

The Future Perspectives of Agricultural Graduates and Sustainable Agriculture in Sudan

Abubaker Haroun Mohamed Adam^{1,*}

¹Associate Prof. of Agronomy and Environmental Studies

Abstract

The objectives of this study were to assess the Quality of Agricultural Graduates, employers' perceptions of the employability and skills. A descriptive, analytical statistics, multistage random sampling method was adopted. Where two types of questionnaires were distributed to the Graduates and institutions associated with Sustainable agriculture (SA). The collected data was analyzed by Statistical Packages for Social Sciences (SPSS). The results revealed some respondents began higher education in Arabic (66.7%), while others in English (33.3%). The respondents faced with difficulties in understanding the courses due to teaching methods (36.7%), language (33.3%), and curriculum (30%). The result indicated some respondents (56.7%) do not have back ground about (SA). The respondents in the Ministries of Agriculture assessed the Graduates in regard to agricultural skills, and confidence to perform duties as fair (10%), and good (23.3%), but, for reliability, managerial skills, tactic and ability to participate in forums as fair (6.7%). Good (27.7%), fair (3.3%), and good (30%) respectively. Assessment of the Graduates at Research Centers, were assessed in relation to Research methodology, statistical analysis, and writing scientific papers as good (40 %). While for Software skills as excellent (100%), and for Agricultural Technology Transfer as very good (80%). While; the respondents from Faculties of Agriculture, assessed the Graduated for practical skills, teaching ability, skills of writing scientific papers, participation in workshops and seminars as good (93.3%), very good (6.7%), fair (6.7) and very good (33.3%), respectively. The Graduates' quality is below the expectations. Based on the above findings, the study recommends the review of the whole educational system, Faculties of Agriculture to include the concepts of sustainable agriculture in their curriculum and give high consideration to practical part. In the same context, further study is recommended including the whole Country.

Corresponding author: Dr. Abubaker Haroun Mohamed Adam, Associate Prof. of Agronomy and Environmental Studies, Cell: (+249)0912892429, Email: abubakerharoun@gmail.com

Citation: Abubaker Haroun Mohamed Adam (2019) The Future Perspectives of Agricultural Graduates and Sustainable Agriculture in Sudan. Journal of Agronomy Research - 1(4):36-43. <https://doi.org/10.14302/issn.2639-3166.jar-19-2732>

Keywords: Multistage, Respondents, institutions, curriculum

Received: Mar 25, 2019

Accepted: Apr 05, 2019

Published: Apr 15, 2019

Editor: Berken Cimen, Cukurova University, Turkey.

Introduction

Agriculture is an important sector in our life, for it constitutes the main source of food, feed, fiber and earning¹.

Sudan; like other third world countries which characterized by low crop productivity despite the advancement in the field of science and technology².

However, the issue of low yield is of great concern. It is attributed to several interrelated and interacted factors, among these, natural factors (Rain-fall irregularity, scarcity, fluctuation, and frequent spells of drought, land degradation, desertification, climate change, pests and diseases etc...), institutional (research, extension), organizational (farmers' unions), and agricultural policy (finance, infrastructures, technology, taxes, marketing)³.

Today, in Sudan, the revolution in higher education drew the attentions of many scholars from various disciplines to cast light on issues like quality of education in relation labor market and sustainable agricultural development. Nevertheless, it is important to understand the concept of quality in terms of qualifications which links the developed knowledge of the graduates during the education to the demands from the labor market⁴.

It is observed that the attendances of higher education is increasing every year, but are the graduates learn the essential skills required by labor market and economic development.

Despite the importance of this issue, only few studies were carried out. Generally, this study sought to assess the quality of graduates of Faculties of Agriculture, based on educational ability and employers' perceptions of employability and skills which can prepare the new graduates for career in sustainable agriculture. Based on this, the following objectives were formulated as guidelines for this study:

1. Measure the academic and thinking skills of the graduates, with emphasis on the aspects of sustainable agricultural development.
2. Examine the factors which affect the skill gains
3. Identify the constraints which face the graduates throughout the study period.

4. Quantify the strength and weakness of the graduates.
5. To understand view of the employers. What do employers think and want?
6. Test the graduates' quality and their ability to contribute in teaching, research and sustainable agriculture.
7. Give/receive feedback.

