

Factors Affecting Women's Access to Agricultural Services and Farm Income in Sennar State

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Abstract

This study was conducted in Abu Hujar and Dali and Mazmum localities of Sennar state, Sudan, where seasonal commercial and subsistence rainfed farming is widely practiced, mainly for production of dura (sorghum), millet and sesame. A main objective was to identify the principle factors that affect access to agricultural services and the impact of these factors on farm production and income. A second main objective was to compare male and female farmers in terms of variables constituting a hypothesized path model of factors affecting production and income. Data for the study were collected during the 2008 agricultural season. A stratified random sampling procedure was employed in selecting a sample composed of 60 male farmers and 60 women engaged in farming activities for comparative analysis. Primary data were collected through use of structured interview schedules, and secondary data were obtained from relevant sources. Data analysis involved use of the Statistical Package for the Social Sciences (SPSS).

Data analysis revealed that the farmers were heterogeneous in terms of educational level. That had a negative effect on access to services and community participation among women. Path analysis revealed the magnitude of direct, indirect and total effects on area under crops and gross farm income from the causally prior variables in the hypothesized causal model. This finding suggests that larger farmers have more access to agriculture production resources and services in Sennar State. On the basis of the study findings, a set of recommendations for achieving equitable access to agricultural production resources and services by male and female farmers was put forward.

Keywords: Agricultural services, farm income, Sennar state

Introduction

The potential for effective contribution by women to the process of agricultural and rural development had been globally reduced by the adoption of socio-economic policies and programs that tend to be less responsive to the development needs of rural women. In this regard, Jiggins *et al.* (1998) noted the following:

It is now widely demonstrated that rural women, as well as men, throughout the world are engaged in a range of productive activities essential to household welfare, agricultural productivity, and economic growth. Yet women's substantial contribution continues to be systematically marginalized and undervalued in conventional agricultural and economic analyses and policies, while men's contribution remains the central, often the sole, focus of attention.

Women are typically, and wrongly, still characterized as "economically inactive" in statistical surveys of agriculture, a result that tells us more about survey methodology than about reality (Janelid, 1975). Agricultural extension services still do not attach much importance to reaching women farmers or women on the farm. Policy makers and administrators typically still assume (in the face of the empirical data) that men are the farmers and women play only a "supportive role" as farmers' wives (Samanta, 1994).

The above global characterization of the status of women farmers is especially true for Sudan where women play significant roles in crop and animal production, but their production potential is not fully utilized. Women farmers in Sudan have limited capacities in terms of access to resources, including education, farmland, research, extension, credit, input supply and marketing services.

This study is planned to investigate and explain the existing differential levels of access to land and agricultural development services by male and female farmers in Sennar State, Sudan, and to assess the impacts of these services on agricultural production and income. The main objectives of the research are:

- a. To evaluate the magnitude of the existing agricultural development services, and their impacts on agricultural production and income, from a gender perspective
- b. To contribute toward the development of potentially sustainable and gender-sensitive strategies and methods for improving access to extension and rural development services in Sennar state.

Thus, the study is intended to achieve the following specific objectives:

- a. To measure and assess the extent of differential access to land resources, credit, production inputs, extension and marketing services by male and female farmers in the study area.
- b. To identify socio-economic factors affecting women's access to agricultural production resources and services and their impacts on farm income.
- c. To suggest ways for improving women's access to agricultural and rural development services.

Methodology

The conceptual model

The methodology involved the development and testing of a conceptual model of causal effects among factors affecting access to agricultural services, and their impacts on crop production and income. The model (as depicted in Fig. 1) was based on recursive causal ordering of variables. It includes a single exogenous variable, namely level of education, and six endogenous variables, namely farmland size, access to extension services, adoption of the recommended technological package for crop production, access to credit, area under crops and gross farm income.

Research Site:

The study was conducted in villages representing the major rain fed farming systems in three localities in Semmar state, namely Abu Hujar and Dali and Mazmum. Sennar state lies in a central location between longitudes 32° 58' and 34° 42' E and latitudes 12° 5' and 14° 7' N surrounded by Gazeira State to the north, Blue Nile State to the south, Gadarif State to the east and White Nile and Upper Nile to the west. The total area of the State is 40608 km², this is estimated to be about 9.7 million feddan approximately, and this comprises 2.7% of the total area of the country. (Ministry of Agriculture and Animal Wealth (2008).

