

# Original Research Article

## **Evaluation of Extension Training Program on Small-Scale Poultry and Rabbit Production Projects at Alexandria Governorate, Egypt**

### **ABSTRACT**

**Aims:** This study was undertaken to measure the efficacy of an extension training program associated with small-scale poultry and rabbit production projects in Alexandria Governorate, Egypt.

**Study Design:** The study was applied using two levels of the Donald L Kirkpatrick model through Action Research approach. The presented content of training program to trainees included important knowledge and skills of three topics which are broilers, ducks and rabbits to success small-scale production projects.

**Place and Duration of Study:** 52 trainees considered as purposive sample, who were attend all sessions of the extension training program in the agricultural administration at Khurshid, Alexandria Governorate, during April 2018.

**Methodology:** A structured questionnaire was designed to collect data from participants before and after implementation of the training program to measure approval level of trainees toward the training program elements and the their knowledge and skills level.

**Results:** The results revealed that majority (61.53%) of trainees had medium level of acceptance towards the extension training program components. Consequently, there was a significant improvement in the knowledge and skills levels of trainees after executing the extension program concerning broilers, ducks and rabbits production for promoting small- scale production projects. Findings also showed that deficiency of knowledge and experience related to poultry production, insufficient extension training programs, unavailability of proper site for establishing the project and getting its licenses, non-provision of capital and lack of veterinary services, in that order, were the most severe constraints affecting poultry production projects.

**Conclusion:** This training program succeeded by increasing and improving the knowledge and skills of participants regarding poultry and rabbits production, which reflect on encouraging them to establish such income-raising projects.

**Key words:** Evaluation, Small- scale projects, Poultry and rabbit production, Extension program.

## 35 **1. Introduction**

36 The global interest of small and medium sized enterprises (SMEs) comes from being the most  
37 labor-generating sector and source of income. Improved SMEs competitiveness might contribute to  
38 economic and social development resulting in poverty reduction, besides providing new job  
39 opportunities that can contribute to the alleviation of unemployment among women and youth [1].  
40 Furthermore, the following rates of unemployment according to United Nations Organization of  
41 human development in the Arab world are reported as (20-25%) in Chad, (15-20%) in Tunisia and  
42 Iraq, (12-15%) in Libya and Sudan, (10-12%) in Lebanon, Egypt, Algeria, Morocco and Jordan, (4-  
43 8%) in Bahrain and the United Arab Emirates [2].

44 Livestock/ poultry sector plays an important role in the economic development through meat  
45 and egg production, in combination with white revolution (milk); thus, it can contribute towards  
46 providing additional income to families which help to raise the living standards of individuals and  
47 improve food security in their family and their community [3]. In spite of this, several results  
48 indicated some of the obstacles that led to the failure of some small and medium poultry projects by  
49 owners in Egypt. The most important obstacles were lack of fund, unawareness of daily market prices  
50 and continue to sell at low prices, high production costs, high prices of feed, high mortality rate due  
51 to ignorance of preventive procedures for infectious diseases, spread of diseases due to lack of the  
52 continuous cleaning of the buildings, breeds used were low productivity, inability for financial and  
53 administrative planning of the project, lack of training and insufficient of veterinary services. All  
54 these previous problems may lead to reluctance and stop a large number of owners continuing on  
55 these poultry production activities [4, 5].

56 In order to sustain the interest of continuing SMEs, the technical information related to poultry  
57 and rabbit production improvement should be disseminated to the owners of these projects. Hence,

58 extension training programs are necessary to ensure meaningful impact on empowers them to be  
59 more self-sustainable which is reflected in the success of such productive projects [6]. Consequently,  
60 the importance of agricultural extension through the provision of extension training programs in the  
61 field of small production projects related to raising broiler, ducks and rabbits for agricultural  
62 undergraduate students, agricultural engineers, farmers and rural housewives. Therefore, keeping in  
63 this view, the officials of agricultural extension work in the agricultural administration at Khurshid,  
64 Alexandria Governorate in cooperation with the Agriculture Directorate towards implementation this  
65 training program. Thus, in this context the objective of this present study was to evaluate the  
66 effectiveness of implemented program by (a) describe socio-economic variables of trainees including  
67 sources of information acquisition (b) characterize the reaction of the trainees towards the elements  
68 of program (c) determine the trainees' learning of the provided training content by the program, (d)  
69 identify constraints faced by the participants concerning poultry production small projects, and (e)  
70 determine trainees' suggestions for enhancing the upcoming extension training programs.

