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Efficiency of some extension methods in adopting planting edible crops (Millet and Sorghum) in Sheikan Locality, Sudan

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ABSTRACT

The present study was conducted in Sheikan locality at North Kordofan State during the period 2014 – 2016. The main objective of the study is to identify the efficiency of some extension methods in convincing farmers to adopt planting some selected improved crops varieties. Seven villages were selected represent 5% of the total number of the locality villages. Ten percent from the total head households were selected as sample. The respondents from each village were selected randomly. Two sources were used to obtain the require information, primary and secondary sources. Statistical Package of Social Sciences (SPSS) was used for data analysis and results obtaining. The results showed that all the respondents confirmed that farming is their main job and used traditional practices, 47.3% of the respondents indicated that the demonstration farms is the most suitable and effective method to

convince farmers for practicing planting improved varieties. The results of Chi-square Test showed significant differences among the respondents towards using farmer's schools as effective method in adopting planting improve millet and Sorghum seeds: (X^2=6.839, P=0.009) and (X^2=4.390, P=0.036) respectively. Also Chi- squire test revealed significant differences regarding use of demonstration plot with improve sorghum variety (X^2 = 5.869, P = .015), while showed significant differences regarding use of field trips with improve Millet seed. (X^2 =3.673, P=.055) A number of recommendations were drawn from the study, among them are: Concentration on using demonstration fields and farmers field schools.

Keywords: Adoption, edible crops, Extension methods, Sudan

1. INTRODUCTION

Agricultural extension is an ongoing process of accessing useful information and raising productivity for agrarian people to identify problems and opportunities, sharing information (Seminar & Systems, 2006) through use of variety of communication methods(Journal, Sciences, & Publications, 2012) and then assisting those farmers to utilize this information or technology for improvement of their quality of life (Project & Strengthening, 2008). The reasons for low yields in most developing countries are non-adoption of latest agricultural technologies and poor farm management by farmers (Jafry, Moyo, & Mandaloma, 2014). These might be attributing to the inadequate performance of public extension to an incentive failure on the part of extension agents. The failure derives from the fact that in most public systems, agents are nominally accountable to their superiors (who may often not be attentive to effective supervision), and are only indirectly (if at all) accountable to their farmer-clients (Feder, Anderson, Birner, & Deininger, 2010) lack of information adapted to local needs and lack of technical knowledge at farm level which can be enhanced considerably if the latest agricultural technologies are communicated to the farmers through an efficient extension method (Khatam, Muhammad, & Ashraf, 2013). Agricultural extension services (including traditional extension, consultancy, business development and agricultural information services) are expected to disseminate these technologies amongst their clients (Directorate of Agricultural Extension Services, 2013). There is now a much-reduced emphasis on uniform messages (such as those provided by the T&V system). The need to involve farmers more in the extension process itself has been recognized for some time and a number of participatory and facilitation approaches have been developed. In addition, farmers need extension on a diverse range of rural development options including information on markets, rural industry and other income opportunities (Chapman & Tripp, 2003). To achieve increased production and improved processing in all the sub-sectors of agriculture (crop, livestock), improvement of quality of life and promotion of environment friendly practices and other objectives require effective extension effort (Koyenikan, 2009).

The objective of this paper is to assess and identify efficiency of some extension methods in adopting planting of Millet and Sorghum in area of study.

2. METHODOLOGY

Study site description

North Kordofan State is located in the central part of Sudan(Net, 2013)Arid and semi–arid zones that cover the largest part of this State(Hamad, 2018). It lays between latitudes 12º 14'and 16º 30'N, longitudes 27º and 32º 35'E (Zeinelabdein & Elsheikh, 2015) Figure1. The average annual rainfall is about 300-mm in the sandy soil while in 400mm in clay soil (annual report, 2014). The population is 2.04 million and 79% of them depend on agricultural activates in rain fed sectors as main sources for livelihoods, the State contribute 10% in exportation from total non petroleum products (annual report, 2014). The major crops grown are millet and sorghum (food crops), groundnut and sesame (cash crops) on the other site Gum Arabic production and forest and Non Timber Forest Products (NTFPs) contribute significantly to livelihood. Animal raised are mainly sheep, camels, and goats (Hamad, 2018) Sheikan locality (the study area) is one of the nine localities; it is located in the southern part of the North Kordofan State. Elobeid is the capital of the state. Sheikan locality lies between the latitudes 12º 30 – 3º 30 and longitudes 29- 30- 30˚ 30 it shares boundaries with four localities; Bara, Umrawaba, Ennuhoud, and Dilling from north, east, west and south respectively, with a total area of 93000 km2, (ADS, 1993).

