

PROFESSIONAL COMPETENCIES OF AGRICULTURAL EXTENSION AGENTS IN KENYA: IMPLICATIONS FOR CURRICULUM DEVELOPMENT

M.C. Lopokoiyit¹, C.A. Onyango¹ and J.K. Kibett¹

ABSTRACT

Agriculture is a multidisciplinary subject intertwined in the livelihoods of individuals and communities. The curricula of undergraduate programmes focus on basic sciences and technical subject matter, with little emphasis on professional skills that enhance the personal effectiveness of the individual in the context of extension service delivery. This study used a training needs analysis of 440 extension agents in both the public and private sectors to determine the professional competencies required by extension staff for effective extension work. The study also explored differences in training needs between front line extension workers (FEW) and subject-matter specialists (SMS). A cross-sectional survey was used and training needs were determined and prioritised using Borich's needs

discrepancy model (BNDM) with a mean weighted discrepancy score (MWDS). The professional competencies were grouped into five areas: information and communications technology (ICT), instructional skills, management, leadership and cross-cutting issues. Competencies with the highest training needs were: computer applications and use in communication, audio and video material development, data and information management, motivation, conflict management and strategic planning. The training needs were significantly different for agents from the public and the private sector. The MWDS ratings were significantly different between FEW and SMS for: computer literacy, internet use, e-mail and electronic communication, preparing audio and visual materials and managing finances. The mean

MWDS ratings for the public sector were higher than those of the private sector. The respondents suggested that: project proposal writing, gender and economic empowerment, communication skills, sustainable agriculture and disaster management should be included in the curricula. The high MWDS obtained across all professional competencies provides a basis for designing relevant courses for inclusion in undergraduate, postgraduate and in-service programmes.

KEY WORDS: TRAINING NEEDS, ICT, INSTRUCTIONAL SKILLS, MANAGEMENT, LEADERSHIP, CROSS-CUTTING ISSUES

¹ Department of Agricultural Education and Extension,
Egerton University, PO Box 20115-536, Egerton, Kenya.



INTRODUCTION AND OBJECTIVES

Agriculture, the mainstay of Kenya's economy, contributes 26% to GDP directly and another 25% indirectly (GoK, 2010). 'Vision 2030' has identified agriculture as one of the key sectors to deliver the 10% annual economic growth rate envisaged under the economic pillar. To achieve this growth, transforming small-scale agriculture from subsistence to an innovative, commercially orientated and modern agricultural sector is critical (GoK, 2010). An efficient agricultural sector will stimulate the national and rural economy by improving incomes, food security and living standards. The role of the national extension system is to make the agricultural sector efficient.

Agricultural extension services facilitate appropriate technology generation and dissemination to the farming community. Extension services are expected to help rural communities get organised and take charge and ownership of their development agenda and activities. To achieve this, extension personnel must develop a new philosophy in which their role is to empower farmers and rural communities with the skills they need. The extension agent's personal effectiveness in communication, interpersonal skills, leadership and management motivates farmers, improves understanding and trust, and empowers them to commitment and action (Chamala and Mortiss, 1990). Empowering communities to build, develop and increase their

power can be done through cooperation, sharing and working together. This requires convergent points or platforms for solving local problems and mobilising human and financial resources for sustainable development. These are non-technical competencies required by extension agents to carry out their work effectively.

This study was designed to identify professional extension training needs of agricultural extension personnel in Kenya in the light of changing trends in agricultural production, extension strategies and environmental concerns that have implications for training of extension workers. Identifying these needs is important to ensure that the curricula address the needs of both public and private extension service providers. It also forms a basis for reviewing the curricula to ensure that training is relevant, demand-driven and responsive to the dynamic agricultural sector. This will also reassure stakeholders that the knowledge, skills and attitudes that graduates learn will be meaningful to their future employment goals. The following hypotheses were tested:

- there is no statistically significant difference in the professional training needs of extension agents in the public and private extension services;
- there is no statistically significant difference in the professional training needs of front line extension workers (FEW) and subject-matter specialists (SMS).

MATERIALS, METHODS AND DATA SOURCES

The study involved multi-stage sampling, through purposive sampling of six counties and private extension organisations, and stratified random sampling of 5,100 staff in the districts under the Ministry of Agriculture (MoA), the Ministry of Livestock Development and private extension organisations. A total of 440 extension agents were sampled, 325 from the public sector and 115 from private extension services. The extension workers in the study had at least a diploma in an agricultural discipline.