## 71 **2. Theoretical Framework**

72 There is a set of models used in the evaluation of extension programs. According to the  
73 purpose of the current study one of these models, the Donald L Kirkpatrick model that consists of  
74 four levels, was applied. Therefore, this study was applied on some levels of this model which are the  
75 first level (reaction) and second level (learning). While on the other two levels; the third level  
76 (behavior) and the fourth level of the model (results) will need a special study to follow the impact of  
77 training program on trainees' workplaces after returning to their workplace [7].

78 Regarding the first level of the model (reaction); it included program content, trainers, training  
79 methods and training surroundings; this has been achieved through the second objective of the study.  
80 In this context, the second level of the model (learning) was measured by the degree that participants

81 acquire the intended knowledge, skills, attitude, confidence and commitment based on their  
82 interaction during the training; this has been accomplished through the third objective of the study by  
83 (pre- post) test to determine behavioral changes in knowledge and skills of trainees, which can be  
84 attributed to the contributions of the program and not to the life experiences of trainees or external  
85 factors.

### 86 **3. Materials and Method**

#### 87 **3.1 Sampling Technique**

88 A total number of 52 trainees considered as purposive sample, representing undergraduate  
89 students, agricultural engineers, farmers and rural housewives who were keen to attend all sessions of  
90 the extension training program in the agricultural administration at Khurshid, Alexandria  
91 Governorate.

#### 92 **3.2 Data Collection and measurement of variables**

93 A structured questionnaire was used to collect data from participants. The first part of the  
94 questionnaire was designed to measure some socio-economic characteristics of participants. A  
95 second part of the questionnaire to measure approval level of trainees toward the training program  
96 elements through 18 items were classified under: the program content, teaching methods and aids,  
97 efficiency of trainers and administrative environment of the program; which were measured by  
98 giving the level of approval a numerical value ranging from 1 to 3; where the number 1 means not  
99 agree, 2 relatively agree and 3 strongly agree. The overall approval level score of the four elements  
100 per participant was calculated by summing all the four elements' values; the maximum theoretical  
101 score per participant was 54 while the minimum was 18. The third part of the questionnaire was

102 planned to measure the knowledge and skills level of participants through 45 aspects of broiler, ducks  
103 and rabbit production which were:

104 1. Broilers' questions included aspects such as awareness regarding the names of some commercial  
105 breeds, the space allocated for chicks during their growth period, the proper temperature during  
106 brooding stage (first week) and at the next weeks, ventilation, lighting, providing litter material (type  
107 and thickness), the house floor type, provided feed for chicks to help digestion, appropriate time for  
108 feeding after hatching and type of provided feed, presented feed to meet their requirements of  
109 vitamins, the feed amount for the chick per day in the first week, type of feed during the last period  
110 before marketing, awareness by the chicks cannibalism reasons, knowledge of diseases affecting  
111 broilers; diseases infection ways, diseases vaccines and the disinfectants usage.

112 2. Ducks' questions included aspects like awareness concerning the names of some commercial  
113 breeds, the proper feed form for ducks, optimum location of drinkers and feeders, auxiliary materials  
114 to help gizzard for feed grinding, knowing the weight of Muscovy ducks male after fattening period  
115 (80 days), the age of sexual maturity for ducks, find out the space allocated for Muscovy ducks,  
116 awareness by the number of eggs for natural incubation, find out the incubation period of Muscovy  
117 duck eggs.

118 3. Rabbits' questions included items such as awareness by the sexual ratio for rabbits, knowledge of  
119 available rabbit breeds at the local market, size and weight of available rabbit breeds, the gestation  
120 period of rabbit female, the required protein level in the feeds for lactating does and growing rabbits,  
121 the most important digestive and viral diseases affecting weaning rabbits, feed form for rabbits, types  
122 of rabbit batteries, the appropriate time for weaning as well as palpation, marketing age and/or weight  
123 of growing rabbits, also the appropriate feeding time during the day.

124           The three topics were evaluated by giving one score for correct answer and zero for incorrect  
125 answer. The overall knowledge and skills level score of the three topics per participant was  
126 calculated by summing all the three items' values; the maximum theoretical score per participant was  
127 66 while the minimum was zero. The knowledge and skills level of such topics for the participants  
128 were assessed by a questionnaire before and after implementation of the training program. While the  
129 fourth section of questionnaire was designed to collect qualitative data through open-ended questions  
130 considering the constraints militating against small production projects related to poultry and rabbit  
131 production, additionally, suggestions or recommendations for improving similar extension training  
132 program in the future were considered. Also personal observations were made about the interaction  
133 and participation of the trainees during the training program.