Sampling procedure and data collection

This study targeted the administration units of Skeikan locality. Seven villages were selected represent 5% from the total number of the locality villages (138). 10% out of the total head households (1299) were selected as a sample of the study (129) farmers. The respondents from each village were selected using simple random technique, Table 1. Two sources of data were adopted; primary and secondary data; the primary data was collected via well designed constructed questionnaire, general observations and group

discussions. Secondary data was obtained from related books, references, reports, workshops, scientific journals and internet websites. Statistical package of social sciences (SPSS) was used for data analysis considering descriptive statistic and Chi-squire Test.

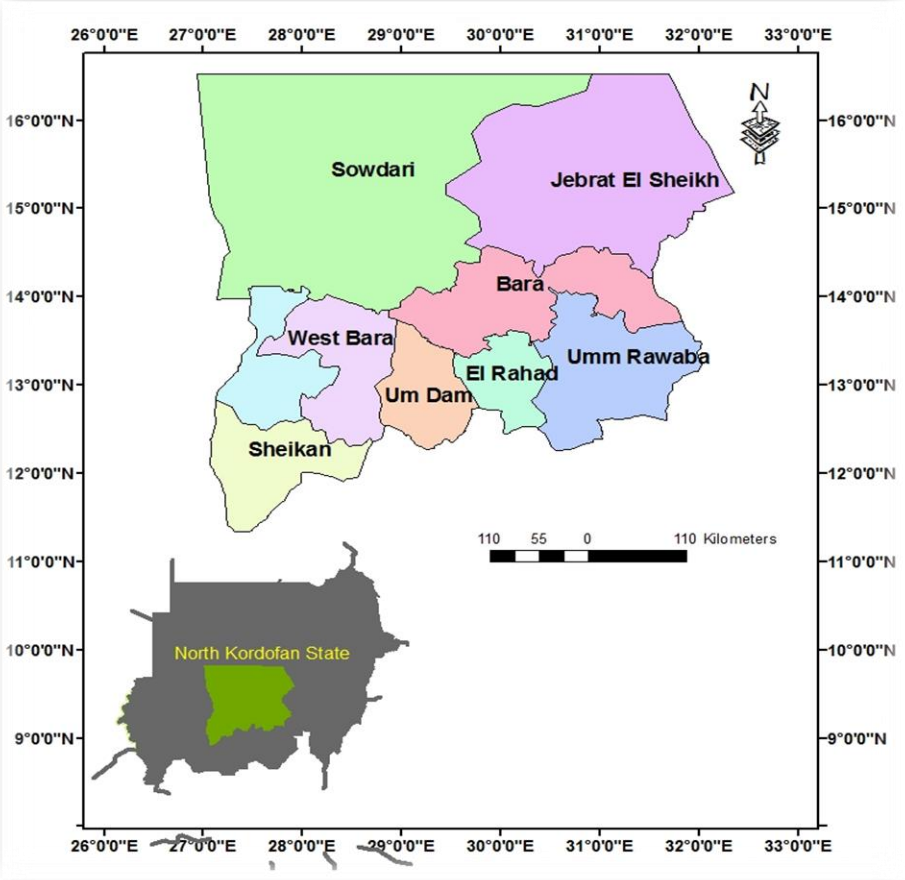

Figure 1 Study Area

Table 1 shows the village name, total number of households in each village, % sample size, and number of respondent in the sample.

Villages Name	Total No. households	% sample size	No. in Sample
El Dmokia	303	10	30
El Karbab	152		15
El Dikia	178		17
Erafat Salim	116		12
Faris	230		23
Gisaba	200		20
El Edate	120		12
Total	1129		129

Source; (Author, 2017)

3. RESULT AND DISCUSSION

Figure 2 indicated that the 98% and 88.8% from the respondents practices local methods in planting both millet and sorghum respectively, this may attributed to farmers in the study area are not received extension packages regarding these practices or not convinced with the modern way. The results revealed that majority of the respondents 76%received agricultural services from extension and 74.4% of these services in form of agricultural inputs, Figure 4, this mean that extension system in the area is responsible to deliver agricultural services to farmers to make them experts in their farm this result confirmed what had been said by (Gerba Leta, Girma Kelboro, 2017) agricultural extension in Sudan is playing a crucial role in agricultural development and rural

transformation. Also results showed that 72.9 and 41.9% from the respondents adopted local varieties for both millet and sorghum respectively, Figure 3. This in line with(Ali-olubandwa, Kathuri, & Wesonga, 2011) which noted that the extension service is charged with the responsibility of ensuring sustainable food production through promoting local practices and provided improved seed that is sufficient for domestic use and for export.

