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The impact of major constraints on agricultural extension in eastern Libya

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Sustainable agricultural development is defined as successful management of the resources of agriculture to satisfy changing human needs, to conserve the environment and increase biological resources. The agricultural extension services can play a crucial role in providing this network of information on sustainable agricultural education. However, the effectiveness of public extension has gradually decreased in recent years. Reasons such as budget tightness, lack of training programmers' for farmers on sustainable agricultural development, low number of extension personnel and poor infrastructure, lack of motivation, insufficient coordination with research organizations. The main objectives of the present study of sustainable agricultural development were to determine the impact of major constraints among farmers, managers and deputy directors on agricultural extension in Eastern Libya: To enhance food security; to increase productivity and competitiveness of the sector; to deepen linkages with other sectors; to create new sources of growth for the sector; and to conserve and utilize natural resources in a sustainable basis. A quantitative research methodology was adopted in this study. Using a questionnaire developed following an extensive literature review, a cross sectional survey was undertaken in the Eastern Libya areas from June to September 2010. According to factor analysis, the implications for major constraints were categorized into two groups consisting of: (1) The major constraints of farmers (2) The major constraints of managers and deputy directors of agricultural extension. A total of 300 farmers, and 46 managers and deputy directors, were approached for this study. Most of respondents were believed that the important of major constraints of agricultural extension for achieving sustainable agricultural development as follow, lack of training programs (58.0 %), high cost (67.4 %), lack of appropriate market (56 %), limited budget (78.3 %) , lack of motivation (76.1 %), weak linkages between researchers(60.9 %), insufficient communication (58.7 %). From this study, it can be concluded that the major barriers hampering adoption of sustainable agricultural development, included little financial returns for farmers, , problems of administrative , financial to agricultural extension management , who found that management of agricultural extension needed more solutions with respect to sustainable practices particularly in the area of the economics of sustainable agricultural development.

Key words: Major Constraints, Agricultural Extension, Sustainable Agricultural Development, Eastern Libya

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Introduction

Agricultural development plans (1972–1986), during the last thirty years water and land resources have been excessively used beyond sustainable levels (Jamahiriya, 2006b). Therefore the proposed plan recognizes the importance of improving the role of extension in sustainable agricultural development to meet higher production targets and achieve higher farmer incomes (Jamahiriya, 2006a). The coastal zone is the most important agricultural area in Libya which located nearly 70 per cent of agricultural activities followed by the mountains and the oases. In addition to farming, Libya is favoured by a long coast on the Mediterranean Sea and by rich natural resources, which are not fully exploited (Jamahiriya, 2006a). The study focused on the eastern part of Libya that relies on rain-fed and irrigated crops, and livestock; there were all together 2938 farms which are grouped into six major agricultural regions: Tubruq, Derna, Al Bayda, Al Marj, Benghazi and Ajdabiya. Most of the arable land and pastureland of Libya is in the eastern parts of the coastal belt. Grains are grown and some livestock is grazed to a lesser extent in the southeast area. Cultivation is sporadic and dependent on rainfall (Laytimi, 2002).

Moving from Tubruq to Benghazi (East to West), across the 'Green Mountains', there is a visible gradient of increasing rainfall, water availability and agricultural activities. Particularly, the plateau between Al Bayda and Al Marj (approx. 100 km by 20-30 km) is covered with large barley fields and wind break tree lines. From Al Marj to Benghazi (coastal plain) the landscape is drier with barley fields and grazing areas. While From Benghazi to Ajdabiya is drier area with grazing areas and Palm Farms in Jalu and Awjlah (FAO, 2011).