### 134 **3.3 Research Design**

135           This study used the Action Research approach; this approach is used for improving  
136 educational practice and performance. It involves action, learning, participation, evaluation, and  
137 critical reflection, based on interpretations gathered by the participants and changes in practice are  
138 then implemented as described by Koshy [8]. This program was conducted in the agricultural  
139 administration at Khurshid, Alexandria Governorate for three days through nine training sessions  
140 during April 2018. Each day included three sessions; each session lasted for approximately two  
141 hours. Professors specialized in the field of poultry and animal production from Faculty of  
142 Agriculture (El-Shatby), Alexandria University presented the educational content to the participants,  
143 using extension educational methods and aids such as lectures and discussions. Also a camera was  
144 used to photograph the location where the extension program sessions were held, speakerphone and  
145 extension exhibits to display samples of feeders, drinkers and batteries. Additionally demonstration  
146 methods were applied in order to differentiate between male and female rabbit as well as demonstrate

147 the process of vaccination, rabbit palpation and rabbit visual examination before buying. The  
148 educational content presented to the trainees included important knowledge and skills of three topics  
149 which are broilers, ducks and rabbits to enable small-scale production projects. At the end of the  
150 training program, documented certificates were delivered to the trainees by the director of the  
151 agriculture directorate.

### 152 **3.4 Data Analysis**

153 Data were analyzed using Statistical Package of Social Science SPSS program, version 15.0  
154 (SPSS, Inc., Chicago IL). Descriptive statistics such as percentages, mean, standard deviation and  
155 frequency distribution were used for categorization and description of the variables. Impact of  
156 training program on the overall knowledge and skills level regarding presented topics among trainees  
157 was tested by Wilcoxon test to measure the difference between median knowledge and skills score  
158 (in terms of percentages) of trainees between before and after the implementation of the extension  
159 training program. Differences were considered significant at ( $P < 0.01$ ).

## 160 **4. Results**

### 161 **4.1 Socio-economic characteristics**

162 The participants' ages (Table 1) ranged between 18 and 62 years, a large proportion of  
163 participants fell in the age group of 18-38 years old (73%); the mean of age was  $30.93 \pm 13.25$  years  
164 old. Majority of the participants (61.5%) have high education level. A high percentage of trainees  
165 (61.53%) was undergraduate students and agricultural engineers, also (67.30%) of average  
166 participants' income falls into the category of "500-1000 pounds". Further, almost half of the  
167 participants (52%) did not receive any training before.

168

**Table 1.** Socio - economic characteristics of participants (N = 52)

<b>Trainees</b>	<b>No.</b>	<b>(%)</b>
<b>Age (yrs.)</b>		
Youth (18-24)	27	51.92
Middle- age (25-38)	11	21.15
Elder (39-62)	14	26.92
<b>Education</b>		
Illiterate	2	3.84
Primary (1-6 grades)	3	5.76
Secondary (7-9 grades)	2	3.84
Preparatory (10-12 grades)	1	1.92
Diploma	12	23.07
University	32	61.53
<b>Occupation</b>		
Undergraduate student	18	34.61
Agricultural engineer	14	26.92
Housewife	6	11.53
businee Free	14	26.92



<b>Monthly income (L.E.)</b>		
(Less than 500)	3	5.76
(500- 1000)	35	67.30
(More than 1000)	14	26.92
<b>Training programs</b>		
Yes	25	48.07
No	27	51.92
<b>Experience in productive activities</b>		
Yes	17	32.69
No	35	67.31

170

171 The results also showed that (67%) of trainees have no experience in productive activities, while  
 172 around (25%) of participants had some projects such as boilers, rabbits, pigeons and layers  
 173 production, only (8%) performed other projects like honeybee and mushroom production. **Therefore,**  
 174 **about (33%) of respondents' trainees own productive activities which represent 17 trainees, only**  
 175 **(10%) of trainees were exposed to extension services in relation to their production projects, while**  
 176 **(23%) of trainees** were not exposed to extension services such as technical services, solving  
 177 marketing problems, training and providing the optimum production requirements.