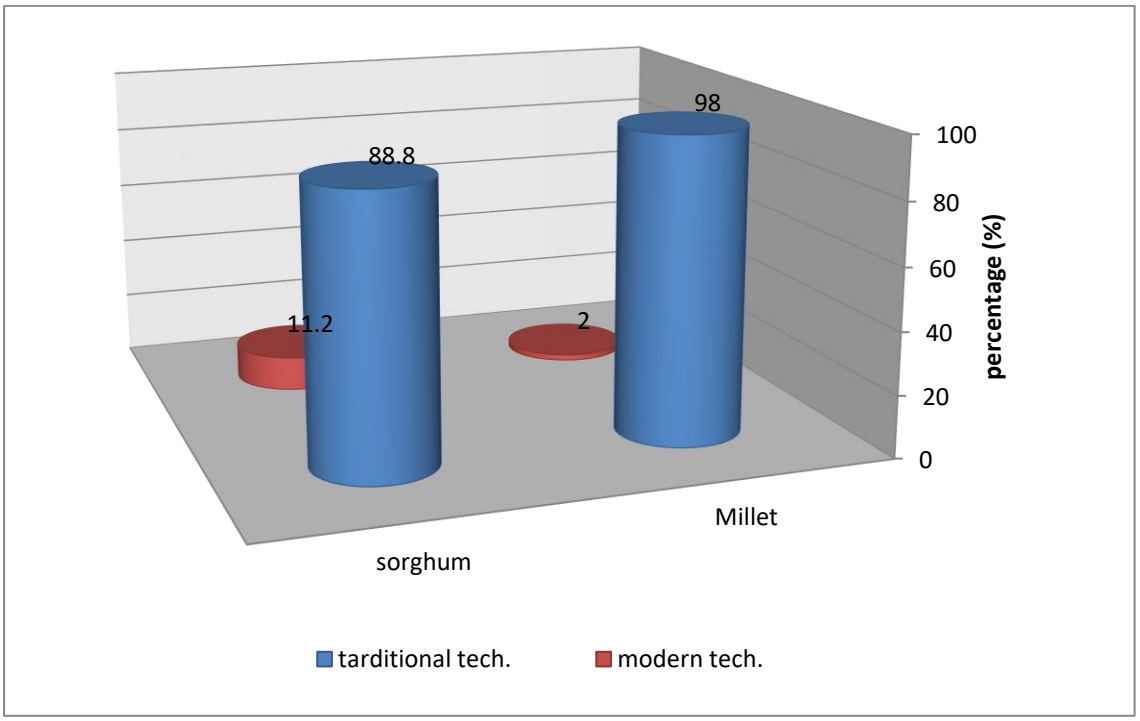

Figure 2 Showed the Comparison between technique used for planting Sorghum and Millet

