Agricultural Education and Farming Competency of Development Agents in Ethiopia: The case of North Gondar

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ABSTRACT
Agricultural education is basic to the development and maintenance of competency of development agents. The purpose of this research was to explore and describe empirically the perceived competency level of agricultural development agents working in four districts of North Gondar Administrative zone. A descriptive survey type of research was conducted to determine competency level and training needs of 100 development agents in farming competency. Findings showed that development agents were slightly competent in their farming competency and they were in need of training in the use of their farming competences. Recommendations include (1) employers have to designed competence strengthen programs through seminars, workshops, and in-service training and (2) agricultural educators need fully implement practice-oriented training.

INTRODUCTION
Agricultural education is an important component in the rural development of Ethiopia (MOFED, 2002). The level of rural development is largely determined by agricultural development, as 85% of the population of Ethiopia is engaged in agriculture. Weakness in agricultural extension is partly to blame for agricultural development success. Agricultural education is, therefore, imperative in the development and utilization of the knowledge, skills, attitudes and the general potential of human resource of the country to improve productivity of the agricultural sector.

In an effort to achieve the goals of agricultural extension, the training of field extension workers takes an important place. This paper was, therefore, aimed to address the question of development agent's technical competency in the field of agriculture. This study was, therefore, aimed to address the question of development agent's competency in the field of
agriculture. Modern skill needs for agricultural development is brought to diversified agricultural production. Agricultural education is critical to this change process because of the role it plays in preparing extension educators and practitioners for professional services in agriculture and rural development.

The training of development agents is central to the achievement of the development of agricultural sector (AUA, 1997; MOFED, 2002). Competent development agents are necessary to maintain the increased productive capacity of the agricultural sector. Available local literatures indicate that no study has been done on the competency of agricultural development agents in relation to adoption of improved agricultural technology. Many agricultural scientists have studied the diffusion of agricultural innovations. The dissemination and adoption of agricultural technologies receive the importance of technically competent and committed extension agents (Mulugeta, 1992). A few thousands of development agents have graduated each year from various agricultural TVET colleges in Ethiopia. Recognizing the importance of agricultural education for successful extension service, assessing the competency of development agents graduated from the agricultural TVET colleges whether they are technically competent or not was the subject of this study. The present study showed that development agents were averagely competent theoretically in technical competency and they were in need of training in the use of their technical competences.

Various competencies needed by development agents have been identified in the literature. Development agents had inadequate competencies to perform their job effectively (Belay and Degnet, 2004). Development agents need well-developed abilities to think critically at higher levels of cognition. A survey study by Lindner and Baker (2003) identified levels of competencies required by master students. The researchers recommended that the most essential competencies have to be included in the agricultural and extension education curriculum.

New extension approaches require new knowledge. Deficiency in knowledge, skills, and ability among development agents is remarkable in African countries (Halim and Ali, 1996). Crucially, the inability of development agents to practice their knowledge puts them in bad light as extension worker (Mulugeta, 1992). The insensitivity of training of extension workers contributed to the credibility problem, which is exacerbated by limited competency development practices. It emphasizes particular attention to the training of development agents with desirable knowledge level.

In Ethiopia, the competency problem of development agents is mainly because of the limited time allocated for the training of development
agents (Mulugeta, 1992; Habtemariam, 1996), the limited access and participation in formal and informal professional education programs (Yalew, 1994). In the same manner, Belay and Degnet (2004) showed that the lack of competency of development agents is attributed to their poor education background, too theoretical training, uncoordinated, irregular limited in-service training.

**OBJECTIVES OF THE STUDY**

Assessment of competency of development agents after formal training is crucial not only to ensure whether they are properly prepared for their work but also to be sure the usefulness of existing agricultural education programmes. The specific objectives of this study were:

1. To determine the level of farming competencies as perceived by development agents.
2. To identify the training needs of developments in selected competency items.
3. To identify the challenges and opportunities to competency of development agents.

**METHODOLOGY**

The study attempted to describe the perceived competence level of development agents and their willingness and ability to mount successful technology transfer activities. Cross sectional design was used, because of the fact that agricultural education and on-the-job training directly affect professional competency of development agents. The target population for this study were development agents who have graduated from the different agricultural TVET colleges (13) working in the study area. Development agents were identified by means of current lists provided by the Agricultural and Rural Development Branch Office of North Gondar.