The following counties were used in the study and formed the accessible population: Bungoma, Elgeyo-Maraket, Kilifi, Machakos, Trans-Nzoia and Uasin-Gishu. These districts have different agro-ecological zones and diverse agricultural activities, ensuring that the study captured the different challenges facing extension workers.

Data on training needs were obtained using a questionnaire with two sections. The first section was designed to solicit demographic data and the second section obtained the rating of professional competencies on a five-point Likert scale for importance, knowledge and opportunity to use. The data were collected by a trained enumerator and analysed using descriptive and inferential statistics (SPSS Version 12.5).

The study used Borich's (1980) needs discrepancy model that lends itself effectively to the standard survey questionnaire – it rates need,



importance, knowledge and opportunity for use (Edwards and Briers, 1999). Scoring on a Likert scale enabled training need to be calculated and prioritised using the mean weighted discrepancy score (MWDS). According to Joerger (2002), Borich's model can be used to compare training needs within and between different groups by subjecting the median scores and MWDS to further analyses. The study used the modified model to include opportunity of use score to further refine the level of need:

$$\text{Educational Need} = (I - K \times I) + ((I - O) \times I) / 2$$

Where, I is the importance score, K the knowledge score and O the opportunity score.

Each section had additional open-ended questions to solicit further views on the various items. The MWDS was then calculated from the ratings to derive training need. The MWDS was also used to rank the training needs. All hypothesis tests were carried out at a 5% level of significance ($\alpha = 0.05$).

RESULTS AND DISCUSSION

Respondents' characteristics

The majority of extension staff were in their mid-career stage as indicated by a mean age of 42.21 years (SD = 8.124). The number of years worked ranged from less than one year to 34 years, with a mean of 16.13 years (SD = 9.289). Few of the

respondents had changed employment (mean = 0.62; SD = 1.268) and this could be attributed to the depressed employment opportunities in the agricultural sector and loyalty to their employers. SMS had a minimum of a degree in an agricultural discipline and constituted 38.4% ($n = 169$) of those sampled. The numbers of SMS with higher-level qualifications were low: PhD ($n = 4$) and master's ($n = 37$). Most extension staff held diplomas (61.6%), so there is a potential for in-service training to upgrade their qualifications.

These figures indicate the high level of qualified personnel in agricultural extension that could be attributed to employers' commitment to professional development. The areas of specialisation were wide to meet the requirements of diverse agricultural activities. According to Huerta and Smith (2001), agent specialisation is a

way of providing expertise closer to extension programme delivery and as a way to improve the county agent's ability to work across county lines and across programme lines. Whereas previously only graduates from technical subjects deemed directly relevant to agriculture were employed as extension agents, there has been a movement to employ extension agents in non-traditional fields such as sociology and environmental science. This is in recognition of the need for multidisciplinary approaches in addressing the complexity of agricultural production systems, as well as cross-cutting issues faced by both farmers and extension agents.

The respondents supervised an average of seven people (SD = 10.086), indicating a need for human resource management competencies.

TABLE 1: SUMMARY OF TRAINING NEEDS IN EXTENSION PROFESSIONAL COMPETENCIES

Extension professional competencies	Importance		Knowledge		Opportunity		MWDS
	\bar{x}	σ	\bar{x}	σ	\bar{x}	σ	
Management skills	4.34	0.905	3.17	1.154	3.76	1.195	5.15
Communication and information technology courses	4.41	0.801	3.36	1.122	3.97	1.122	5.02
Instructional skills	3.99	1.045	2.90	1.179	3.45	1.285	4.79
Cross-cutting issues	4.12	1.022	3.16	1.127	3.61	1.247	4.45
Leadership competencies	4.31	0.92	3.38	1.068	3.85	1.135	4.23
Overall mean score	4.234	0.939	3.194	1.130	3.728	1.197	4.73



Professional competencies

A summary of the ratings of professional competencies is presented in Table 1. The professional competencies had a mean MWDS rating of 4.73, indicating that all the competencies were required for training; however, management skills had the highest training need, with a MWDS of 5.15.

Training needs in ICT

The MWDS ratings of ICT competencies were generally higher for the public sector, indicating greater training needs. Significant training need differences were observed between public and private-sector agents for using internet, e-mail and electronic communication (MWDS: public = 8.7421, private = 6.3636, $P = 0.010^*$), computer literacy (public = 9.0115, private = 5.5600, $P = 0.000^*$) and data/information management (public = 7.5900, private = 4.7628, $P = 0.000^*$). ICT is being embraced in the public sector, and government initiatives such as e-government, e-farmer and e-marketing in the Ministry of Agriculture have contributed to the high MWDS in ICT (GoK, 2010). These competencies had high MWDS ratings for both the public and private sectors, underscoring the importance of ICT in agriculture. The decentralisation of extension services to the district level requires extension officers to prepare and present reports and technical information to a wider range of stakeholders, including farmers,

donor agencies, community-based organisations (CBOs), farmer groups and collaborating ministries. This requires competent use of ICT and presentational skills (Chowdhury, 2001; Kibwika *et al.*, 2009).

