Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

Training Needs of Extension Agents in AL Diwaniyah Province, Iraq

https://dx.doi.org/10.4314/jae.v22i2.11

Kshash Bassim Haleem
Agricultural College. Al_Qasim, Green University, Babil, Iraq
Email: bassimhaleem@y
Phone: +9647811970465

Abstract

The study assessed the training needs of extension agents in AL Diwaniyah province. Interview schedule was used to collect data from 60 extension agents through face-to-faces interaction. The collected data were analyses using frequency, percentage, weighted arithmetic mean, simple correlation. Findings revealed that forty-five of the respondents had medium training needs. The respondents had a high level of training needs in the area of post-harvest technology, integrated pest management (IPM), information and communication technology (ICT), value addition of agricultural commodities, floriculture management, marketing of agricultural commodities, protected agriculture, planning and implementation agricultural extension programmes, climate change, fish farming technologies, organic agriculture, and determination of farmers training needs. significant and negative correlation was investigated between training need and educational qualification, years of experience, and number of training attended. The study recommends that training courses should be conducted for extension agents in areas where respondents showed a middle and high training needs.

Keywords: Competency ,Extension areas, In-service training , Iraq.

Introduction

Agricultural extension remains one of the prime movers of agricultural development. Extension agents represents a core labor force in the activities and programmes of agricultural extension. The effectiveness of extension services is highly dependent on the preparedness and professional competencies of extension agents (Jasmin et al.,2013; Okoedo and Edobor ,2013; Hoffmann, 2014). For any extension organization to improve its performance a continuous and systematic training of it staff is necessary (F.A.O. 2001).

The main factor limiting of the success of training programmes for extension agents in developing countries is the inadequacy of information on their training needs (Woods , 1988 ;Allo,2001; Olatunji et al.,2015 ; Catherine et al.,2017). Therefore, if extension agents are to improve their on the- job effectiveness, they must receive continuous in service training in line with their training needs (Mohammad et al.,2006; Amirhossein and Zarafshani ,2008) .

Some recent studies identified the need for training of extension gents(Inne et al.,2018; AL-Zahrani et al.,2017; Chikaire et al.,2017; Anka,2016; Ayesha et

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

al.,2016; Kehinde and Laseinde 2015; Mariappan et al.,2015; Okeowo,2015; Robert and Ahmad,2015; Said and Waman,2015; Abbasi et al.,2014; Jamagani et al.,2014; Dinesh et al.,2013; Haruna and Abdullahi,2013; Mary et al.,2013; Musa and Khalid ,2013; Abdulhamid and Emmanuel, 2012; Adisa and Balogun,2012; Ja'afar et al.,2012; Muhammad et al.,2012; Nongtdu et al.,2012; Azizah,2011; Muhammad et al.,2011; Ovwigho,2011; Michael and Gibson,2010)

Agricultural sector in Iraq faces many challenges, the most important of which is the decline in production and productivity, which happened mainly due to ineffective extension services, and poor rehabilitation and training of extension agents. Therefore, there is the need to examine the training needs of extension agents in Iraq in order to enhance their skills and expertise. The study was undertaken to identify the "training needs of extension agents in Diwaniyah province/ Iraq" The Specific objectives of the study were to:

1- assess the training needs of extension agents; and
2- examine the relationship of selected characteristics of extension agents with training needs.

Methodology

The study was carried out in Diwaniyah province, in the center-south of Iraq between longitude 31.17 to 32.24 North latitude and 44.24 to 45.49 East. The population for this study consisted of 70 extension agents working in the province, (10) were chosen for testing the questionnaire reliability. All the (60) remaining, were involved in the study. to provide data from 15-25 August, 2017.
The instrument used was a two-part questionnaire. The first part included some extension agents' characteristics: gender, field of study, educational qualification, years of experience in extension services, and number of training attended. The second part listed 30 area of agricultural extension

Content validity of the questionnaire was established by a panel of experts in the field of agricultural extension. A pilot study was conducted to establish reliability of the instrument, a Cronbach's alpha (a reliability coefficient) of (0.91) was established, indicating the instrument used was reliable and valid.
Training needs was measured on a 5-point Likert-type scale of very highly needed (4), highly needed (3), moderately needed (2), slightly needed (1), and not needed (0). Each respondent was given a score relation to their grading of training need, and a weighted mean (W.M.) score were determined out for each statement. Based on the score for area, respondent categorized in to 3 groups according to their training needs: low (0-40), medium (41-81) and high (82-122). The 30 area of training needs were categorized in to 3 groups: low (0-1.3), medium (1.4-2.7), and high (2.8-4). The index values of observations were represented by the mean score.