Sustainable agriculture: The term 'sustainability' was used by a German scientist⁵. Then it has evolved from three perspectives: as a system of production to achieve food self-reliance; as a concept of stewardship; and as a vehicle for sustaining rural communities⁶. But, the term has been first widely used by Lord Northbourn (1940) describing the farming systems that focused on the farm as a dynamic, living, balanced, organic⁷.

Later on, the term had broader meaning than just the use of materials to achieve farming objectives. Albert Howard and William Albrecht were among the scientists in the USA and Europe who investigated and promoted sustainability in agriculture. However, other important historical influence on the development of sustainable agriculture was the research on the connection between the condition of the soil, food quality, and human health, Furthermore, ecology and Agro-ecosystems contributed much to sustainable agriculture.

Recently, Christopher Chapman and Spencer Cheshire were the leader for concept of sustainable agriculture in Canada in 1950s, where many environmental and sustainable agriculture organizations were created.

The need for sustainable agriculture owes to its origin to the philosophy of 'holism', which enunciates that all things are connected and their interactions in nature are complex. Stimulus to one component creates response to that as well as the system as a whole also responds⁸.

Assessment

It is the key to develop the graduates' qualities, aiming at providing a significant incentive for the graduates (give/ receive feedback), and at the same time gives stakeholders the assurance that the graduates have actually achieved the graduate

qualities.

Some researchers⁹, described different methods and tools used to assess the quality of the graduates. Few examples can be mentioned, among these the Graduate Employability Indicators (GEI), Graduate Employability Indicators Surveys (GEIS), Tool Generates Graduate Employability Indicators charts (GGEIC), Graduate Employability Indicators Reporting Template Progression through Programs (GEIRTPP), and Employer Satisfaction Survey (ESS)¹⁰.

Materials and Methods

This study was carried out during the period from August to October, 2017. It considered several Faculties /Colleges of Agriculture, Research Centres and Ministries of Agriculture in Khartoum State-Sudan.

Materials

Questionnaire Design

Two types of questionnaires were designed .One for the graduates and the other for the employers.

Method

Sample Types, Sampling Techniques and Data Collection

In the Light of the Said Objectives, the Following Methods were Adopted

A descriptive, analytical statistics, multistage; random sampling method was followed. The Employer Satisfaction Survey (ESS) approach was used, where the generic skills, technical skills and work readiness of graduates were assessed. Moreover, for quality Indicators, both the graduates as well as the employers were asked. The graduates were asked about the acquired knowledge and skills, while the employers asked about their views on some indicators. Moreover,

direct interviews and observation were considered.

Randomly, two types of samples were considered. First, the graduates (2-5 years) from different governmental sectors associated with agricultural activities. The second type targeted the employers. Where randomly; three Faculties/Colleges of Agriculture were selected from five Universities. Then, administrative were chosen from three departments in each Faculty/College of Agriculture. Moreover, administrative from Ministries of Agriculture as well as Research Centers were considered too.

Data analysis

The collected data were statistically analyzed by Statistical Packages for Social Science (SPSS) Software, Version 23

The results of the said data were presented in form of tables.

Results and Discussion

Two types of results were obtained, the descriptive and statistical analysis which includes the Analysis of Variance (ANOVA) and T-test which are presented in Tables (1-7).

The Descriptive

The result showed the majority of the respondents were Male (63.3%). As far as the education concern, most of the respondents are BSc. Holder (46.6%), followed by Post Graduate Diploma (PGD) (26.7%) and MSc. (26.7%).

Great number of respondents began higher education in Arabic (66.7%), while the other group began in English (33.3%). However, the respondents faced with difficulties in understanding the courses

Table 1. Mean Squares for ANOVA of different questions in basic information -Khartoum State (2017).

Q. No.	Question	T-test
1	Sex	(0.50) ^{2**}
Q.No.	Question	Mean Square
2	Do you have background on sustainable agriculture?	0.40 ^{ns}

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig.

Table 2. Mean Squares for ANOVA of different questions in Education –Khartoum State (2017)

Q. No.	Question	T-Test
1	Medium of instruction	(0.50) ^{2**}
2	If it was difficult what is the reason(s)	(0.50) ^{2**}
3	Are you satisfied with your study?	(0.50) ^{2**}
Q. No.	Question	Mean Square
4	How did you begin your higher education	1.23**
5	How can you assess your teaching facilities: The Visual aids	0.92**
6	How can you assess the teaching facilities? The Practical part	0.278 ^{ns}

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig.