A similar trend was observed between FEW and SMS; however, only using internet, e-mail and electronic communication (FEW = 9.0126, SMS = 6.9470, $P = 0.018^*$) and computer literacy (FEW = 9.4811, SMS = 6.1210, $P = 0.000^*$) were significantly different. Data/information management (FEW = 7.3475, SMS = 6.2461, $P = 0.087$) had high MDWS for both FEW and SMS, but the difference was not significant. The MWDS were lower for SMS than for FEW, indicating that the work of FEW in terms of report writing, data transmission and acquiring technical information is changing from dependency on SMS for information and going on-line through the internet to the Ministry of Agriculture National Farmers Information Service (NAFIC) that provides both market and technical information.

Writing grant proposals (public = 6.0194, private = 5.1914, $P = 0.198$; FEW = 6.0760, SMS = 5.4370, $P = 0.254$) was also rated highly for both the public and private sectors, but the differences were not significant among the groups. Writing grant proposals is an important skill in seeking funds and support for agricultural activities. Although previously a domain of the private sector, research institutions and top management in the

Ministry of Agriculture, the paradigm shift from centralised top-down extension to a pluralistic decentralised extension approach means that districts are the focal point of planning and implementing agricultural programmes, so staff at this level should be able to write fundable grant proposals.

Training needs in leadership skills

There were no significant differences in MWDS ratings of leadership competencies between the public and private sector or between FEW and SMS. Despite the lack of significance, the relatively high MWDS ratings are an indication of equal importance accorded to these competencies by all respondents (private, public, FEW and SMS). The discussion on leadership competencies involves leadership competencies in dealing with internal stakeholders (agricultural staff and support staff) and providing leadership to external stakeholders (e.g., farmers). Motivating employees, employee appraisal and counselling, and mentoring/coaching employees were ranked high and prioritised as a training need by both the public and private sectors. Engagement with communities and stakeholders is a key tenet in the paradigm shift towards pluralism, demand-driven and community-based extension (Kutilek and Earnest, 2001). Quality programmes depend on dealing with relevant problems in a timely fashion and this requires team-work, with each member of the



team working in her or his area of comparative advantage (Ahmed and Morse, 2010).

A similar trend was observed between FEW and SMS: there were no significant differences between FEW and SMS ratings for these leadership competencies. However, SMS had a higher average MWDS rating than the FEW. This would be expected due to the importance and greater opportunity of use as trainers and managers at the district and divisional levels. The relatively high MWDS ratings imply that training in these competencies should be prioritised.

Training needs in management skills

The mean MWDS ratings for the public sector were higher than those of the private sector. The high MWDS indicated a high training need across all management competencies. Only strategic planning (public = 6.5968, private = 4.8675, $P = 0.006^*$) was significantly different. This may be attributed to a larger span of control in terms of staff numbers in the public sector as opposed to the private sector. With the districts and divisions being the centres of work, more management responsibility is devolved and hence the expressed training needs (Strong and Harder, 2009).

Increased emphasis on corporate governance and improved management of public institutes may also contribute to the observed training needs.

Both groups of respondents (FEW and SMS) had relatively high MWDS ratings, indicating the

importance of management competencies in general. FEW had greater training needs across most management competencies, but there were no significant differences between FEW and SMS. This could be attributed to SMS having more experience at managerial level and training at the undergraduate level, as opposed to FEW who are diploma holders. However, the management training needs expressed by FEW show that these management skills are not a preserve of senior management, but a skill necessary for effective extension work at the interface with farmers. These findings are similar to the findings of Cooper and Graham (2001), who found that personal and career-development skills ranked higher for county agents (FEW) than county supervisors (SMS). Management skills such as team-work, conflict resolution, decision-making, giving credit, fairness and delegation were ranked higher for the county supervisors (SMS) than county agents.