Sampling Procedure and Sample Size

A multi-stage stratified random sampling procedure was employed for selection of representative farmers from rain-fed farming communities of the study area. First, three localities were selected for purposes of the study from principal rain fed areas. From each locality forty farmers were selected (20 male farmers and 20 female farmers). Stratification based on gender and farm size. Thus the sample was composed of 60 female farmers and 60 male farmers for comparison.

Data Collection procedure:

Primary data were collected by means of use of structured personal interview schedules. Secondary data were compiled from available governmental and non-governmental records.

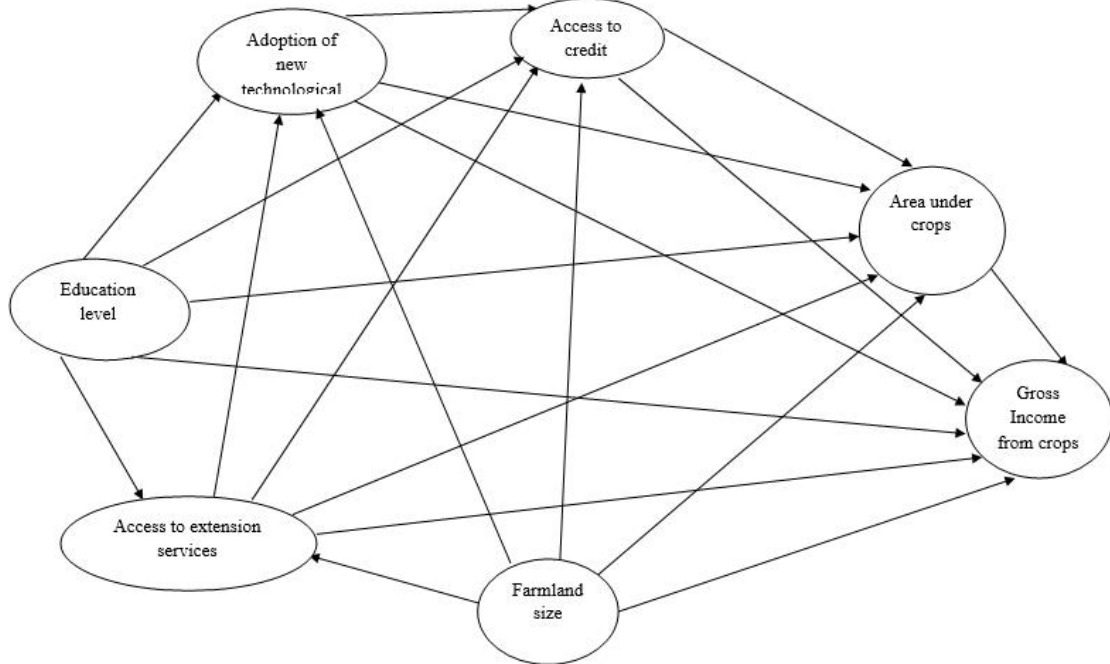


Fig. 1: The conceptual model of causal relationships among selected variables

Data Analysis:

The primary data were analyzed using the electronic Statistical Package for the Social Sciences (SPSS). Different statistical procedures were used in this study for purpose of descriptive analysis. The t-test analysis procedure was employed to determine whether the observed differences between male and female farmers are significant in relation to the model variables. The *Enter* multiple regression analysis procedure was employed as basic procedure of path analysis for testing and revising the conceptual model of factors affecting the production of the three principle crops in the targeted communities. Path analysis is superior to ordinary regression, as it expands the analysis by quantifying and explaining the existing significant direct, indirect and total effects from causally prior variables in a revised causal model (Saeed, 1989; Saeed and Babiker, 2011).