Data were analysed using frequency, percentage ,mean , standard deviation(SD), and person correlation coefficient . Training needs of extension agents were analysed separately, weighted mean score were calculated, the relative importance ranked in descending order.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

Result and Discussion

Characteristics of Extension Agents

The majority (75%) of respondents were male. The field of study of 66.7% were non-agriculture extension. Educational qualification of 66.7% of extension agents were the Bachelor's Degree in agricultural science (BSc). The experience of respondents as extension agents ranged from 4 to 31 years, with a mean of 14.8 years, 75%had more than 10 years' experience. All extension agents have attended between 1 to 20 in-service training programmes with a mean of 11.8, the majority (65%) had attend more than 10 in-service trainings.

Table 1: Extension agents' characteristics

Characteristics		Percentage(n=60)
Gender	Male	75
	Female	25
Field of study	Agricultural Extension	33.3
	Non Agricultural Extension	66.7
Educational qualification	Agriculture Secondary school	8.3
	BSc in agricultural science	66.7
	Higher diploma in agricultural extension	20
	MSc in agricultural science	5
Years of experience	4-10	25
	11-17	46.7
	18-24	20
	25-31	8.3
Number of training attended	1-5	8.3
	6-10	26.7
	11-15	45
	16-20	20

Training Needs of Extension Agents

Table 2 shows that 45% of the respondents indicated medium need for training on some extension areas while 38.3%, indicated high, and 16.7% indicated low training needs. The average needs for training for all respondents was 69.88% which is within medium level of values ranging between (0-120) numeric value.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

Table 2: Distribution of respondents according to their levels of training need

Training need Categories	%(n=60)	Mean	SD
Low (0-40)	16.7	29.71	9.2
Medium (41-81)	45	55.22	13.5
High (82-122)	38.3	104.12	11.9
Overall	100	69.88	29.08

With respect to agricultural extension areas in which extension agents needs training, the data were presented in Table 3 with their rank order.
The important areas in which they required training most essentially(high level) were ; post-harvest technology ,integrated pest management (IPM), Information and communication technology (ICT),value addition of agricultural commodities, floriculture management , marketing of agricultural commodities ,protected agriculture, planning and implementation agricultural extension programmes, climate change, fish farming technologies, organic agriculture ,and determination of farmers training needs. However, the least important areas (low level) were: poultry farming, non- tillage, methods and process of agricultural extension communication, and dairy farming.

One of the challenges faced by farmers in developing countries is high postharvest losses. Farmers have been losing between 30% and 80% of their crops, fruits and vegetables before
they reach the final consumer (Kumar et al.,2006; Weinberger et al., 2008; Kitinoja and AL Hassan,2012; Willis et al.,2015; Taiwo and Bart,2016). These losses are observed at harvesting, during packing, transportation, in wholesale and retail markets, and during delays at different stages of handling. The main reason for post-harvest losses is lack of proper technical knowledge The effectiveness of extension service delivery in the postharvest horticulture sector, however, largely depends on the adequacy of extension workers and technical experts on postharvest handling(Dormita and Bautista,2016).The post-harvest loss prevention extension challenge displays multiple dimensions ,extension agents are increasingly involved in providing educational programmes and training activities on postharvest topics, so, they need more training in this area.

