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

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***Author's contribution***

*The sole author designed, analysed, interpreted and prepared the manuscript.*

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## 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 were considered as a purposive sample, who attended 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 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

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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 of trainees 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.

*Keywords: Evaluation; small- scale projects; poultry and rabbit production; extension program.*

## 1. INTRODUCTION

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

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

In order to sustain the interest of continuing SMEs, the technical information related to poultry and rabbit production improvement should be disseminated to the owners of these projects. Hence, extension training programs are necessary to ensure meaningful impact on empower them to be more self-sustainable which reflect on the success of such productive projects [6]. Consequently, the importance of agricultural extension through the provision of extension training programs in the field of small production projects related to raising broiler, ducks and rabbits for agricultural undergraduate students, agricultural engineers, farmers and rural housewives. Therefore, keeping in this view, the officials of agricultural extension work in the agricultural administration at Khurshid, Alexandria Governorate in cooperation with the Agriculture Directorate towards implementation this training program. Thus, in this context the objective of this present study was to evaluate the effectiveness of implemented program by (a) describe socio-economic variables of trainees including sources of information acquisition (b) characterize the reaction of the trainees towards the elements of program (c) determine the trainees' learning of the provided training content by the program, (d) identify constraints faced by the participants concerning poultry production small projects, and (e) determine trainees' suggestions for enhancing the upcoming extension training programs.

## 2. THEORETICAL FRAMEWORK

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

Regarding the first level of the model (reaction); it included program content, trainers, training methods and training surroundings; this has been achieved through the second objective of the study. In this context, the second level of the model (learning) was measured by the degree that participants acquire the intended knowledge, skills, attitude, confidence and commitment based on their interaction during the training; this has been accomplished through the third objective of the study by (pre- post) test to determine behavioral changes in knowledge and skills of trainees, which can be attributed to the contributions of the program and not to the life experiences of trainees or external factors.

## 3. MATERIALS AND METHODS

### 3.1 Sampling Technique

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

### 3.2 Data Collection and Measurement of Variables

A structured questionnaire was used to collect data from participants. The first part of the questionnaire was designed to measure some socio-economic characteristics of participants. A second part of the questionnaire to measure approval level of trainees toward the training program elements through 18 items were classified under: the program content, teaching methods and aids, efficiency of trainers and administrative environment of the program; which were measured by giving the level of approval a numerical value ranging from 1 to 3; where the number 1 means not agree, 2 relatively agree and 3 strongly agree. The overall approval level score of the four elements per participant was calculated by summing all the four elements' values; the maximum theoretical score per participant was 54 while the minimum was 18. The third part of the questionnaire was planned to measure the knowledge and skills level of participants through 45 aspects of broiler, ducks and rabbit production which were:

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

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

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

The three topics were evaluated by giving one score for correct answer and zero for incorrect answer. The overall knowledge and skills level score of the three topics per participant was calculated by summing all the three items' values; the maximum theoretical score per participant was 66 while the minimum was zero. The knowledge and skills level of these topics for the participants were assessed by a questionnaire before and after implementation of the training program. While the fourth section of questionnaire was designed to collect qualitative data through open-ended questions considering the constraints militating against small production projects related to poultry and rabbit production, additionally, suggestions or recommendations for

improving similar extension training program in the future, were considered. Also, personal observations were made about the interaction and participation of the trainees during the training program.

### 3.3 Research Design

This study used the Action Research approach; this approach is used for improving educational practice and performance. It involves action, learning, participation, evaluation, and critical reflection, based on interpretations gathered by the participants and changes in practice are then implemented as described by Koshy [8]. This program was conducted in the agricultural administration at Khurshid, Alexandria Governorate for three days through nine training sessions during April 2018. Each day included three sessions; each session lasted for approximately two hours. Professors specialized in the field of poultry and animal production from Faculty of Agriculture (El-Shatby), Alexandria University presented the educational content to the participants, using extension educational methods and aids such as lectures and discussions, also a camera was used to photograph the location where the extension program sessions were held, speakerphone and extension exhibits to display samples of feeders, drinkers and batteries. Additionally demonstration methods were applied in order to differentiate between male and female rabbit as well as demonstrate the process of vaccination, rabbit palpation and rabbit visual examination before buying. The educational content presented to the trainees included important knowledge and skills of three topics which are broilers, ducks and rabbits to enable small-scale production projects. At the end of the training program, documented certificates were delivered to the trainees by the director of the agriculture directorate.

