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Challenges Relating to Application of Some Agricultural Innovation in *Elgouz* Locality, South Kordofan State, Sudan

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ABSTRACT

The idea of this topic was produced due to the importance of the agricultural innovation in increasing productivity in the area, therefore improve the GDP. Extensionists have been trying to persuade smallholder farmers to adopt agricultural innovations. This paper was dedicated to deal with challenges concerning the application of some agricultural innovations in *Elgouz* locality, South Kordofan State, Sudan. This study aimed specifically to find out the type of innovations and farmer perception toward innovation and what extension services were delivered. Primary quantitative and qualitative data were collected by social survey, direct interview and group discussion. Thirty six (36) questionnaires were randomly distributed among the farmers who received and practiced agricultural innovation; secondary data were collected from books, journals, and relevant sources. SPSS analysis Program was applied. The results of study indicated that two innovations were delivered to farmers; improved seed and agricultural mechanics, also the results showed that ineffective role of extension services, and majority of farmers have positive perceptions towards agricultural innovations (72%). The results revealed that constrains relating to improved seed and agricultural mechanisms such as attacks by pest, germinations problems, cost in uses, and difficult to repair. Finally, the study recommends that more attention should be given to agricultural extension systems and deep agricultural researches in this discipline.

Keywords: Challenges Relating, Application, Agricultural Innovation, *Elgouz* Locality, South Kordofan State, Sudan.

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INTRODUCTION

Agricultural technology holds much potential to contribute towards crop productivity gains and crop improvement for smallholder farmers in developing countries (Anthony & Ferroni, 2012). Agriculture contributes close to 40 per cent of Sudan's Gross Domestic Production (GDP). Most of

the Sudanese who live in rural areas depend on agriculture for their livelihood and seventy per cent of the labor force is principally employed in agricultural activities, (Azizur, 2004). Crop production contributes approximately 45 per cent of the GDP originating in agriculture, livestock contributing most of the remainder,

with forestry and fishery contributing just over 5 percent. Innovation is the process by which individuals or organizations master and implement the design and production of goods and services that are new to them, irrespective of whether they are new to their competitors, their country, or the world, (Bank World, 2011). Agricultural development depends on innovation. Innovation is a major source of improved productivity, competitiveness, and economic growth throughout advanced and emerging economies, and plays an important role in creating jobs, generating income, alleviating poverty, and driving social development. Education and training institutions are especially significant in Agricultural Innovations System (AIS) because they develop human resources and at the same time serve as a source of knowledge and technology. The absence or decline of these institutions leaves a large gap in a country's innovation capacity (World Bank, 2008).

Throughout history, agriculture-led development strategies with state support programs have been essential to achieving rapid economy-wide growth, poverty reduction, and structural transformation (Bezemer & Headey, 2008). Investments in science and technology have been a steady component of most strategies to improve and maintain agricultural productivity all over the world particularly in developing countries. (Rajalahtiet et al., 2005). Yet efforts to strengthen research systems and increase the availability of knowledge have necessarily increased innovation or the use of knowledge in agriculture by those residing in rural area. The agriculture research institute developed adapted early maturing varieties of these crops and with the support of FAO farmer seed enterprises were organized to produce certified seed for sale to farmers in the surrounding villages (Guei et al., 2010). Due to increasing use of mechanisms in agriculture, there is an urgent need to evaluate mechanisms benefits

and impacts in agricultural production (Altieri & Nicholls, 2012). The overall objective of this study is to address the challenges of application of agricultural innovation among smallholder in the farming system in the study area.

MATERIAL AND METHODS

Area of the study

South Kordofan State is bordered by North Kordofan State from the north, Republic of South Sudan from south, White Nile State from east, West Kordofan State from the west. Its population is estimated at 1,206,404 persons, (census, 2008). The State covers an area of 970470 square kilometers, (MCA, 2008). The livelihood activities found in the area are agro-pastoralists & nomadic pastoralists. The area is characterized by a large livestock population includes cattle, sheep, goats and camels, which represents about 30 percent of the estimated national livestock count. Rain-fed farming, both for subsistence needs and commercial operations, is practiced in the area. Rainfall is adequate and there are extensive plains of clay soil, a third source of livelihood is derived from the natural forests in the form of fuel wood production, building material, gum Arabic and fruit harvesting from various trees (UNDP, 2006).

Population of the Study

The target population of the study the beneficiaries of 12 villages in *Elgouz* locality, 50% from the total number of villages was selected. The total number of targeted population was 1931 (324 households) (census 2008). Head of household was interviewed.