Several stone fruit tree plantations of small and medium size are present; and Principal crops produced include vegetables, fruits, wheat, barley and dates while principal livestock include Sheep and goat flocks which are relatively large (approx. 50 – 70 heads). Many camels, cows and poultry farms are also observed. Agriculture infrastructure, machinery and agricultural extension service centers are present across the eastern area (FAO, 2011). The Tubruq area consists of three agricultural areas (Tubruq, Aljaghbub and Altamimi) comprising 34 farms. The principal crops produced include watermelons and dates, and the principal livestock include sheep, goats and camels. In addition to a pasture development project there is an ostrich breeding project (Agriculture Ministry of Libya 2011). The Derna area consists of three agricultural areas (Derna, Alqubah and Kirissah) with 945 farms. The principal crops produced include watermelons, tomatoes, wheat and barley. The principal livestock include sheep and goats, followed by cattle, camels and poultry. In addition, there is a vegetation development project (Agriculture Ministry of

Libya 2011). The Al Bayda area consists of five agricultural areas (Al Bayda, Shahat, Alhaniyah, Alhamamah, Qusr Libiya) with 814 farms.

The principal crops produced include vegetables, fruit, wheat and barley and the principal livestock include sheep and goats, followed by cattle and poultry. In addition, there is a vegetation development project (Agriculture Ministry, 2011). The Al Marj area consists of five agricultural areas (Al Marj, Batth, Al Bayyadah, Jardas Al Abid and Al Uwayliyah) with 614 farms. The principal crops produced include vegetables, fruit, wheat and barley; and the principal livestock include sheep and goats, followed by cattle and poultry. In addition there is a vegetation development project (Agriculture Ministry of Libya 2011). The Benghazi area consists of five agricultural areas (Benghazi, Tocra, Al Abyar, Suluq and Qminis) with 401 farms. The principal crops produced include vegetables, fruit, wheat and barley and the principal livestock include sheep and goats, followed by cattle and poultry. In addition, there is a pasture development project and ostrich breeding project (Jamahiriya, 1978). The Ajdabiye area consists of four agricultural areas (Az Zuwaytinah, Ajdabiye, Jalu and Awjilah) with 130 farms. The principal crops produced include vegetables and dates and the principal livestock include sheep, goats and camel. In addition, there is a pasture development project (Agriculture Ministry of Libya, 2011).

Materials and methods

A questionnaire was developed on the basis of our initial extensive review of literature. The questionnaire has three sections which cover demographic information, personal experience among farmers, managers and deputy directors on agricultural extension in Eastern Libya. A cross-sectional survey was undertaken in divided into six areas at the Eastern Libya, namely of Tubruq, Derna, Al Bayda, Al Marj, Benghazi and Ajdabiya. Data collected through the use of questionnaires on a sample of population involved in agriculture in the study area. A total of 300 farmers and 46 of managers and deputy directors (Agricultural Extension Management) are involved. The questionnaire consisted of several categories of questions. Part I: - Demographic information such as age, gender, level of education, present position in the organization, work experience. Part II: - The major constraints (Farmers, agricultural extension management). Both non-parametric statistical tests and the appropriate descriptive statistics for demographic characteristics (mean and standard deviation for age) were performed using the statistical package for social sciences SPSS® for Windows, version 16 from June to September 2011.

To assess the content validity of the questionnaire, the preliminary version, consisting of 6 items for Farmers and15 items for managers and deputy directors, was reviewed by a senior lecturer, and a lecturer in the School of Housing, Building & Planning, Universiti Sains Malaysia. These professionals were asked to provide their overall opinion of the questionnaire and to list the questions in the order of their relevance and importance. The more relevant and important questions were thus highlighted. To assess the face validity of the questionnaire, thirty participants were solicited, who were asked for their views on the significance, worth, and simplicity of each question; they were also asked to identify any questions which, in their view, should be removed so as to make the questionnaire simpler. In addition to this, the participants were also invited to make further comments on whether the questions were easily comprehensible or not. Most of them suggested simplifying the questions.

The reliability test was applied to all the variables comprising all domains. The reliability of the tool was estimated on the basis of Cronbach's Alpha (ά = 0.73). Each section of the questionnaire included a set of statements for which responses were requested. These were questions which required a "*yes" or "no*" response. To indicate the level of agreement a 5-point Likert scale was used, where 1 = *strongly agreed*, 2 = *agreed*, 3 = *neutral*, 4 = *disagreed*, 5 = strongly *disagreed*. There was a section inviting comments at the end of the questionnaire.