### 3.4 Data Analysis

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

## 4. RESULTS

### 4.1 Socio-economic Characteristics

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

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

| Trainees | No. | (%) |
|---|---|---|
| **Age (yrs.)** | | |
| Youth (18-24) | 27 | 51.92 |
| Middle- age (25-38) | 11 | 21.15 |
| Elder (39-62) | 14 | 26.92 |
| **Education** | | |
| 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 |
| **Occupation** | | |
| Undergraduate student | 18 | 34.61 |
| Agricultural engineer | 14 | 26.92 |
| Housewife | 6 | 11.53 |
| businee Free | 14 | 26.92 |
| **Monthly income (L.E.)** | | |
| (Less than 500) | 3 | 5.76 |
| (500- 1000) | 35 | 67.30 |
| (More than 1000) | 14 | 26.92 |
| **Training programs** | | |
| Yes | 25 | 48.07 |
| No | 27 | 51.92 |
| **Experience in productive activities** | | |
| Yes | 17 | 32.69 |
| No | 35 | 67.31 |

The results also showed that (67%) of trainees have no experience in productive activities, while around (25%) of participants had some projects

such as boilers, rabbits, pigeons and layers production, only (8%) performed other projects like honeybee and mushroom production. Therefore, about (33%) of respondents´ trainees own productive activities which represent 17 trainees, only (10%) of trainees were exposed to extension services in relation to their production projects, while (23%) of trainees were not exposed to extension services such as technical services, solving marketing problems, training and providing the optimum production requirements.

## 4.2 Sources of Information Acquisition

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

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

## 4.3 Reactions towards Training Program Components

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

Teaching methods and aids: majority of participants stated that the used educational methods (lectures, discussions, demonstration methods and extension exhibits) were appropriate for objectives, training subjects, additionally numbers and levels of trainees. A few percentages (29-33%) of trainees agreed that the educational aids used were sufficient and attract the attention (Table 4). Also, efficiency of trainers: from 87- 92% of trainees have high level of acceptance about the high

**Table 2. Frequency distribution of participants regarding sources of information acquisition on 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 |

*F: Frequency*

**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. | (%) | 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 ± SD | 13.23 ± 1.52 | | 9.01 ± 1.59 | | 14.09 ± 1.43 | | 8.86 ± 1.42 | | 45.21 ± 3.80 | |

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

| Items | Level of approval | | | | | |
|---|---|---|---|---|---|---|
| | Strongly agree | | Relatively agreeable | | Not agree | |
| | F. | (%) | F. | (%) | F. | (%) |
| **Training program content** | | | | | | |
| The program satisfied actual 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 |
| **Teaching methods and aids** | | | | | | |
| 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 |
| **Efficient of trainers** | | | | | | |
| 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 |
| **Administrative environment** | | | | | | |
| 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 |

*F: Frequency*

qualifications of the trainers; ability to offer a structured explanation of the content and motivate/ encourage trainees for participation in the discussion. While administrative environment

component: about 77% and 67% agreed to the balance between the training hours and topics, also the period of training sessions was adequate and appropriate, respectively (Table 4). Almost half of the trainees (51%) disagreed that physical conditions of the training room support the trainees to understand and interact which were represented in lighting, ventilation and temperature.

### 4.4 Percentage of Correct Answers of Participants before and after Implementing the Training Program

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

### 4.5 Constraints Encountered by Participants Related to Small Poultry Production Projects

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

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

### 4.6 Suggestions of Trainees Regarding Enhancing of Similar Future Extension Programs

The results in Table 7 show that most of the trainees (96.15%) suggested that modern educational methods such as result demonstration should be included through organizing field visits to some farms and factories related to training subjects. Also, 82.69% suggested the need to topics related to poultry

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

| Program topics | Median knowledge and skills score (%) | | | |
|---|---|---|---|---|
| | Before training | After training | W value | P value |
| | Median (%) | | | |
| 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* |

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

**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 |

*F: Frequency*

**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 |

*F: Frequency*

and rabbits diseases, like symptoms of diseases, ways of infection, prevention and immunization, in addition to topics in the field of animal and fish production such as fish, sheep and calves. Use audio-visual aids like data show projector to display content easily and also providing the content is distinguished by modernity were represented as other suggestions by 65.38% and 57.69% of participants, respectively. While 55.76% of trainees suggested to provide scientific handout in printed or soft copy format.