178 **4.2 Sources of information acquisition**

179 Data presented in Table 2 show that around half of trainees (48%) who acquired their  
 180 information permanently about poultry and rabbit production from trainers/ specialists and  
 181 demonstration methods. While computer and veterinarians were represented as information receiving  
 182 sources by 44.23, 42.30 of trainees, also 40.38% of participants acquired the information from  
 183 extension agents; all of these sources were considered as modern interpersonal and mass media  
 184 sources.

185 **Table 2.** Frequency distribution of participants regarding sources of information acquisition on  
 186 poultry and rabbits breeding (N = 52)

Source	Always	Sometimes	Rarely	Never
	Frequency			
Television	3	14	8	27
Radio	1	2	9	40
Friends/ neighbors	8	16	1	27
Newspaper	6	15	4	27
Pamphlets	3	6	9	34
Posters	5	12	5	30
Family	3	7	0	42
Extension agents	21	6	1	24
Veterinarian	22	7	5	18
Agricultural association	10	10	2	30
Demonstration methods	25	15	8	4
Computer	23	6	4	19

Books/ lectures	18	11	3	20
Trainers/ specialists	25	17	9	1

187 *F: Frequency*

188 Results revealed also that few of them always got their information through traditional  
 189 interpersonal sources like friends/ neighbors (15.4%) and family (5.7%), besides traditional mass  
 190 media sources as television (5.7%), radio (1.9%), newspaper (11.5%), pamphlets (5.7%) and posters  
 191 (9.6%).

### 192 4.3 Reactions towards training program components

193 Data in Table 3 showed that majority of participants (61.53%) were classified as medium level  
 194 of approval towards training program elements. Data also showed that majority of trainees had  
 195 medium acceptance level for three components from the training program content (65.38%), teaching  
 196 methods and aids (65.38%) and administrative environment of training (75.00%). Further, concerning  
 197 the element efficiency of trainers was represented as high level of approval by around 56% of  
 198 participants. In connection with training program content: it was evident from the data presented in  
 199 Table 4 that most of participants (87, 83 and 73%) have a high level of approval regarding training  
 200 content as related to scientific levels and professional of trainees, the program satisfied **actual needs**  
 201 **concerning this topic** and the program objectives were clearly defined, respectively.

202 **Table 3.** Distribution of participants according to reaction towards training program elements (N = 52)

Level of approval	Elements								Overall
	Content		Methods and aids		Trainers		Administrative environment		
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	

Low level	6	11.53	9	17.30	5	9.61	9	17.30	10	19.23
Medium level	34	65.38	34	65.38	18	34.61	39	75.00	32	61.53
High level	12	23.07	9	17.30	29	55.76	4	7.69	10	19.23
Mean $\pm$ SD	13.23 $\pm$ 1.52		9.01 $\pm$ 1.59		14.09 $\pm$ 1.43		8.86 $\pm$ 1.42		45.21 $\pm$ 3.80	

203

204 Teaching methods and aids: majority of participants stated that the used educational methods  
 205 (lectures, discussions, demonstration methods and extension exhibits) were appropriate for  
 206 objectives, training subjects, additionally numbers and levels of trainees. A few percentages (29-  
 207 33%) of trainees agreed that the educational aids used were sufficient and attract the attention (Table  
 208 4). Also, efficiency of trainers: from 87- 92 % of trainees have high level of acceptance about the  
 209 high qualifications of the trainers, ability to offer a structured explanation of the content and  
 210 motivation trainees for participation in the discussion. While administrative environment component:  
 211 about 77% and 67% agreed to the balance between the training hours and topics also the period of  
 212 training sessions was adequate and appropriate, respectively (Table 4). Almost half of the trainees  
 213 (51%) disagreed that physical conditions of the training room support the trainees to understand and  
 214 interact which represented in lighting, ventilation and temperature.