Results

The major findings of the study under five sub-sections were presented. First sub-section described the demographic characteristics of farmers, managers and deputy directors who participated in the study. The second described the major constraints which perceived by farmers and management of agricultural extension in achieving sustainable agricultural development in Eastern Libya. The third described organizational characteristics in agricultural extension services and highlights their roles, interactions and coordination and identifies roles in sustainable agricultural development. The performance of the support mechanisms in sustainable agricultural development is analyzed in the fourth sub-section. Finally, in the fifth section the performance of current service delivery systems to develop pluralism and decentralization is analyzed from the perspective of polices and institutional arrangements.

Demographic characteristics of farmers

The demographic profile of the farmers who participated in this study is described in Table 1. The data were obtained from farmers who gave their

opinions in response to the questions or statements included in the survey. Three hundred questionnaires were distributed to farmers in the eastern region of Libya. Mean age was 51.77 years with standard deviation (SD) = ± 0.528 years. Three hundred and forty questionnaires were distributed but only 300 were answered; all respondents were male (n = 300, 100%), and most were married (n = 299, 99.7%; single: n=1, 0.3 %). Nearly all (n = 230, 76.7 %) were over 48 years of age, and most others were in the age bracket of 38–47 years (n = 60, 20%), while in the bracket of 28–37 years and 18–27 years there were only nine men (n = 9,3 %) and one man (n = 1, 0.3 %) respectively. The current position of the respondents was that 263 (87.6 %) were without qualification, 14 had an intermediate diploma (4.7 %), 12 had a higher diploma (4.0 %), eight had a degree (2.7 %), and three had a masters degree (1%). Regarding their experience in agriculture, 63 (21.0 %) had over 30 years of experience, 213 (71.0 %) had 16–30 years' experience, while in the brackets of 5–15 years and less than five years there were 24 (8%) and 0 (0.0%) respectively.

Table 1. Demographic Characteristics of the Farmers (n = 300)

Variable	**Frequency**	**N (%)**
Gender		
	Male	300 (100%)
Age	Mean 51.77 ± SD 0.528	
	18-27	1 (0.3%)
	28-37	9 (3.3%)
	38-47	60 (20%)
	< 48	230 (76.7%)
Qualification		
	Without qualification	263 (87.7%)
	Intermediate Diploma	14 (4.7%)
	Higher Diploma	12 (4%)
	Degree	8 (2.7%)
	Masters Degree	3 (1.0%)
Years of Experience		
	5-15	24 (8%)
	16-30	213 (71%)
	< 30	63 (21%)
Marital Status		
	Single	1 (0.3%)
	Married	299 (99.7%)

Demographic characteristics of managers and deputy directors

The demographic profile of the managers and deputy directors who participated in this study is described in Table 2. Mean age was 43.8 years with

standard deviation (SD) = ± 0.577 years. The data were obtained in respect of the managers and deputy directors who gave their opinions in response to the questions or statements included in the survey. Fifty questionnaires were distributed in the eastern region in Libya, but only 26 managers and 20 deputy directors responded. All of the participants in the study were male (100 %, n = 46) and all were married.

The ages of the respondents ranged from 38–47 (67.4%, *n* = 31), 28–37 years (17.4%, n = 8), and over 48 (15.2%, n = 7). Of the extension specialists, 21.7% (n = 10) had a higher diploma in agricultural extension and 54.3% (n = 25) of respondents were degree holders. Only 8.7% of extension specialists had masters degree (n = 4). Of respondents, 15.2% (n = 7) had an intermediate diploma. Experience in agricultural extension was over 30 years for 4.3% (n = 2), 13.0% (n = 6) were in bracket of 16–30 years, while in the bracket of 5–15 years there was 80.4 % (n = 37), and 2.2% (n = 1) were in bracket of less than five years.