Table 3. Mean Square for ANOVA of different questions in Sustainable Agriculture-Khartoum State (2017).

Q. No.	Question	Mean Squares
1	Water harvest and spread techniques	4.63**
2	Indigenous knowledge	4.63**
3	To what extent you are exposed to outdoor and sustainable agriculture?	0.38 ^{ns}
4	Sustainability indicators (Policy relevance, Predictability, Measurability)	2.88**
5	Pressure State Response (PSR)	0.45 ^{ns}
6	Low in put price issues	2.31**
7	Economic sustainability	4.43**
8	Agro forestry	2.16**
9	Water use Efficiency (WUE)	4.63**
10	Mono-cropping	2/34**
11	Rotation course system	1.60**
12	Integrated pest management	2.88**
13	Parameters used for measuring sustainability	1.06**
14	Computable General Equilibrium (CGE) Models	0.07 ^{ns}
15	Non-linear system interactions	0.79*
16	European Commission (EC) indicators	1.61**

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig.

Table 4. Mean Squares for ANOVA of different questions in Extension – Khartoum State (2017)

Q. No.	Question: Do you have any background about the followings?	Mean Square
1	Water harvest and spread techniques	6.43**
2	Indigenous knowledge	1.53**
3	Top Bottom - Bottom up Approach	4.33 ^{ns}
4	Intermediate technology	1.73**
5	Group extension	9.00 ^{ns}
6	Alternative agriculture	9.00 ^{ns}
7	Consumer taste and behavior	9.33 **
8	Land Use Management and Planning	2.74**
9	Participatory Approach	9.33 **
10	Total quality Management	8.33**
11	Micro-credit (Micro-Finance)	1.03**
12	Land carrying capacity (grazing)	0.17 ^{ns}
13	Animal draught power	0.68*
14	Project Management Cycle	0.70*
15	Law of Variable proportion	0.03 ^{ns}
16	Zero Tillage (No Till)	0.90*
17	Contemporary Agriculture	0.30 ^{ns}
18	Precision Agriculture	0.23 ^{ns}

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig

Table 5. Mean Squares for ANOVA of different questions in Ministries of Agriculture-Khartoum State (2017)

Q. No.	Question: How can you assess the Graduates in regard to:	Mean Squares
1	Agricultural skills	1.10**
2	Managerial skills	0.80*
3	Confident to perform duty	1.10**
4	Ability to participate	1.90**
5	Tactic	1.90**
6	Reliable	1.10**
Q. NO.	Question	T-Test
7	Need for further training	(0.51) ^{2ns}

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig

Table 6. Mean Squares for ANOVA of different questions in Universities in Khartoum State (2017)

Q. No.	Question: How can you assess the Graduates in regard to:	Mean Squares
1	Research Methodology	0.45 ^{ns}
2	Design and statistical analysis	0.45 ^{ns}
3	Software skills	1.25 ^{**}
4	Writing papers	0.45 ^{ns}
5	Knowledge about Agricultural information and Technology	0.71 ^{**}
6	Latest development in research area	0.71 ^{**}
Q. No.	Question	T-Test
7	Need further training	0.93 ^{**}

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig

Table 7. Mean Squares for ANOVA of different questions in Research Centers - Khartoum State (2017)

Q. No.	Question	Mean Squares
1	Taught courses (subjects)	1.79 ^{**}
2	Practical skills	2.85 ^{**}
3	Ability to teach	1.83 ^{**}
4	Writing papers	1.39 ^{**}
5	Participation in workshops, seminars	1.00 ^{**}
Q. No.	Question	T-Test
6	Need for further training	(5.01) ^{2**}

NB: cv* = Sig., cv** = Highly Sig., ns = Non Sig

during their study, due to teaching methods (36.7%), language (33.3%), and Curriculum (30%). Furthermore, great numbers of respondents (56.7%) do not have background on sustainable Agriculture (SA).