215 **Table 4.** Distribution of trainees according to their evaluation of the training program items (N= 52)

Items	Level of approval					
	strongly agree		Relatively agreeable		Not agree	
	F.	(%)	F.	(%)	F.	(%)
Training program content						

The program satisfied <b>actual</b> needs	43	83	8	15	1	2
Program objectives were clearly defined	38	73	10	19	4	8
Training content was related to scientific levels and professional of trainees	45	87	6	12	1	2
Linking the theoretical and practical aspects of the training program	29	56	19	37	4	8
The content is distinguished by modernity that suits the age requirements	32	62	11	21	9	17
<b>Teaching methods and aids</b>						
Adaptation of the educational methods to objectives and training subjects	40	77	9	17	3	6
Suitable educational methods for the numbers and levels of trainees	32	62	17	33	3	6
Efficiency of used teaching aids to attract the attention	17	33	19	37	16	31
The educational aids used were sufficient	15	29	9	17	28	54
<b>Efficient of trainers</b>						
Ability of trainers to clarify and transfer information	48	92	2	4	2	4
The instructor was able to offer a structured explanation of the content	46	87	6	12	0	0
The trainer is able to motivate trainees for participation in the discussion	47	90	4	10	1	2
The instructor used practical teaching methods and aids to stimulate interest	33	63	17	29	2	4
The trainers have high communication skills with the trainees	46	88	6	12	0	0

<b>Administrative environment</b>						
Program time was out of official working time	14	27	23	44	15	29
The period of training sessions was adequate and appropriate	35	67	12	23	5	10
The balance between the training hours and topics according to its importance	40	77	11	21	1	2
Physical conditions of the training room enable the trainees of understanding and interaction	4	10	21	40	27	51

216 *F: Frequency*

217 **4.4 Percentage of correct answers of participants before and after implementing the training program**

218 The percentages of correct answers on presented topics amongst participants are shown in  
 219 Table 5. The results showed that there were significant increment ( $P < 0.01$ ) in the correct answers of  
 220 trainees after implementing the training program related to all program subjects (broilers, ducks and  
 221 rabbits production).

222 **Table 5.** Percentages of correct answers reflecting the knowledge and skills level among participants  
 223 before and after the implementation of extension training program (N = 52)

<b>Program topics</b>	<b>Median knowledge and skills score (%)</b>			
	<b>Before training</b>	<b>After training</b>	<b>W value</b>	<b>P value</b>
	<b>Median (%)</b>			
Broilers	36.66	70.00	4.314	0.001*
Ducks	41.66	66.66	3.508	0.001*
Rabbits	16.66	54.16	5.789	0.001*

224 \*Significant at ( $P < 0.01$ ), *W* value corresponds to Wilcoxon's paired test.

225 **4.5 Constraints encountered by participants related to small poultry production projects**

226 Table 6 shows that (86.53%) of participants revealed that inadequate knowledge and experience  
 227 related to poultry production was the most important constraint, while (80.76%) of trainees facing the  
 228 problem of insufficient extension training programs in the field of marketing and ignorance with the  
 229 economic feasibility study of such projects.

230 **Table 6.** Constraints of trainees concerning poultry production small projects (N = 52)

Constraints	F.	(%)	Order rank
High feed cost	20	38.46	7th
Inadequate knowledge and experience related to poultry production	45	86.53	1st
Unavailability of proper location for establishing the project and getting its licenses	34	65.38	3rd
Non-provision of capital	33	63.46	4th
Fear of loss	25	48.07	6th
Lack of veterinary services regarding diagnosis and treatment of diseases	29	55.76	5th
Insufficient extension training programs in the field of marketing and the economic feasibility study of projects	42	80.76	2nd

231 *F: Frequency*

232

233 Moreover (65.38%) and (63.46%) of trainees indicated that unavailability of proper location  
 234 for establishing these projects as one of the most important technical obstacles, and non-provision  
 235 sufficient capital to purchase the basic requirements of these projects such as birds, hatcheries,  
 236 feeders, drinkers and feeds, respectively, were considered as constraints of their productive projects.  
 237 Additionally, lack of veterinary services such as veterinarians in the field of diseases diagnosis,  
 238 treatments and availability of vaccinations was represented as constrain by (55.76%) of trainees.

#### 239 4.6 Suggestions of trainees regarding enhancing of similar future extension programs

240 The results in Table 7 show that most of the trainees (96.15%) suggested that modern  
 241 educational methods such as result demonstration should be included through organizing field visits  
 242 to some farms and factories related to training subjects. Also, 82.69% suggested the need to topics  
 243 related to poultry and rabbits diseases, like symptoms of diseases, ways of infection, prevention and  
 244 immunization, in addition to topics in the field of animal and fish production such as fish, sheep and  
 245 calves. Use audio-visual aids like data show projector to display content easily and also providing the  
 246 content is distinguished by modernity were represented as other suggestions by 65.38% and 57.69%  
 247 of participants, respectively. While 55.76% of trainees suggested to provide scientific handout in  
 248 printed or soft copy format.