Table 2. The Demographic Characteristics of Managers and Deputy Directors (n = 46)

Variable	**Frequency**	**N (%)**
Gender		
	Male	46 (100%)
Age	Mean 43.8 ± SD 0.577	
	28-37	8 (17.4%)
	38-47	31 (67.4%)
	< 48	7 (15.2%)
Qualification		
	Intermediate Diploma	7(15.2%)
	Higher Diploma	10(21.7%)
	Degree	25(54.3%)
	Masters Degree	4 (8.7%)
Years of Experience		
	Less than 5years	1(2.2%)
	5-15	37(80.4%)
	16-30	6(13.0%)
	< 30	2(4.3%)
Marital Status		
	Married	46(100.0%)
Job Title		
	General Manager	26(56.5%)
	Deputy Director	20 (43.5%)

The major constraints of sustainable agricultural development

The purpose of this study was to examine the perceptions of the major constraints regarding sustainable agricultural development in eastern Libya, which consisted of the following: -

Major constraints that hinder farmers in achieving sustainable agricultural development:

With response to our respondents, were asked about their perceptions regarding the major constraints which are shown in Table 3. More than half of respondents 58% (n = 174) strongly agreed with the necessity for training programmes to farmers on sustainable agricultural development. The adoption of technology requires the existence of appropriate financial recourses which are usually unavailable for most farmers 47.3 % (n = 142) strongly agreed with this statement. The lack of appropriate markets and prices for the agricultural products resulted in a lack of adoption of new technologies and practices (56 %, n = 168, strongly agreed), while 37.3 % (n = 112) of farmers strongly agreed that farmers do not react towards the advices and the programmes of agricultural extension as a result of some failure that accompanied earlier implemented methods or programmes. Additionally, a proportion of farmers (56.3 %, n = 169) strongly agreed that procedures for payment of agricultural credit loans are still very difficult and need to be streamlined. Farmers, 41.7 % (n = 125) strongly agreed that there was a high cost for supporting sustainable agricultural development programmes Table. 3, the highest mean refers to Lack of training programmes for farmers on sustainable agricultural development (Mean = 4.56, SD = ± 0.536) and the lowest mean refers to the high cost for supporting sustainable agricultural development programmes (Mean = 4.12 ± SD = 0.980).

Table 3. The Major Constraints of Farmers

Item in question	Responses						
	SD (%)	DS (%)	N n (%)	A n(%	SA n (%)	Mean	SD
1	00(00%)	1(0.3%)	3(1%)	122(40.7%)	174(58%)	4.56	0.536
2	9(3%)	9(3%)	5(1.7%)	135(45 %)	142(47.3%)	4.31	0.888
3	1(0.3%)	7(2.3%)	6(2%)	118(39.3%)	168(56%)	4.48	0.687
4	30(10%)	55(18.3%)	9(3%)	94(31.3%)	112(37.3%)	3.68	1.392
5	5(1.7%)	3(1%)	9(3%)	114(38%)	169(56.3%)	4.46	0.756
6	7(2.3%)	17(5.7%)	35(11.7%)	116(38.7%)	125(41.7%)	4.12	0.980

Note: SD strongly disagree; DS disagree; N neutral; A agree; and SA strongly agree.

Question 1: What are the major constraints that hinder Farmers in achieving sustainable agricultural development?

Lack of training programmers' for farmers on sustainable agricultural development, The adoption of technology requires the existence of appropriate financial recourses which are usually unavailable to farmers, Lack of appropriate market and price for the agricultural products those results in lack of adoption of new technologies and practices, Farmers do not react towards the advices and the programmes of agricultural extension as a result of some failures that accompanied earlier implemented methods or programmes, Procedures for payment of agricultural credit loans are still very distressed and need to be streamlined, The high cost for supporting sustainable agricultural development programmes.

The major constraints that hinder the management of agricultural extension in achieving sustainable agricultural development:

Agricultural extension could play a key role in fostering sustainable agricultural development programs but there have been major constraints of sustainable agricultural development Table. 4, as there is an absence of legislative policy for the coordination of work between the management of agricultural extension and other organizations 63 % (n = 29) agreed with this statement. Additionally there is an absence of participation of farmers' organizations, organizations of education and agricultural credit organizations in the planning process and implementation of sustainable agricultural development programs 60.9 % (n= 28) agreed. In addition the model from the top to the bottom does not encourage feedback on the information because it creates a rigid hierarchy 52.2 % (n = 24) agreed with this. Most (78.3%, n = 36) also agreed there was a limited budget allocated to agricultural extension services. Also, another major constraint was the number of field staff which was limited compared to the number of farmers – 63 % (n = 29) agreed with this. The employed field staff have low salaries and lack professional incentives 76.1% (n = 35) agreed. While the thought, 67.4 % (n = 31) agreed that there was a high cost of purchasing and maintaining equipment and software; 58.7 % (n = 27) agreed there was insufficient communication with other organizations of agreed; and 58.7 % (n = 27) agreed that there were intensive bureaucratic procedures with regards to the relations between the management of agricultural extension and other organizations. As Additionally, 60.9% (n = 28) agreed there were weak linkages between researchers, field staff, farmers and their organizations, and 58.7% (*n* = 27) agreed there is no relation between the content of the training courses and the duties of the workers in the field of agricultural extension. In

addition, there is lack of motivation for the field staff for hard work, creativity and there is an inadequate system of promotion –76.1% (n = 35) of agreed with this statement.

Furthermore, 71.7% (n = 33) agreed there is a poor infrastructure. As can be seen from Table 4, the highest mean refers to Poor infrastructure (Mean = 3.85 ± SD = .759) and the lowest mean refers to the model from the top to the bottom does not encourage on the feedback of information because it creates a rigid hierarchy (Mean = 3.48 ± SD = 809).

Table 4. The Major Constraints of Management of Agricultural Extension

Item in question	Responses						
	SD (%)	DS (%)	N n (%)	A n(%)	SA n (%)	Mean	SD
1	1(2.2%)	3(6.5%)	6(13%)	29(63%)	7(15.2%)	3.83	.851
2	2(4.3%)	2(4.3%)	9(19.6%)	28(60.9 %)	5 (10.9%)	3.70	.891
3	1(2.2%)	4(8.7%)	15(32.6%)	24(52.2%)	2(4.3%)	3.48	.809
4	2(4.3%)	1(2.2%)	4(8.7%)	36(78.3%)	3(6.5%)	3.80	.778
5	2(4.3%)	4(8.7%)	6(13%)	29(63%)	5(10.9%)	3.67	.944
6	3(6.5%)	2(4.3%)	4(8.7%)	35(76.1%)	2(4.3%)	3.67	.896
7	2(4.3%)	3(6.5%)	8(17.4%)	31(67.4%)	2(4.3%)	3.61	.856
8	3(6.5%)	4(8.7%)	7(15.2 %)	29(63.0 %)	3(6.5%)	3.54	.982
9	2(4.3%)	3(6.5%)	9(19.6%)	27(58.7 %)	5(10.9%)	3.65	.924
10	2(4.3%)	2(4.3%)	8(17.4%)	28(60.9%)	6(13%)	3.74	.905
11	1(2.2%)	3(6.5%)	11(23.9%)	27(58.7 %)	4(8.7%)	3.65	.822
12	2(4.3%)	4(8.7%)	1(2.2%)	35(76.1%)	4(8.7%)	3.76	.899
13	1(2.2%)	2(4.3%)	5(10.9%)	33(71.7%)	5(10.9%)	3.85	.759

Note: SD strongly disagree; DS disagree; N neutral; A agree; and SA strongly agree.

Question 1: What are the major constraints that hinder the management of agricultural extension in achieving sustainable agricultural development?

The absence of legislative policy for the coordination of work between the management of agricultural extension and other organizations, Absence of participation of farmers' organizations, organizations of education and agricultural credit organizations in the planning process and implementation of sustainable agricultural development programs, The model from the top to the bottom does not encourage on the feedback of information because it creates a rigid hierarchy, Limited budget allocated to agricultural extension services, The number of field staff is limited compared to the number of farmers, The employment field staff that have low salaries and lack of professional incentives, The high cost of purchasing and maintaining equipments and software, Insufficient communication with other organizations, Intensive bureaucratic procedures are in relations between the management of agricultural extension and other organizations, Weak

linkages between researchers, field staff, farmers and their organizations, There is no relation between the content of the training courses and the duties of the workers in the field of agricultural extension, Lack of motivation of the fields' staff for the hard work, creativity and inadequate system of promotion, Poor infrastructure.