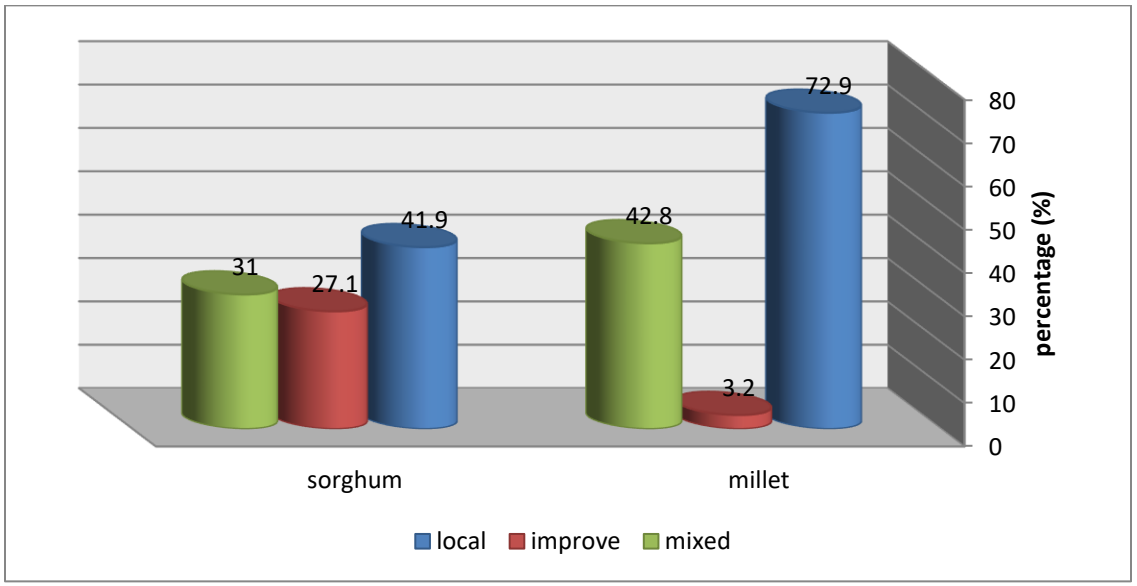

Figure 3 Varieties of millet and sorghum planted in the area

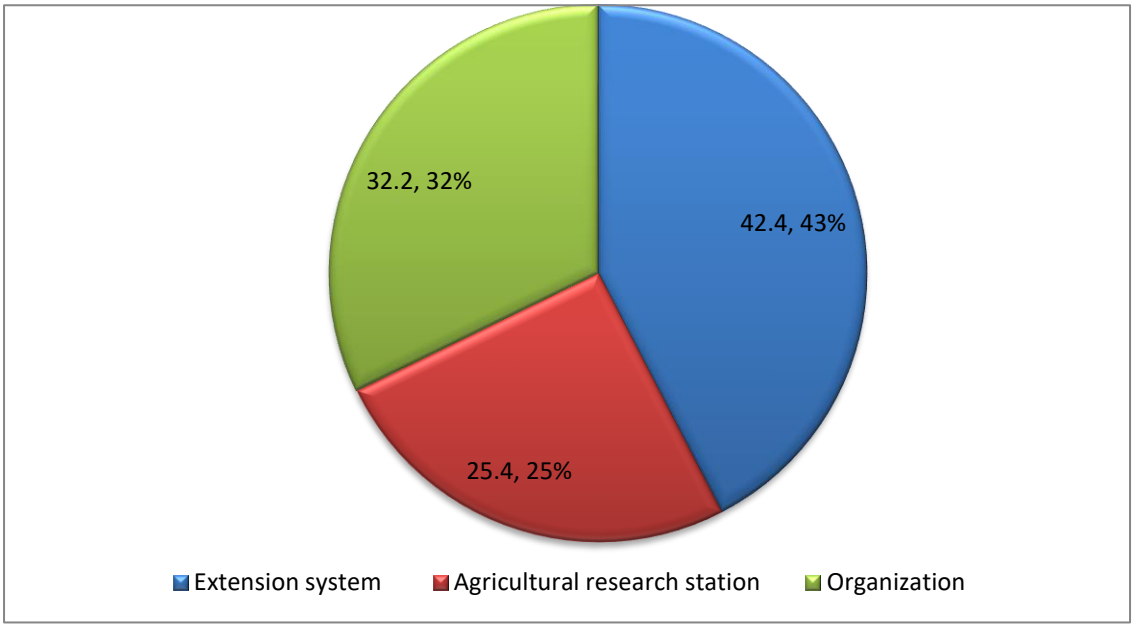

Figure 4 Sources of accessing agricultural information

The results of Chi-squire in the following tables 2,3,4,5,6,7, and 8 depicted that strong association between different extension methods followed by framers and adoption of modern technology which reflected in their agricultural production, this in line with (Project & Strengthening, 2008) It is not enough for an extension agent to have technical knowledge; he must also know how to communicate this knowledge and how to use it for the benefit of the farm family. In Sudan a range of approaches to extension delivery (bottom up approach is more participatory approaches) have been promoted over the last years by the various extension service providers, including government extension offices, non-governmental organizations (NGOs) and research center(State, 2017). Appropriate extension methods encourage setting with farmer to know what in their mine and practice with them the appropriate methods for adoption, therefore adopting of learning by doing is more effective's approaches to accelerate the adoption process. Agricultural Innovations System (AIS) develop human resources and at the same time serve as a source of knowledge and technology, the absence or decline of these institutions responsible for knowledge transfer leaves a large gap in a country's innovation capacity(Adam, Hamad, Mohamed, Ibrahim, & Abutaba, 2015).