For the Ministries of Agriculture, the respondents assessed their Graduates (2-5 years) in relation to agricultural skills and confidence to perform duty as fair (10%), and good (23.3%) respectively. For reliability and managerial skills as fair (6.7%), and good (27.7%). For tactic and ability to participate in forum as fair (3.3%) and good (30%).

The Graduates of Research Centers were assessed in relation to Research methodology, statistical analysis, and writing scientific papers as good (40 %). While for Software skills as excellent (100%), and for Agricultural Technology Transfer as very good (80%). The results of assessment for practical skills, teaching ability, skills of writing scientific papers, participation in workshops and seminars. were as good (93.3%), very good (6.7%), fair (6.7%), and very good (33.3%), respectively.

Results of Statistical Analysis

The followings are tables for analysis of variance (ANOVA) and T-Tests for significance. The responses were quantified into 2 and 3 levels, and analyzed using ANOVA and T-Test, where relevant to detect the possible differences among levels of questions.

Conclusion and Recommendations

Conclusion

Based on the above Results, the Study Concludes

The main problems faced the Graduates were the medium of instruction, curriculums, laboratories, and practical work. Considerable percentages of graduates have little information about sustainable agriculture (SA.),

Gradates at the Ministries of Agriculture lack the management and administration skills,

The graduates at the Faculties/Colleges of Agriculture and Research Centres despite of some weakness, they are better compared to their colleagues in other sectors.

All employers are not satisfied with the skills and performance of the graduates.

Recommendations

1. All Graduates need further training.
2. The higher education study system needs to be reviewed so that to have competent Graduates who can meet the labor market demands.
3. Sustainable Agriculture and related subjects to be included in the curriculums.
4. Further assessment is recommended including the whole country,

References

1. Hossein Aghahi. Khadileh Moradi and Nashmail Afsharzade (2012): Agricultural Graduate Students' Attitudes Towards Sustainable Agriculture: Case of Razi University, Iran.
2. Godfray, H.C.J.; Beddington, J.R.; Crute, I.R.; Haddad, L.; Lawrence, D.; Muir, J.F.; Pretty, J.; Robinson, S.; Thomas, S.M.; Toulmin, C. (2010): Food Security: The Challenge of Feeding 9 Billion People. *Science* (2010) 327 (5967) 812-818. (DOI: 10.1126/science.1185383).
3. Thabit A. Hassan, Suliman Elmahil Suliman (2015): Economic Analysis of Factors Affecting Crop Production in South Darfur State – Sudan. *ARNP Journal of Science and Technology*. VOL. 5, NO. 5, May 2015. SSN 2225-7217. ©2011-2015. All rights reserved.
4. Bergan, S. (2007) Qualifications. Introduction to a concept. Strasbourg: Council of Europe Publishing. Zlatkin-Troitschanskaia, O., Shavelson, R.J., & Kuhn, C. (2015). The international state of research on measurement of competency in higher education. *Studies in higher education*, 40 (3), 393-411.
5. Baldy, J. Framing a Sustainable Local Food System—How Smaller Cities in Southern Germany Are Facing a New Policy Issue. *Sustainability* 2019, 11, 1712
6. P. Hurst P. Termine M. Karl (2005): Agricultural workers and their contribution to sustainable agriculture and rural development. Food and Agricultural Organization of The United Nations [2005], <http://www.eldis.org/>).
7. Clive A. Edwards, Rattan Lal, Patrick Madden, Robert H. Miller and Gur House (1990): Sustainable

- Agricultural System. Copyright, 1990 by the Soil and water Conservation Society. Manufactured in the United States of America. 10 9 8 7 Library of Congress Catalog Card No. 89-26370. ISBN 0-935734-21-x).
8. Bertie Weddell, (2015): What is Holistic Agriculture. Centre for Sustainable Agriculture and Natural Resources. Washington State University. College of Agriculture, Human and natural Resources Sciences.
 9. Clive A. Edwards, Rattan Lal, Patrick Madden, Robert H. Miller and Gur House (1990): Sustainable Agricultural System. Copyright, 1990 by the Soil and water Conservation Society. Manufactured in the United States of America. 10 9 8 7 Library of Congress Catalog Card No. 89-26370. ISBN 0-935734-21-x).
 10. John F. Welsh, Sukhen Dey, (2002) "Quality measurement and quality assurance in higher education", Quality Assurance in Education, Vol. 10 Issue.