The structured questionnaire for selected development agents was prepared with great care. The instrument particularly farming competency items were prepared based on literature review and presented to panel of experts for review. Additional evidence of instrument reliability was estimated by calculating a Cronbach’s Alpha Coefficient on the final sample to measure internal reliability and stability for the instrument. Reliability coefficients were found to range between 0.839 and 0.922, which is still more than the cut-off point, 0.64.

In order to assess the current level of competence and training needs in each competency areas, a likert-type scale and effect size model were used respectively. The respondents rated each competency items twice according to the five-point likert type scale. They first rated each items
importance to their agricultural extension career and secondly they rated their competence level in performing the tasks of each items. Then, effect sizes were computed using the formula shown bellow:

\[
d = \frac{M_1 - M_2}{SD_{pooled}} \]

\[
SD_{pooled} = \sqrt{\frac{(SD_1^2 + SD_2^2)}{2}}
\]

\(d\) = effect size; operationally defined as a training need in this study
\(M_1\) = mean importance of the task items as rated by all respondents
\(M_2\) = mean competence level of the task items as rated by all respondents
\(SD_1\) = standard deviation for mean importance of the task items
\(SD_2\) = standard deviation for mean competence level of the task items
\(\sqrt{\cdot}\) = Square root of the standard deviation for mean importance of the task items plus the standard deviation for mean competence level of the items divided by two.

**RESULTS AND DISCUSSION**

**Farming competency**

In order to determine farming competency of development agents, they were asked to rate their level of competence for ten grouped task related items using the five point Likert-type scales. The competency items were chosen to determine their: (1) ability to exercise practical farming skill in the field, and (2) willingness to perform physical tasks. Mean rating values for each competency items was computed and used to place participants' level of competence by level of education category. The following schemes, as used by Villarreal (2003), were used to interpret the mean values of competency items:

0.00-1.49 = not competent or not important (very low)
1.50-2.49 = less than average (low)
2.50-3.49 = average competence or importance (medium)
3.50-4.49 = above average competence or importance (high)
4.50-5.00 = very competent or important (very high).
Table 1. Mean score for farming Competency levels of development agents by education level (N = 100)

<table>
<thead>
<tr>
<th>Competency items</th>
<th>Certificate</th>
<th>Diploma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration of spray</td>
<td>2.53(.70)</td>
<td>2.36(.70)</td>
<td>2.41(.69)</td>
</tr>
<tr>
<td>Maintain spray equipments</td>
<td>1.88(.49)</td>
<td>2.10(.50)</td>
<td>2.04(.50)</td>
</tr>
<tr>
<td>Nursery lay out</td>
<td>3.44(.53)</td>
<td>3.29(.65)</td>
<td>3.34(.61)</td>
</tr>
<tr>
<td>Compost preparation</td>
<td>4.29(.69)</td>
<td>4.21(1.10)</td>
<td>4.23(.99)</td>
</tr>
<tr>
<td>Crop storage facilities</td>
<td>2.53(.80)</td>
<td>2.26(1.92)</td>
<td>2.34(.61)</td>
</tr>
<tr>
<td>Demonstrate poultry housing</td>
<td>2.50(1.04)</td>
<td>2.91(.92)</td>
<td>2.79(.97)</td>
</tr>
<tr>
<td>Demonstrate castration</td>
<td>2.11(.47)</td>
<td>2.00(.87)</td>
<td>2.03(.77)</td>
</tr>
<tr>
<td>Slaughtering procedure</td>
<td>2.61(.81)</td>
<td>2.60(.89)</td>
<td>2.61(.86)</td>
</tr>
<tr>
<td>Space requirements of cattle</td>
<td>3.28(.96)</td>
<td>3.33(.78)</td>
<td>3.31(.83)</td>
</tr>
<tr>
<td>Beehive management</td>
<td>3.35(.86)</td>
<td>3.42(.82)</td>
<td>3.40(.83)</td>
</tr>
<tr>
<td>Overall</td>
<td>3.17(.75)</td>
<td>3.03(.46)</td>
<td>3.05(.52)</td>
</tr>
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</table>

Note. Scales: Competence level: 5 = strongly agree; 4 = agree; 3 = slightly agree; 2 = disagree; 1 = strongly disagree. Figures in parenthesis indicate standard deviation.