Table 2 Chi-square Test for significant effects of FFSs on plantation of improved millet crop

		Millet crop		Total	Sig.
		Local	Improved		
FFSs	Exposure	12	2	14	.009
	Not exposure	82	1	83	
Total		94	3	97	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 *value*= 6.839

Table 3 Chi-square Test for significant effects of extension leaflets on plantation of improved millet crop

		Millet crop		Total	Sig.
		Local	Improved		
Extension leaflet	Exposure	12	3	15	.001
	Not exposure	82	0	82	
Total		94	3	97	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 *value*= 16.92

Table 4 Chi-square Test for significant effects of Field visits on plantation of improved sorghum crop

		Sorghum crop		Total	Sig.
		Local	Improved		
Field visits	Exposure	1	4	5	.05
	Not exposure	31	53	84	
Total		32	57	89	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 value= 3.673

Table 5 Chi-square Test for significant effects of office visits on plantation of improved sorghum crop

		Sorghum crop		Total	Sig.
		Local	Improved		
Office visits	Exposure	3	8	11	.015
	Not exposure	51	27	78	
Total		54	35	89	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 value= 5.869

Table 6 Chi-square Test for significant effects of demonstration plots on plantation of improved sorghum crop

		Sorghum crop		Total	Sig.
		Local	Improved		
Office visits	Exposure	3	8	11	.015
	Not exposure	51	27	78	
Total		54	35	89	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 value= 5.869

Table 7 Chi-square Test for significant effects of farmer field school on plantation of improved sorghum crop

		Sorghum crop		Total	Sig.
		Local	Improved		
FFSs	Exposure	6	10	16	.036
	Not exposure	48	25	73	
Total		54	35	89	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 value= 4.390

Table 8 Chi-square Test for significant effects of radio programs on plantation of improved sorghum crop

		Sorghum crop		Total	Sig.
		Local	Improved		
Radio programs	Exposure	26	26	52	.015
	Not exposure	28	9	37	
Total		54	35	89	

P≤ 0.05 = significant, indicating by Chi-square Test: source; field research (2017)

Z^2 value= 5.973

The results extend to show that 96.8% and 64.8% of the respondents adopt improved seed and early maturity varieties respectively this due to effects of season variability in the area, and were exposure more frequency to field visits, office visits, and

demonstration plots for accessing their necessary agricultural information 93%, 87.6%, and 86% respectively, (Figure 5 and 6). Also the respondents perceived that the demonstration plots, farmer's field school, field visits have significantly affects and convinced methods 47.3%, 38%. 63.4% respectively, and 67% focused on learning by doing as training approach for recommended packages, Figure 7 and 8. (Egziabher, Mathijs, Gebrehiwot, & Bauer, 2013) Said that there are various extension teaching methods used as one package by the extension worker to effect desirable changes in the behavior of farmers, arrange the best learning situations and provide opportunities in which useful communication and interaction takes place between extension workers and farmers. Such teaching methods/pathways include group training, demonstration plot.