Reducing crop losses due to pests is one of agricultural producers aims. Integrated pest management (IPM) has been considered as the best method to do so. Its primary goal is to control destructive pest populations while simultaneously eliminating or reducing the use of chemical pesticides.
IPM implementation also faces the constraints of training and knowledge experienced mostly by farmers and extension agents (Catherine,2005; Rahman,2012).
A large number of farmers had moderate to low level of knowledge about climate change (Nwobodo and Agwu ,2015 ; Sujit and Padaria , 2015). There is an increasing need for climate change-related extension programmes and activities. According to Hossein and Knierim (2015) farmers access to information on climate change through extension agents creates more awareness and favorable condition for adoption of those farming practices that are suitable under climate change.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

Although most of extension agents has excellent knowledge about climate change (Ogunlade, Abdulwahab & Mensah, 2014), a large number need training on climate change (Adisa and Balogun,2012; Onyeme and Iwuchukwu ,2012).
Fish farming activities has seen a rapid increase in the number, area and production of fish farms.Fish farmers require periodic update and upgrading of their technical knowledge and skill, they need training to remove barriers, improve technical competency and efficiency for better resource utilization, increase productivity and performance (Ifejika, Uzokwe & Oladosu,2013) . Improving production and productivity of fish farms can only by the introduction of modern technologies. Akangbe et al.,2015 concluded that use of fish improved technologies had positively influenced fish production output of fish farmers and increased profit/ income via higher yield/harvest.in developing countries fish farmers depend upon extension agents in access to improved information, practices and technologies, so , extension agents should be trained in this aspect.

dissemination of organic farming system required farmers access to essential knowledge on efficient ways, sustainable means and support structures that encourage organic practices and incentives to adopt them, which is becoming a top priority of extension activities.

The effectiveness of extension service delivery is critically dependent on the knowledge of extension agents on the various agricultural innovations they disseminate to farmers (Oladele and Tekena,2010). Organic farming is a new farming system which requires some specific knowledge and skill. Extension agents reported a training need to upgrade their knowledge and skills in areas of organic farming practices.

Successful extension activities are established on the actual farmer's needs, so, extension agents should know how to determine farmers training needs.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

Table 3: Weighted mean and level of training needs in areas of agricultural extension

Areas of training needs	W.M
Post-harvest technology	3.9***
Integrated pest management (IPM)	3.8***
Information and communication technology (ICT)	3.7***
Value addition of agricultural commodities	3.7***
Floriculture management	3.7***
Marketing of agricultural commodities	3.6***
Protected agriculture	3.5***
Planning and implementation agricultural extension programmes	3.4***
Climate change	3.2***
Fish farming technologies	3.1***
Organic agriculture	3.0***
Determination of farmers training needs	2.8***
Livestock production and disease control	2.6**
Management and soil conservation	2.3**
Management of horticulture crops	2.2**
Irrigation methods and water conservation	2.1**
Use of social media	2.0**
Recording and reporting	1.8**
Research methodology	1.7**
Evaluation of agricultural extension programmes	1.6**
Beekeeping	1.5**
Foundations and principles of agriculture extension	1.5**
Farm management	1.5**
Management of vegetable crops	1.4**
Food industries	1.4**
Agricultural extension methods	1.4**
Poultry farming	1.3*
Non tillage	0.9*
Methods and process of extension communication	0.8*
Dairy farming	0.6*

***= high; **=medium; *=low.

Relationship Between Selected Characteristics of Extension Agents and Training Needs

Coefficient of correlation was computed in order to explore the relationships between the overall training needs score of each of the respondents and selected characteristics of the extension agents (Table 4). It was observed that sex and field of study was not significantly related to training needs of respondents. While a significant and negative correlation between training need and educational

Journal of Agricultural Extension
Vol. 22 (2) June, 2018
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
Email: editorinchief@aesonnigeria.org

qualification, years of experience, and number of training attended which indicates that with the increase in these variables, the training needs will decrease and vice-versa. Extension agent who have more educational qualification, years of experience, and number of training attended, needed less training.

Table 4: Correlation coefficient of selected characteristics with training needs

Characteristics	Correlation coefficient (r)
Sex	0.149
Field of study	0.117
Educational qualification	- 0.387*
Years of experience	- 0.461*
Number of training attended	- 0.325*

*P≤0.05.