Development agents rated farming competency items of 'less than average', 'average', or 'more than average'. The findings indicated that development agents are: (1) less competent in demonstrating calibration spray and simple maintenance of spray equipments, (2) averagely competent in demonstrating nursery layout, slaughtering procedure and cattle space requirement and beehive management, and (3) more competent in demonstrating compost preparation, crop storage facilities, poultry housing, and cattle castration. In comparison, the mean competence rating of certificate agents is greater than diploma agents. This may merit the need for consideration or re-examining the selection or training of development agents. Mulugeta (1992) indicated that the training and background (being rural or urban) of agents is one of the development problems in Ethiopian agricultural extension system. It is suggested that extension agent must not only acquire farming competency but also must learn about rural customs, values and ways of thinking.

**Training need**

The overall effect size result of farming competency items for diploma (1.56) and certificate (1.09) development agents is large. From this finding, training need of diploma agents is higher than certificate agents by 43%. The finding suggested that development agents need stronger training in the indicated farming competency components. The results of effect size analysis revealed small effect size, medium effect size and large effect sizes, indicating wider variation in farming competency among the respondents. Competency domains receiving large effect size were spray calibration, maintenance of spray equipments,
slaughtering procedure, and beehive management (Table 2). Higher effect size is an important indication for higher training need on these farming competency domains. Interestingly, Dlamini (2004) finding associates high training need with wider competency gaps. Training need of agents showed variation in nursery lay out by both group of development agents: larger training need for diploma (0.84) and medium for certificate agents (0.65). Thus, the development agents in the study areas perceived themselves with wider gaps in farming competency.

Competency domains receiving medium effect size ($d = 0.50-0.79$) were nursery lay out for diploma agents and space requirement of cattle for certificate agents. From the competency domains, compost preparation, crop storage, poultry housing, and cattle castration seem to require no training need (zero effect size) for both groups of development agents.

Table 2. Training need (effect size) of development agents by education level (N=100)

<table>
<thead>
<tr>
<th>Competency</th>
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</tr>
<tr>
<td>Compost preparation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Crop storage facilities</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Poultry housing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Castration</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Slaughtering technique</td>
<td>1.04</td>
<td>1.63</td>
</tr>
<tr>
<td>Space requirements of cattle</td>
<td>0.69</td>
<td>1.10</td>
</tr>
<tr>
<td>Beehive management</td>
<td>1.15</td>
<td>1.17</td>
</tr>
<tr>
<td>Overall</td>
<td><strong>1.09</strong></td>
<td><strong>1.56</strong></td>
</tr>
</tbody>
</table>

Note. Cohen Descriptors: Small size effect: $d = 0.49$ or less; Medium effect size: $d = 0.50-0.79$; Large effect size: $d = 0.80$ and above.

**Challenges to competency of Development Agents**

Though the competency of development agents is generally average, they were challenged with some major problems. Limited practical farming skills, mismatch of competencies, overloading with too many assignments were of the problems limiting their farming competencies. Particularly, possessing practical farming skills is an important quality component for farming competency of development agents. This study believes that practical knowledge and pertinent skills are of great value for development agents, whatever his/her area of specialization.
Development agents did not feel confident and secured in their practical farming skills. They felt that the college courses had not properly prepared them to deal with practical matters of agriculture. Lack of in-service training and inadequate technical support exacerbated the competency problem of development agents. Failure to prepare development agents with practice-oriented training is indeed a very serious shortcoming given the fact that training of development agents has a multiplier effects. Their skill is essential for the training of farmers in the farmers' training centers. Development agents graduating from those colleges would be expected to staff and provide training for farmers in Farmers Training Centers. Thus, presence of well trained and competent development agent is crucial not only for the effectiveness of extension service but also for the viability of farmers training in the future.

CONCLUSIONS

The findings of this study have well-built implications for agricultural educators for practice oriented teaching. Development agents targeted for competency study exhibited slight better farming competency. This has been exemplified by their ratings of competence and training needs assessments. Lower competence ratings were observed compared to importance ratings. They express high training needs in most competency areas. Limited practical farming skills, mismatch of competencies, overloading with too many assignments were some of the problems limiting the competency of development agents. Development agents are not in the right track of possessing practical faming skills, which is an important quality component for farming competency of development agents. Low levels of farming competency in practical exposure of agricultural activities may cause negative consequences for demonstration of knowledge and skills. Since, development agents are required to demonstrate their knowledge and skills to extension service beneficiaries. An implication relative to the present study exists that development agents should be targeted for in-service training to increase their competency level and to cope up with the day-to-day challenges they face in the field. It is also wise for Agricultural educators to incorporate more hands-on teaching in the classroom. As agriculture is truly applied sciences, the development agents must be given the opportunity to apply the knowledge they have learned in their course work.

References