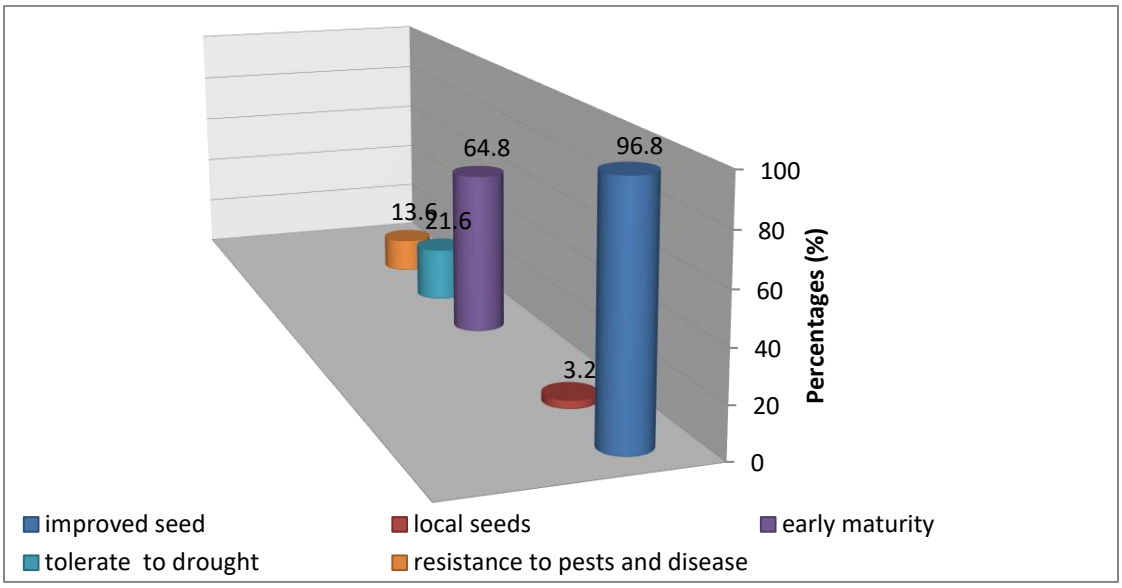

Figure 5 Perception of the respondents towards improved varieties compared with local and their justifications

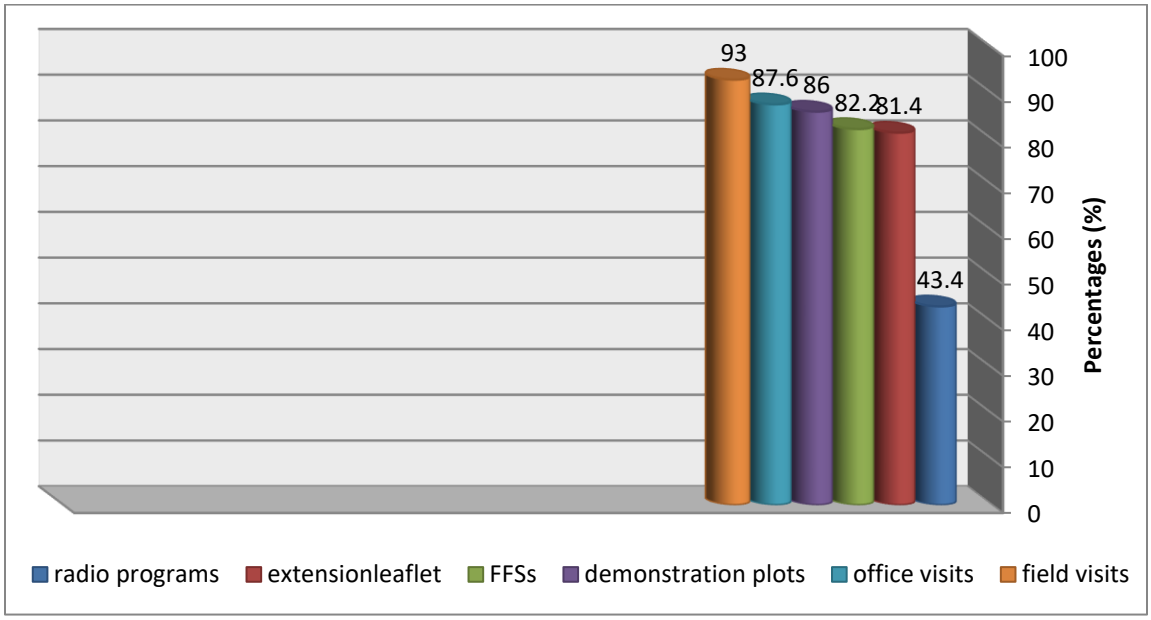

Figure 6 Distribution of the respondents according their exposure to extension methods

