12 that Business planning was ranked first for its importance followed by Finance management and Risk bearing ability as second and third for its importance with respect to entrepreneurship development skills.

Ranking based on Level of Importance with respect to Soft Skills is shown in Table 13 that Self-motivation was ranked first followed by Stress Management and Time Management as second important.

The study used twelve broad core competencies and skills namely Programme planning skills, programme implementation skills, Enhancing Efficiency and Effectiveness of Extension Skills, communication skills, ICT skills, programme evaluation skills, professional development skills,

personal skills, Technical Expertise and Marketing Skills, leadership and management skills, entrepreneurship development skills and soft skills. Findings of the respondents perceiving all core competencies to be important to their profession but the revelation of higher rankings to particular individual skills and competencies under each broad areas of skills selected in the study indicates that extension professionals are very much interested and in need to learn. Competency needs are context specific and dynamic. Thus, it is imperative to periodically examine what competencies extension professionals possess and how they value them. Hence in order to get acquainted with the indicated important skills there is a need of provision of education on these important core competencies and skills. There is a need to develop extension education curricula integrating these core competencies and providing education and training on these core competencies to extension professionals. Also, the higher rankings are indicative of their wish to receive additional in-service training to enrich their skills and competencies to improve their performance. These findings support Ghimri et al. [1].

Table 11. Level of importance expressed by respondents with respect to leadership and management skills n=261

SI No	Skills and Competencies	Mean	SD	Mean index scores	Rank
1	Cultural intelligence	3.87	0.94	0.88	I
2	Motivating farmers	4.39	0.80	0.86	II
3	Delegating responsibilities to subordinates	4.29	0.82	0.83	III
4	Conflict management	4.15	0.92	0.83	III
5	Social and cultural upliftment	4.14	0.89	0.77	IV

Table 12. Level of importance expressed by respondents with respect to entrepreneurship development skills n=261

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Business planning	4.30	0.84	0.90	I
2	Finance management	4.34	0.86	0.88	II
3	Risk bearing ability	4.38	0.84	0.87	III
4	Innovativeness	4.51	0.78	0.86	IV
5	Resilience	4.30	0.84	0.86	IV
6	Strategic management	4.30	0.81	0.86	IV
7	Promoting group entrepreneurship	4.25	0.89	0.84	V

Table 13. Level of importance expressed by respondents with respect to soft skills n=261

SI No	Skills and competencies	Mean	SD	Mean index scores	Rank
1	Self-motivation	4.46	0.82	0.91	I
2	Stress Management	4.58	0.79	0.90	II
3	Time Management	4.52	0.79	0.90	II
4	Positive thinking	4.52	0.80	0.89	III

4. CONCLUSION

Based on the findings of the study, it is recommended that training programs for the extension workers should be designed and organized considering the core skills and competencies to enhance the competence along with upgrading the skills of extension workers. Besides, required competencies has to be incorporated in the extension curriculum at the graduate and post-graduate levels to meet the need of the future workforce in view of changing agricultural situations. Extension and advisory services need to clearly articulate their role in the rapidly changing rural and agricultural context to redefine them and increase its interest in extension services. To improve the performance of extension services first of all the roles, responsibilities and competencies of extension workers should be clearly defined. When employing extension agents, their proficiency levels relating to these concepts should be assessed. Continuous education and in-service training should be given to update and upgrade the abilities and skills of the extension agents. The agricultural extension workers should be assigned duties and responsibilities in the areas where they best perform their roles.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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