## 5. DISCUSSION

### 5.1 Socio-economic Characteristics

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

Participants with limited training programs imply the need of training programs for this productive age category (youth) to increase their knowledge and skills for initiating private production projects, especially in the field of poultry production, which play a vital role in improving household income to face unemployment and/or lower income resources. This result agrees with Amer [11] who stated that the most important reasons to overcome unemployment; keen interest of the training and job creation through the possession of small projects.

Additionally, lack of extension services related to production projects for participant reflect the effective role of extension services to motivate and help participants to improve understanding, performance and success of their poultry production projects [12]. This finding is in accordance with Ogunwale et al. [13] who reported that contact with extension agents and the benefit from various services had positive impact on the chicken production practices.

### 5.2 Sources of Information Acquisition

Sources of information acquisition for trainees reflect the importance of modern sources especially trainers/ specialists and demonstration methods. The latter imply that trainees may feel confident to acquire information on poultry production projects through extension training programs and demonstration methods and still need more information to improve their managerial skills and knowledge concerning

poultry production small projects. Almost similar results were reported by Brent et al. [14] who found that the two most useful sources of information were demonstration methods and livestock technical specialists among the highest rated information sources.

### 5.3 Reactions towards Training Program Components

The overall acceptance level of trainees towards training program elements could be due to relative deficiencies in some items of the extension program components. Regarding training program content indicates a good planning of the training content in relation to the scientific levels and professional of trainees, in addition to the need for coordination and organization between theoretical and practical aspects of the explained content. The obtained results are in accordance with the findings of Moussa [15] who reported that the respondents agreed on the attention of officials for planning of the training program to suit the abilities of the trainees and their interests, which led them to attend because this program reflect their actual needs they demanded. In this context, the basic principles of adult education indicate that the degree of learner's assimilation is influenced by the individual motivations and interests related to the educational content provided [16].

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

### 5.4 Percentage of Correct Answers of Participants before and after Implementing the Training Program

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

### 5.5 Constraints Encountered Participants Related to Small Poultry Production Projects

The obstacles of inadequate knowledge and experience related poultry production, additionally insufficient extension training programs in the field of marketing and the economic feasibility study of projects which represented the most important constraints of trainees. This indicated the need for such extension programs to provide them with the required information in the mentioned areas for enhancing their productive skills in the field of poultry and rabbits production. These results agree with the findings of Al-Ameri and Al-Ghalibi [21] who reported that the most problems and difficulties facing the small enterprises were represented in lack of economic feasibility study, inability to financial and administrative planning, lack of adequate information systems and inability to obtain information on markets and suppliers. While unavailability of proper location

for establishing the project and non-provision of capital, which confirmed the findings of Al-Mashharawi and Al- Ramlawi [22] who mentioned that obtaining the location suitable for the establishment of the project and the financing constraints due to the difficulty of access to loans are the most important obstacles to small projects. Lack of veterinarians for diagnosis and treatment of diseases, is in a line with the finding of Elkashef et al. [23] who stated that the high cost of veterinary services was a constraint affecting information acquisition of chicken production practices, as was mentioned by majority of respondents.

### 5.6 Suggestions of Trainees Regarding Enhancing of Similar Future Extension Programs

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

## 6. CONCLUSION AND RECOMMENDA-TIONS

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

1. Conducting a real feasibility study that takes into account the economic, social and environmental dimensions of small enterprises.
2. Availability of appropriate banking loans to finance small-scale projects that to be characterized by clearness and compatibility.
3. Encouraging beneficiaries (household women, agricultural engineers, farmers and youth) to set up income-raising projects through providing facilities and technical support by non-governmental organizations (NGOs) and governmental organizations.
4. Providing training programs, extension services and veterinary services for both poultry and livestock production can improve the knowledge and managerial skills of beneficiaries, especially youth and householders, in order to establish small production projects.
5. Organizing and conducting such training programs regularly to serve different categories of agricultural professionals and take advantage of the current study.

## CONSENT

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

## COMPETING INTERESTS

Author has declared that no competing interests exist.

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