Conclusion and Recommendation

The majority of respondents had medium and high training needs. Extension agents perceived high level of training in the following areas; post-harvest technology ,integrated pest management (IPM), Information and communication technology (ICT),value addition of agricultural commodities, floriculture management , marketing of agricultural commodities ,protected agriculture, planning and implementation agricultural extension programmes, climate change, fish farming technologies, organic agriculture ,and determination of farmers training needs. Educational qualification, years of experience, and number of training attended showed significant and negative correlation with training need.
Training course should be conducted for extension agents in areas where respondents showed a middle and high training needs. More similar studies should be conducted in another provinces to know perceived training needs of extension agents in various extension areas..

References

Abbasi R., A. Ahmadpour, A. Sharifzadeh and A. Norouzi , (2014).Determine educational-professional needs for extension agents and agricultural experts Tobacco Company in Mazandaran and Golestan provinces with model Burich . European Journal of Experimental Biology, 4(3):263-268.

Abdulhamid A. and H. Emmanuel, (2012).Assessment of the training needs among agricultural extension workers in Gombe state agricultural development programme . *Journal of Science, Technology and Education*,1(1):105-111.

Adisa R. and K. Balogun ,(2012). Analysis of training needs of extension agents on climate change issues in Ekiti State Agricultural Development Project (EKSADP), Nigeria. J*ournal of Agricultural Extension*,16(2):24-33. http://dx.doi.org/10.4314/jae.v16i2.3

Akangbe J., G. Ajiboye and S. Komolafe,(2015). Effects of improved fish production technology on the output of fish farmers in Ilorin, Kwara State, Nigeria. *Ruhuna Journal of Science*,6:50-62.

Allo, A.V. (2001). Professional requirements of the extension worker in training the extension worker. FFTC Extension Bulletin, No. 173.

Al-Zahrani K., F. Aldosari , M. Baig , M. Shalaby , and G. Straquadine, (2017).Assessing the competencies and training needs of agricultural extension workers in Saudi Arabia. *Journal of Agricultural Science and Technology*,19(1): 33-46.

Amirhossein A. and K. Zarafshani, (2008).Training needs of Iranian extension agents about sustainability: The use of Borich's need assessment model. *African Journal of Agricultural Research*,3(10):681-687.

Anka L., (2016).Analysis of training needs of extension agents on climate change issues in Zamfara agricultural development project (ZADP) Nigeria . *Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Science,* 32 (1): 66-74

Azizah S.,(2011).Training needs assessment of agricultural extension officers in Animal Husbandry Department of Malang Regency, East Java-Indonesia. *Journal of Agricultural Extension and Rural Development* ,3(8):147-152.

Ayesha C., M. Ahmad, T. Ali and M. Zafar, (2016).identification and prioritization of training needs of agri. extension personnel working in the Punjab, *Pakistan .Journal of Agricultural Research*, 54(2):313-320.

Catherine P., K. Frempong, M. Magheni, R. Agunga and C. Igodan, , (2017). The role of agricultural extension in Africa's development, the importance of extension workers and the need for change. *International Journal of Agricultural Extension*, 5(1):59-70.

Catherine N. M. (2005). Challenges in the implementation of integrated pest management: the need for enabling structures and strategies in developing countries. *International Journal of Agriculture and Rural Development* ,6(1):142-150. http://dx.doi.org/10.4314/ijard.v6i1.2601 .

Chikaire J., J. Oparaojiaku and N. Chikezie , (2017). Agricultural value chain training needs of front-line extension professionals in Imo State, Nigeria. *International Journal of Sustainable Development*,11(3):93-100.

Dinesh Y., P. Sood, S. Thakur and A. Choudhary, (2013). Assessing the training needs of agricultural extension workers about organic farming in the North-Western Himalayas. J*ournal of Organic Systems*, 8(1):17-27. http://www.organic-systems.org/journal/81/8104.pdf

Dormita R. and O. Bautista, (2016).Nature and extent of extension delivery on postharvest handling of horticultural perishables in the Philippines. *Asian Journal of Agriculture and Development*,13(1):87-103.