Discussion

Agricultural extension could play a key role in fostering sustainable agricultural development programs through its Training programs, but there has been a growing realization that traditional extension models have not been sufficiently effective in promoting adoption of sustainable agricultural practices (Allahyari, 2009). Extension organizations face several challenges in applying including: Lack of training for farmers, lack of knowledge and skills among employees, high cost of buying and maintaining hardware and Software and Legislative, policy and regulatory hurdles, the adoption of technology requires the existence of appropriate financial recourses which are usually with farmers (FAO, 2002). In addition poor infra structure, absence of participation of local organizations in planning and implementation process of sustainable agricultural development programs (Kalantari *et al.* 2008). Sector agricultural extension is characterized by poorly motivated staff, a preponderance of non-extension duties, inadequate finances, the absence of legislative policy for the coordination of work between the management of agricultural extension and other organizations, the dense bureaucratic procedures in the relations between the extension and other organizations ,insufficient communication with other organizations. Because of top-down model creates a rigid hierarchy, which discourages the feedback of information (Kizilaslan *et al.* 2007). On the other hand, the weaknesses in the present agricultural extension system, there was a very weak linkage between research and extension wings and there existed low coordination between them (Nisar *et al.* 2004). In addition, there is a fundamental lack of appropriate training in the roles and responsibilities of agricultural extension officers on sustainable agricultural development (Azizah, 2011). Also the numbers of field staff working in the agricultural extension management are not enough when compared to the large number of farmers. This is because of the very low salary and the lack of incentives for field staff (Cho *et al.* 2004). There is a need for educational Programs and training courses for farmers on sustainable agricultural, because farmers lack the skill and knowledge on improved agricultural practices .This had resulted in deficiencies in some technical and managerial skills of farmers because they were unable to access production information routinely (Owona *et al.* 2010).

Economical factors such as high cost of consultancy services for farmers and lack of access to financial resources by farmers were identified as other barriers to the effectiveness of Sustainable agricultural development (Rasouliazar *et al.* 2011). A financial resource, as one of the main factors of production, is necessary to purchase farm inputs and to undertake development work necessary to enhance the competitiveness of farms. The degree of access to this resource will undoubtedly influence farming decisions. Where capital is not easily available from Farmers resources, credit is an alternative (Ganpat *et al.* 2000). Issues surrounding credit use very limited is available from commercial banks and individuals, and only at high interest rates. This situation is even worse for small farmers who cannot provide the credit guarantees required by creditors (Betru, 1996). Also unavailable Procedures for payment of Agricultural Credit loans are still very distressing and need to be streamlined (FAO, 2002). In addition to Market failures also result from the limited capacity of Farms to pay for services and the imperfections prevailing in output, input and credit markets. Market imperfections severely limit farmers' ability to access new technologies, equipment and inputs (Rivera *et al.* 2004).

Conclusion

Major barriers hampering adoption of sustainable agricultural development, included little financial returns for farmers, low farmer knowledge with respect to sustainable agricultural development, problems of administrative , financial to agricultural extension management and low extension staff knowledge with respect to sustainable agricultural development, who found that management of agricultural extension needed more solutions with respect to sustainable practices particularly in the area of the economics of sustainable agricultural development.

Conflict of Interest

Authors would like to declare of no conflict of interest associated with this study.

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Recommendations

The proposed solutions are as follows: Specialized technical committees composed of the management of agricultural extension, education organizations, agricultural credit organizations and farmers' organizations for planning and implementing of programs of agricultural extension to achieving of sustainable agricultural development, The Promotion and the participation of the low level staff in the management of Agricultural Extension in the usual decisions and providing an independent budget for operating expenses, Provide training courses for employees and farmers focusing on sustainable agricultural development through field schools (classroom training and on-farm and field visits), by coordination with education organizations (universities and research centres), Initiating contracts and agreements Between the Management of Agricultural Extension and private sector organizations to increase financial resources, Participation in the reform of agricultural markets to stabilize farmers' incomes, The use of direct funding for national priority programs, including the introduction of new technologies and developing production, Support of micro-credit institutions especially through linkage with commercial banks that would enhance credit delivery to farmers.

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