Results and Discussion

Data analysis revealed that the educational level of most of the farmers (70%) was low (see Table 1). There were significant differences between female and male farmers in terms of farm size and areas under crops (see table 2). The majority of farmers (95.8%) had no access to extension sources, and there is no significant difference between male and female in terms of access to agricultural information sources (see table 3).

Data analysis also revealed the existence of significant differences between male and female farmers in terms of adoption of components of the recommended technological packages for production of the different field crops (see tables 4, 5 and 6 below). The levels of adoption of the recommended crop production practices are markedly lower among women.

Table 1: Distribution of farmers in the sample by level of education

Level of education	Male farmers No = 60		Female farmers No = 60		All farmers No = 120	
	Freq.	%	Freq.	%	Freq.	%
Illiterate	6	10.0	18	30.0	24	20.0
Khalwa	7	11.7	17	28.3	24	20.0
Primary	25	41.7	18	30.0	43	35.8
Intermediate	9	15.0	4	6.7	13	10.8
Secondary	10	16.7	2	3.3	12	10.0
Graduate	3	5.0	1	1.7	4	3.3
Total	60	100.0	60	100.0	120	100.0

There are many constraints which limit the performance of women in crop production, but the main obstacles are their lack of adequate access to land credit services, and their low social capital. The majority of the farmers in the sample are characterized by low involvement in community organizations' activities, and that is more so among women.

Table 2: t-test of significance of the observed differences between male and female farmers in terms of variables related to land

Variables	Farmer Group	Mean	Std. Deviation	Mean different	t value	Sig
Farmland size (in feddans)	Males	240.0000	258.66181	197.3500	5.165	.000
	Females	42.6500	143.87351			
Area under crops (in feddans)	Males	378.1250	1284.87392	362.1333	2.183	.033
	Females	15.9917	21.46390			

Table 3: t-test of significance of the observed differences between male and female farmers in terms of access to extension information sources

Variables	Farmer Group	Mean score out of 1	t value	Sig
Access to agricultural information through extension field visits	Males	.1000	-.285	.776
	Females	.1333		
Access to agricultural information through extension meetings	Males	.0833	.946	.346
	Females	.0167		
Access to agricultural information through extension field days	Males	.0667	1.657	.100
	Females	.0000		
Access to agricultural information through extension office visits	Males	.5167	1.069	.287
	Females	.3167		

The needs expressed by farmers (male and female) include supply of low-priced inputs, the provision of subsidies for all farming inputs in addition to reduction of land rent, establishment of new projects to allow for more access to farmland, facilitation of access to credit through arrangements involving repayment in installments rather than in full at harvest time, and improvement education and health services.

The results shown in table 7 summarize the output of the six multiple regression analyses that were conducted for testing the hypothesized conceptual framework. Each of the endogenous variables in the model was regressed on the causally prior endogenous and/or exogenous variables. The displayed results suggest that the variables that have significant effects on access to extension services are farmland size (that have a direct effect of access to extension

information), and level of education, the effect of which is indirect is mediated through its impact on farmland size. Differences exist between male and female farmers with regard to the level of their access to extension services. However, these differences are not significant. All members in the sample are not getting any significant access to extension information sources.

Table 4: Frequency and percentage distribution of respondents by their adoption technological package for dura

Adoption of components of the technological package for dura production	Male farmers No = 60		Female farmers No = 60		All farmers No = 120	
	Freq.	%	Freq.	%	Freq.	%
Adoption of recommended dura land preparation method						
Not adopted	3	5.0	24	40.0	27	22.5
Adopted	57	95.0	36	60.0	93	77.5
Adoption of recommended dura sowing date						
Not adopted	4	6.7	24	40.0	28	23.3
Adopted	56	93.3	36	60.0	92	76.7
Adoption of recommended dura planting density						
Not adopted	58	96.7	58	96.7	116	96.0
Adopted	2	3.3	2	3.3	4	3.3
Adoption of recommended dura seeds rate technological package						
Not adopted	3	5	30	50.0	33	27.5
Adopted	57	95	30	50.0	87	72.5
Adoption of recommended dura harvesting method						
Not adopted	3	5.0	24	40.0	27	22.5
Adopted	57	95.0	36	60.0	93	77.5