Food and Agricultural Organization (FAO) (2001). Global consultation on agricultural extension services. *A Journal of extension Education* 2 (3); 11 – 14

Ja'afar M., J. Neils, D. Mojaba, A. Sulaiman and J. Shall, (2012). Training needs assessment of mid-career agricultural extension officers: Evidences from Sasakawa Africa Fund for extension education (SAFE) intervention in North-

east Nigeria. *Journal of Agricultural Extension and Rural Development*, 4(18):471-477. DOI: 10.5897/JAERD12.008

Jamagani Z. , R. Sani, D. Omokore ,and N. Achi (2014). Training needs of extension workers: A case study of Maigana and Samaru zones of Kaduna state agricultural development project. *Journal of Animal Production Research*,26(1):46-53.

Jasmin A., A. Asmuni and A. Ismail (2013). Roles of extension agents towards agricultural practice in Malaysia. *International Journal on Advanced Science Engineering Information Technology* ,3(1):59-63

Haruna S. and Abdullahi Y.(2013). Training of public extension agents in Nigeria and the implications for government's agricultural transformation agenda. *Journal of Agricultural Extension*,17(2):98-104. http://dx.doi.org/10.4314/jae.v17i2.13

Hoffmann, V. (2014). Governmental extension services, their generic problems and potential solutions. International conference proceeding : Innovations in extension and advisory services:15.-18. November .Nairobi, Kenya.

Hossein M. and A. Knierim (2015). Risk communication for farmers' adaptation to climate change : a new task for agricultural advisory services. *International Journal of Performability Engineering*, 11(6):533 -547.

Ifejika P.,U. Uzokwe and I. Oladosu (2013). Training needs of table size fish farmers operating in Niger State, Nigeria. *World Rural Observations*,5(4):108-113.

Inne L., R. Bordoloi, Pankaj M., Rajkumar S. and Ram S., (2018).Training needs assessment of agricultural extension personnel in Arunachal Pradesh, India . *International Journal of Current Microbiology and Applied Sciences*,7(1):1684-1694. https://doi.org/10.20546/ijcmas.2018.701.204

Kehinde A., A. Laseinde, (2015). Training needs assessment on the use of social media among extension agents in Oyo State, Nigeria. *Journal of Agricultural Informatics*, 6(1):100-111 . doi:10.17700/jai.2015.6.1.144

Kitinoja, L. and AL Hassan, H., (2012). Identification of appropriate postharvest technologies for improving market access and incomes for small horticultural farmers in Sub-Saharan Africa and South Asia. Part 1: Postharvest losses and quality assessments. *Acta Horticulturae*, 934:31–40. DOI: 10.17660/ActaHortic.2012.934.1

Kumar D., Basavaraja H. and Mahajanshetti S., (2006). An economic analysis of post-harvest losses in vegetables in Karnataka. *Indian Journal of Agricultural Economic*,61(1): 134–146.

Mariappan K., J. Kumar, P. Anand and J.Paul, (2015). Training needs of extension personnel in Pacific white shrimp (Litopenaeus vannamei) farming. *Fishery Technology*,52(4) : 265 – 270.

Mary L.,C.Onyango and J. Kibett , (2013).Extension management competency needs of agricultural extension agents in Kenya. *Mediterranean Journal of Social Sciences*,4(6):11-20 . Doi:10.5901/mjss.2013.v4n6p11

Michael H., and J. Gibson, (2010). A needs assessment of aquaculture extension agents, specialists, and program administrators in extension programming. *Journal of Extension* , 48(2), Article 2FEA6.

Mohammad C.,A. Hossein and D. Breazeale, (2006). Analysis of the training needs of multi-functional extension agents associated with sustainability. J*ournal of International Agricultural and Extension Education*,13(1):51-58. DOI:10.5191/jiaee.2006.13105

Muhammad Z., K. Nawab, A. Khatam, M. Qasim, G. Ayub and N. Nawaz, (2012). Communication gap and training needs of Pakistan's agricultural extension agents in horticulture. *Sarhad Journal of Agriculture*,28(1): 129-135.