Sampling Procedure

Table 1 shows the villages' names, total number of households in each village, % Sample Size and number of respondents in the sample.

Table 1: Sampling procedure of study

Villages Name	Total No. of Households	% Sample Size	No. of respondents in the sample
Nabak	139	10	14
Al Adaay	28	10	4
El Dibaba	56	10	6
El karbab	31	10	4
Umkanite	14	10	2
Khomme	56	10	6
Total	324	10	36

Data Collection

The study depended on primary and secondary sources of data. The primary data (quantitative data) were collected by using Participatory Rural Appraisal (PRA) in term of a questionnaire; which is designed, pretested and then randomly distributed to 36 respondents, and six group discussions were conducted in each village. While secondary data were obtained from annual reports, books, journals and other relevant sources.

The Questionnaires were distributed in each village according the following equation

$$N = n^0 \div y (^n)$$

N= Number of questionnaires distributing to target village.

n^0 = Total number of population in the target village.

y = total number of population in target villages

n = total number of questionnaires.

Data Analysis Procedures

The data were coded and fed to computer and a statistical technique was applied. Statistical Package for Social Sciences (SPSS) was used in data analysis. Descriptive statistical analysis (frequencies and percentages) was used, and Chi-square test was used to investigate the association between the variables of the study. The results of some analysis were transferred to Excel sheet to formulate figures and graphs.

RESULTS AND DISCUSSION

Tow type of innovations were delivered to farmers in study area these are Improved seed and how used it and agricultural mechanisms. The main constraints were faced respondents relating to improve seed were 19.4% for germination obstacles, 8.3 % for attacks by pest, 30.6 % heat intolerance, and 41.7 % not available in the area. Constraints for agricultural mechanization 47.2% unsuitability for soil, 8.3% for cost in uses, 44.4% for difficult to repair. More than 86% from the respondents were used innovations that recommended to farmers in the area through extension services such as improved seed (sorghum, groundnut, watermelon, and sesame) and agricultural mechanisms (plows, agricultural tractor) as most important innovations recommended. But most of beneficiaries saw that the extension program was not efficient due to many reasons such as insufficient extension methods (19.4%), weakness of extension agents in delivering the knowledge (44.4%), lack of extension workers 36.2%.

Also the results extended to indicate that majority of the beneficiaries (72%) saw the agricultural innovations as important for agricultural production sustainability particularly in our country. Qualitative results were appeared in group discussion, which revealed that majority of farmers' enthusiasms to solve their agricultural problem through good extension services. Most of them need skills need training particularly in agricultural mechanisms.

Results of chi-square test were showed that There was no significant association between social characteristics and application of agricultural innovation also results revealed that There was a significant association between extension services and increase farmers knowledge toward innovation.

CONCLUSION

Increasing productivity and incentive to adopt new agricultural innovation has been major concern in South Kordofan State. The study diagnoses current obstacles in application innovations by smallholder farmers in the area, also the study concluded that farmers have constructive perception in some agricultural innovations if they used effectively. In order to avoid these challenges the study recommended that; government and relevant institutions must give attention toward extension body through logistic and financial support, also extension worker need in-depth training to improve their capabilities in delivering agricultural messages. For researchers find out adaptable varieties to farmers in rain fed sector. For government or agricultural institutions gives poor farmers agricultural mechanization easy to use and cost-effective (Table 2, 3, 4, 5).

Table 2: distribution of farmer of the sample by constraints relating to improved seed in area

Constraints	Frequency	Parentage
Germinations problems	7	19.4
Attacks by pest	3	8.3
Not available in area	15	41.7
Heat intolerance	11	30.6
Total	36	100

Table 3: distribution of the farmers of the sample by constraints relating to agricultural mechanisms

Constraints	Frequency	Parentage
Unsuitability for soil	17	47.2
Cost in uses	3	8.3
Difficult to repair	16	44.4
total		100

Table 4: distribution of the farmers of the sample by constraints relating to extension system

Constraints	Frequency	Parentage
Insufficient extension methods	7	19.4
Weakness of extension agents in delivering the knowledge	16	44.4
Lack of extension workers	13	36.1
total	36	100

Table 5: distribution of the sample of beneficial perception toward agricultural innovations

Farmer perception	Frequency	Parentage
Good for increasing production	18	50
To some extent	12	33.3
Unsuitable for poor farmer	6	16.7
total	36	100

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