249 **Table 7.** Suggestions for improvement of future extension training programs (N = 52)

Suggestions	F.	(%)	Order rank
Modern educational methods more practical should be used and include field visits	50	96.15	I
Topics related to diseases of poultry and rabbits, fish production, sheep and calves can be included in training programs	43	82.69	II



Use audio-visual aids like data show projector to transfer information clearly and easily	34	65.38	III
Providing program content distinguished by modernity	30	57.69	IV
Providing the scientific handout in form of printed or soft copy	29	55.76	V
Contract agreements with the universities to expand the activity and be held on the universities during weekends	28	53.84	VI
The need to set up a social medial group for announcement of such programs in advance and facilitate the communication with the largest number of participants	25	48.07	VII
Repeat the training programs every specific period	15	28.84	VIII
The time of training program should be increased	15	28.84	IX
Extending and implementing these programs in all governorates in order to overcome the distance impediment between governorates	14	26.92	X
Select an appropriate place for the program either faculties' halls or farms	10	19.23	XI

250 *F: Frequency*

## 251 **5. Discussion**

### 252 **5.1 Socio-economic characteristics**

253 The participants' age indicated that there is a high percentage of youth among participants,  
 254 therefore, it is expected that this category has more activity, vitality, ability to work and produce. It is  
 255 easy to implement various extension programs to provide them with the right knowledge, information  
 256 and skills, which may be reflected on their performance towards poultry productive projects [9].  
 257 Also, the educational level of trainees is expected to be positively associated to their capability of  
 258 receiving information through different training activities [10].

259 Participants with limited training programs implies the need of training programs for this  
 260 productive age category (youth) to increase their knowledge and skills for initiating privet production

261 projects especially in the field of poultry production, which plays a vital role in improving household  
262 income to face unemployment and/or lower income resources. This result agrees with Amer [11] who  
263 stated that the most important reasons to overcome unemployment; keen interest of the training and  
264 job creation through the possession of small projects. Additionally, lack of extension services related  
265 to production projects for participant reflect the effective role of extension services to motivate and  
266 help participants to improve understanding, performance and success of their poultry production  
267 projects [12]. This finding is in accordance with Ogunwale et al. [13] who reported that contact with  
268 extension agents and the benefit from various services had positive impact on the chicken production  
269 practices.

## 270 **5.2 Sources of information acquisition**

271 Sources of information acquisition for trainees reflect the importance of modern sources  
272 especially trainers/ specialists and demonstration methods. The latter imply that trainees may feel  
273 confident to acquire information on poultry production projects through extension training programs  
274 and demonstration methods and still need more information to improve their managerial skills and  
275 knowledge concerning poultry production small projects. Almost similar results were reported by  
276 Brent et al. [14] who found that the two most useful sources of information were demonstration  
277 methods and livestock technical specialists among the highest rated information sources.

## 278 **5.3 Reactions towards training program components**

279 The overall acceptance level of trainees towards training program elements could be due to  
280 relative deficiencies in some items of the extension program components. Regarding training  
281 program content indicates a good planning of the training content in relation to the scientific levels  
282 and professional of trainees, in addition to the need for coordination and organization between

283 theoretical and practical aspects of the explained content. The obtained results are in accordance with  
284 the findings of Moussa [15] who reported that the respondents agreed on the attention of officials for  
285 planning of the training program to suit the abilities of the trainees and their interests, which led them  
286 to attend because this program reflect their actual needs they demanded. In this context, the basic  
287 principles of adult education indicate that the degree of learner's assimilation is influenced by the  
288 individual motivations and interests related to the educational content provided [16].

289 Teaching methods and aids used referred to the modernity and density of the educational  
290 methods to suit the training situation and attract the attention of trainees contrary to traditional and  
291 insufficient of the educational aids used. This result is similar to the finding of Popat et al. [17] who  
292 identified that supply of audio-visual aids and effective teaching methods positively affect  
293 communication. Whereas, efficiency of trainers implies that their selection has been highly  
294 successful in terms of communication and teaching efficiency, as well as scientific competence in the  
295 specialization, which reflects their ability to deal with individual differences among trainees and  
296 clarifying the training content. Similar finding was reported by Moussa [15] that most of trainees  
297 have a high degree of approval for the competence of the trainers, furthermore the success of the  
298 training depends on the experiences of the trainers that enable them to achieve the objectives of the  
299 training program effectively. While the element of administrative environment referred to the need  
300 for attention to the training environment; consequently, other researchers have also reported focus on  
301 managing the training environment in terms of the appropriate physical conditions as well as the time  
302 and place to implement the activities of extension programs which reflect the effectiveness of these  
303 programs [18].