Muhammad Z., Z. Ul Haq, N. Khan, U. Pervaiz and M. Khan, (2011).training needs of agricultural extension agents in Khyber Pakhtunkhwa. *Sarhad Journal of Agriculture*,27(1): 133-137.

Musa A., and A. Khalid, (2013).Training needs assessment of extensionists in Gezira Scheme, Sudan. *Journal of Agricultural and Veterinary Sciences*,14(1):52-60.

Nongtdu G., R. Bordoloi, R. Saravanan, R. Singh ,and N. Singh, (2012).Training needs of agricultural extension personnel in Meghalaya. *Indian Journal of Hill Farming* 25(1):1-8.

Nwobodo C. and A. Agwu, (2015). Knowledge level of youth farmers on climate change in Benue state of Nigeria. *African Journal of Agricultural Research*, 10(30):2875-2881.

Ogunlade I., S. Abdulwahab and A. Mensah,(2014). Knowledge levels of extension agents and their perceived impact of climate change on extension service provision in Ghana. *Ethiopian Journal of Environmental Studies & Management* 7(1):96-103. doi: http://dx.doi.org/10.4314/ejesm.v7i1.12.

Okoedo O.and E. Edobor , (2013).Identification of Communication Needs of Extension Agents in Ondo State Nigeria .*Journal of Agriculture and Veterinary Science* ,4(1):1-6.

Oladele O. and S. Tekena, (2010). Factors influencing agricultural extension officers' knowledge on practice and marketing of organic agriculture in North West province, South Africa . *Life Science Journal*,7(3):91-98.

Olatunji, S., F. Onumadu and C. Ifeanyi, (2015). Job performance and job satisfaction of agricultural extension agents in Rivers State Agricultural Development Project (ADP). *Journal of Agriculture and Veterinary Science*,8(1):50-55.

Onyeme N. and J. Iwuchukwu, (2012). Responsiveness of extension workers to climate change in Anambra state, *Nigeria. Journal of Agricultural Extension*,16 (1):88-102. http://dx.doi.org/10.4314/jae.v16i1.10.

Ovwigho B., (2011).Training needs of agricultural extension agents in the central agricultural zone of Delta State Nigeria. *International Journal of Rural Studies*,18(1):4-9.

Rahman M.,(2012).Problems and suggestions for farmers' adoption of IPM practices in Rice *(oryza sativa* L) cultivation. *Bangladesh Journal of Agricultural Research*.37(1):121-128. DOI: http://dx.doi.org/10.3329/bjar.v37i1.11183

Robert A. and R. Ahmad, (2015).Training needs of Indonesian agricultural extension workers for the 21st Century: A recommendation based on a field study. *Asian Journal of Agriculture and Development*, 12(2):45-57.

Said H. and G. Waman, (2015).Training needs of agricultural assistants working in State Department of Agriculture. *International Journal of Science and Research*, 4(5): 1547-1549.

Sujit S. and R.Padaria,(2015).Measuring farmers' awareness and knowledge level about climate change and formulating future extension strategies. *Indian Research Journal of Extension Education*, 15 (1):107-111.

Taiwo A. and A. Bart-Plang, (2016). Factors responsible for post-harvest losses and their effects on rice producing farmers: A case study of Afife and Aveyime rice projects in the Volta region of Ghana. *International Research Journal of Engineering and Technology*,3(4):1014-1021.

Weinberger K, Genova C and Acedo A, (2008). Quantifying postharvest loss in vegetables along the supply chain in Vietnam, Cambodia and Laos. *International Journal of Postharvest Technology and Innovation*, 1(3**)**:288–297. DOI: 10.1504/IJPTI.2008.021463

Willis Owino, Victor Afari-Sefa, and Ngoni Nenguwo, (2015).Postharvest loss assessment of vegetables in Kenya. The first international congress on postharvest loss prevention, Oct 4-7, 2015, Rome, Italy.

Woods, J.(1988). Making rural development projects more effective: A management systems approach. *Journal of Extension Systems*, 4(2):3-28.