Training needs in instructional skills

The training needs across all the instructional competencies were higher for the public sector than for the private sector. The following competencies were significantly different: preparing television and/or radio educational programmes (public = 7.4433, private = 5.7368, $P = 0.036^*$), questioning/feedback skills (public = 5.4347, private = 3.4697, $P = 0.004^*$), group dynamics/psychology (public = 5.1382, private =

3.3507, $P = 0.010^*$), teaching methods (public = 4.6601, private = 3.0800, $P = 0.009^*$), determine learning objectives (public = 4.6475, private = 3.1269, $P = 0.028^*$) and evaluating learning (public = 4.6763, private = 3.2826, $P = 0.023^*$). These competencies can be divided into two groups: preparation of instructional material and instructional skills. The public sector has as its primary mandate extension services through the dissemination of agricultural knowledge to farmers and other stakeholders, while the private sector, though carrying out extension work, does not have this as a primary mandate – for example, Kenya Agricultural Research Institute (KARI) is mandated to carry out research, while Mumias Sugar Company (MSC) is primarily a business enterprise and extension services contribute to its bottom line. This could explain the greater need for training in the public than in the private sector. The importance of the media and communication with the wider public is expressed by the highest MWDS ratings, and could be an important extension strategy to raise awareness, reach and sensitise a wider range of the public and stakeholders. This paradigm shift from individual to group extension methodologies creates a centre of reference from which farmers can seek further information, encourages demand-driven extension and contributes to the growing importance of mass media communication.

Among the MWDS ratings of instructional competencies for FEW and SMS, only preparing



audio/visual materials (FEW = 7.2636, SMS = 5.8514, $P = 0.034^*$) was significantly different. FEW expressed greater training needs than SMS except in facilitation skills (although this difference was not significant).

Training needs in cross-cutting issues

Cross-cutting issues touch on general principles such as democracy, gender, good governance, human rights and technology. They have the potential to affect or be an element of several areas and must be considered in the design and implementation of activities in which they may occur. The analysis of cross-cutting issues between the public and private sectors yielded significant differences for: home/cottage industry (public = 6.0742, private = 3.6791, $P = 0.001^*$), micro-finance (public = 5.9276, private = 3.8472, $P = 0.002^*$), appropriate technology (public = 5.5216, private = 3.8239, $P = 0.003^*$) and human rights (public = 5.52, private = 4.17, $P = 0.0046^*$). The public sector expressed greater training need than the private sector, as indicated by the mean MWDS. Home/cottage industry, knowledge of micro-finance and appropriate technology are needs that can be attributed to the value addition and agri-business (*Kilimo Biashara*) programmes to improve farm incomes and returns to producers (GoK, 2004; 2005). Appropriate technology is not only necessary at the processing level, but also for reducing labour costs and improving farm efficiency. Respect for human rights contributes to good governance and gives farmers a voice through empowerment in the

agricultural industry, and is therefore a key extension activity to minimise exploitation of primary producers.

There were no significant differences in MWDS of FEW and SMS on cross-cutting issues. The similar MWDS means show that both groups considered cross-cutting issues of equal importance for incorporation in the curricula.

Respondents' suggestions for professional extension competencies to be included in the undergraduate agricultural curricula

The study had an open-ended question for which respondents could suggest competencies they felt needed to be incorporated in the curricula. The six courses mentioned by over 65% of the respondents were: project-proposal writing (87.5%), gender and economic empowerment (82.5%), presentation and communication skills (78.2%), sustainable agriculture (69.8%), disaster management (67.7%) and HIV/AIDS (66.8%). These corroborate the findings presented above and reveal further training needs not covered in the curricula, such as disaster management (frequency, $f = 298$), risk management ($f = 245$), human rights ($f = 167$), professional risk ($f = 26$) and geographical mapping systems ($f = 17$). In an increasingly volatile agricultural, consumer demand and climatic environment, risk management is becoming a key issue for farmers and risk management courses ought to be included in the undergraduate agricultural curricula (Vergara *et al.*, 2002).

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

All the extension professional competencies had positive MWDS, indicating that they were all relevant and required for effective extension work. Particular emphasis should be placed in the undergraduate agricultural curricula on professional extension competencies covering: communication, ICT, leadership, management, instructional methods and cross-cutting issues. The differences in training needs between FEW and SMS should be used to design appropriate in-service training programmes to improve extension service effectiveness and productivity. The development of these professional competencies cannot be acquired in a single course, but competency should be developed by integrating them into existing courses, assignments and projects that require students to apply these skills throughout undergraduate agriculture curricula. This requires a multidisciplinary approach to curriculum development. Individual course development should be discouraged because agricultural activities and challenges require holistic and systemic approaches developed through team teaching and joint development of exercises and case-studies, requiring knowledge from various disciplines. The positive MWDS scores from across the professional competencies call for an in-depth review of course titles and of the depth, scope, sequencing, types of teaching–learning



experiences and methodology, in order to impart explicit, tacit and implicit knowledge.

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