#### 304 **5.4 Percentage of correct answers of participants before and after implementing the training program**

305 The significant improvement in knowledge and skills level of trainees after implementing the  
306 training program concerning broilers, ducks and rabbits production explained that the training  
307 program can have an obvious positive impact on increasing the knowledge and skills level of  
308 trainees. This success might be due to the appropriateness of the subjects covered during the training  
309 sessions that may help to increase the interest of trainees which is reflected on increasing knowledge  
310 acquisition [19], in addition to the high educational level for participants and the exposure to modern  
311 information sources for instance trainers/ specialists and computer, as well as high efficiency of  
312 trainers as the results showed previously. Over and above, it could be expected that trainees might  
313 have some experience and information from internet and cumulative exposure to different training  
314 and teaching situations that lead to higher level of receiving more knowledge and improving their  
315 skills as reported by Kumar et al. [20].

#### 316 **5.5 Constraints encountered participants related to small poultry production projects**

317 The obstacles of inadequate knowledge and experience related poultry production, additionally  
318 insufficient extension training programs in the field of marketing and the economic feasibility study  
319 of projects which represented the most important constraints of trainees. This indicated the need for  
320 such extension programs to provide them with the required information in the mentioned areas for  
321 enhancing their productive skills in the field of poultry and rabbits production. These results agree  
322 with the findings of Al-Ameri and Al-Ghalibi [21] who reported that the most problems and  
323 difficulties facing the small enterprises represented in lack of economic feasibility study, inability to  
324 financial and administrative planning, lack of adequate information systems and inability to obtain  
325 information on markets and suppliers. While unavailability of proper location for establishing the  
326 project and non-provision of capital, which confirmed the findings of Al-Mashharawi and Al-  
327 Ramlawi [22] who mentioned that obtaining the location suitable for the establishment of the project

328 and the financing constraints due to the difficulty of access to loans are the most important obstacles  
329 to small projects. Lack of **veterinarians** for diagnosis, treatment of diseases, is in a line with the  
330 finding of Elkashef et al. [23] who stated that the high cost of veterinary services was a constraint  
331 affecting information acquisition of chicken production practices, as mentioned by majority of  
332 respondents.

### 333 **5.6 Suggestions of trainees regarding enhancing of similar future extension programs**

334 The modern educational methods more practical through organizing field visits to some farms  
335 and factories as suggest by respondents is in conformity with the findings of Nagaraju and Sankhala  
336 [24]. Use audio-visual aids like data show projector to display content easily and also providing the  
337 content is distinguished by modernity were in consistent with the results of Shah [25] While  
338 providing scientific handout in printed or soft copy format is in agreement with Fathy et al. [16].

## 339 **5. Conclusion and Recommendations**

340 The training program has been successful for two categories; the first category is individuals  
341 who have not been exposed to small productive projects where the program has provided them with  
342 basic information to encourage the production of small income-generating projects for them and  
343 preferably to follow an economic feasibility study. The second category represents those who already  
344 have productive projects where the program has improved their knowledge and skills. There is a need  
345 for training programs on deeper topics for longer period of time such as diseases and the production  
346 breeds using practical teaching methods and audio-visual aids. Based on the findings of this study,  
347 several recommendations could be suggested as follows:

- 348 1. Conducting a real feasibility study that takes into account the economic, social and  
349 environmental dimensions of small enterprises.

- 350 2. Availability of appropriate banking loans to finance small-scale projects that to be  
351 characterized by clearness and compatibility.
- 352 3. Encouraging beneficiaries (household women, agricultural engineers, farmers and youth) to  
353 set up income-raising projects through providing facilities and technical support by non-  
354 governmental organizations (NGOs) and governmental organizations.
- 355 4. Providing training programs, extension services and veterinary services for both poultry and  
356 livestock production can improve the knowledge and managerial skills of beneficiaries,  
357 especially youth and householders, in order to establish small production projects.
- 358 5. Organizing and conducting such training programs regularly to serve different categories of  
359 agricultural professionals and take advantage of the current study.

360 **Consent Disclaimer:**

361 As per international standard or university standard, participants' written consent has been collected and  
362 preserved by the author(s).

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