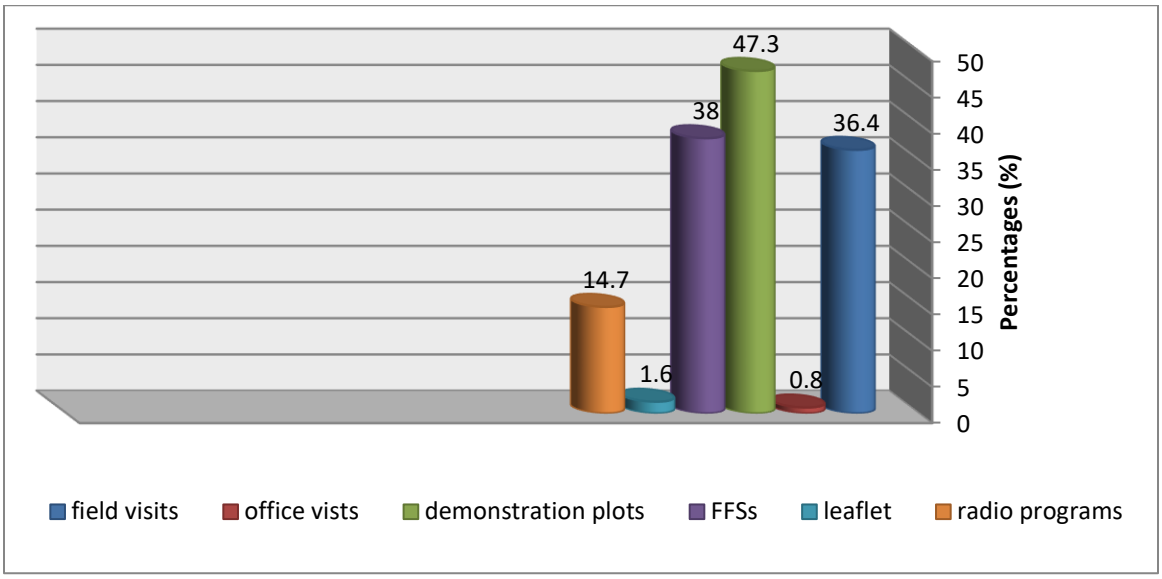

Figure 7 Best extension method for delivering agricultural information from farmer's point of views

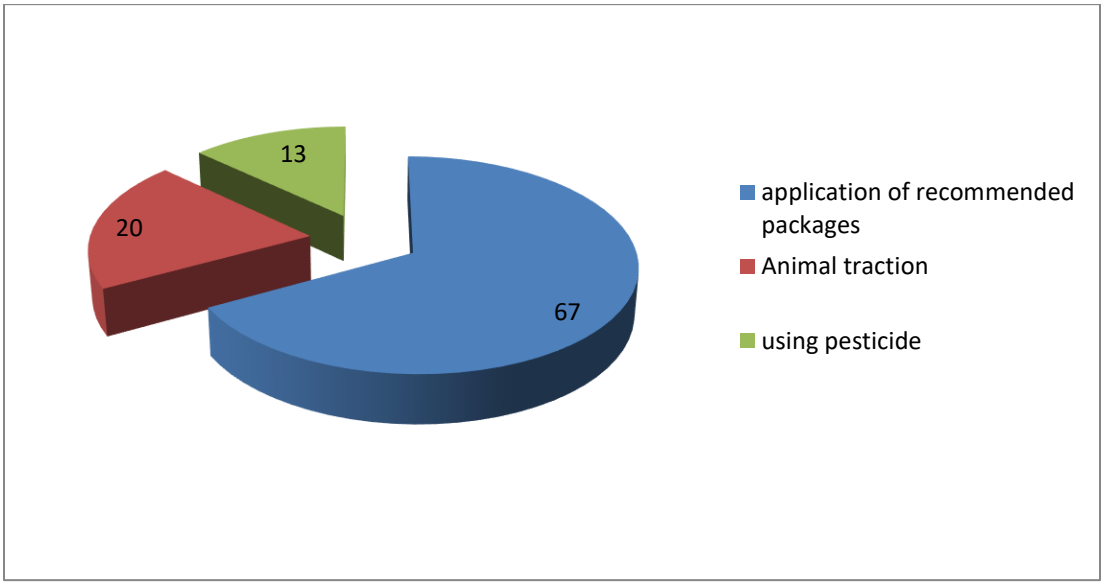

Figure 8 Issue of training conducted to respondents

4. CONCLUSION AND RECOMMENDATIONS

Despite the importance of agriculture for Sudan economy, the Sudan government budgetary allocation to the sector has been declined in the recent years, because policy makers were not recognize the important of agricultural sector as well as majority of farmers adopted traditional practices and local varieties in their farm. Extension system is responsible for knowledge transfer and supervision regarding millet and sorghum crops in the field, learning by doing approached which practiced through field visits, farmer field school, and demonstration plots were more effective's to accelerate the adoption process. Chi-squire Test showed significant difference between extension methods followed by extension officer and adoption of modern technology which reflected in improvement of their agricultural production.

Based on the results of study some recommendations has been mentioned such as encourage farmers to participate in farmer field school and demonstration plots, incentive framer to visits extension offices to strength collaboration and partnership.

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Conflict of Interest: The authors declare that there are no conflicts of interests.

Peer-review: External peer-review was done through double-blind method.

Data and materials availability: All data associated with this study are present in the paper.

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