Table 5: Frequency and percentage distribution of respondents by adoption of technological package for sesame

Adoption of components of the technological package for sesame production	Male farmers No = 60		Female farmers No = 60		All farmers No = 120	
	Freq.	%	Freq.	%	Freq.	%
Adoption of recommended sesame land preparation method						
Not adopted	20	33.3	41	68.3	61	50.8
Adopted	40	66.7	19	31.7	59	49.2
Adoption of recommended sesame sowing date						
Not adopted	20	33.3	41	68.3	61	50.8
Adopted	40	66.7	19	31.7	59	49.2
Adoption of recommended sesame agriculture rotation						
Not adopted	20	33.3	49	81.7	69	57.5
Adopted	40	66.7	11	18.3	51	42.5
Adoption of recommended sesame seeds rate						
Not adopted	22	36.7	41	68.3	63	52.5
Adopted	38	63.3	19	31.7	57	47.5
Adoption of recommended sesame harvesting method						
Not adopted	20	33.3	41	68.3	61	50.8
Adopted	40	66.7	19	31.7	59	49.2

Men in the sample were also found to be in a better position to take the risk of adopting the recommended crop production technological packages, seemingly because they are relatively more educated, have larger farmland units, and have some access to credit services. The analysis suggests that access to credit services is determined by farmland size, access to extension

services, adoption of the recommended crop production technological packages, and education. The male farmers received higher scores on the latter variables, relative to the female farmers,

Table 6: Frequency and percentage distribution of respondents by their adoption technological package for millet

Adoption of components of the technological package for millet production	Male farmers N = 60		Female farmers N = 60		All farmers N = 120	
	Freq.	%	Freq.	%	Freq.	%
Adoption of recommended millet land preparation method						
Not adopted	45	75.0	38	63.3	83	69.2
Adopted	15	25.0	22	36.7	37	30.8
Adoption of recommended millet sowing date						
Not adopted	45	75.0	39	65.	84	70.0
Adopted	15	25.0	21	35.0	36	30.0
Adoption of recommended millet planting density						
Not adopted	59	98.3	60	100.0	119	99.2
Adopted	1	1.7	0	0.0	1	.8
Adoption of recommended millet seeds rate						
Not adopted	45	75.0	38	63.3	83	69.2
Adopted	15	25.0	22	36.7	37	30.8
Adoption of recommended millet harvesting method						
Not adopted	45	75.0	38	63.3	83	69.2
Adopted	15	25.0	22	36.7	37	30.8

Table 7: Effects on model variables from causally prior predictors

Dependent variable	Predictor	Direct effect	Indirect effect	Total effect
Gross crop income	Farmland size	0.345	0.259	0.604
	Area under crops	0.322	-----	0.322
	Education	-----	0.123	0.123
	Access to credit	-----	0.106	0.106
	Adoption of crop production package	-----	0.021	0.021
	Access to extension	-----	0.008	0.008
Area under crops	Farmland size	0.665	0.141	0.806
	Access to credit	0.329	-----	0.329
	Education	-----	0.188	0.188
	Adoption of crop production package	-----	0.064	0.064
	Access to extension	-----	0.026	0.026
Access to credit	Farmland size	0.346	0.068	0.414
	Adoption of crop production package	0.195	-----	0.195
	Education	-----	0.122	0.122
	Access to extension	-----	0.078	0.078
Farmland size	Education	0.201	-----	0.201
Adoption of crop production package	Access to extension	0.400	-----	0.400
	Farmland size	0.181	0.171	0.352
	Education	0.195	0.070	0.265
Access to extension	Farmland size	0.427	-----	0.247
	Education	-----	0.086	0.086

The determinants of area under crops, according to the path analysis procedure, are farmland size, followed by access to credit, education, adoption of the recommended crop production technological packages and access to extension services.

The variables that have most significantly affected gross farm income were found to include farmland size, followed by area under crops, level of education, access to credit, adoption of technological package, and access to extension services.

Since farmland size is a fundamental contributor to gross farm income, the larger the area cultivated, the more is the gross income obtained. It is generally noticed that farmland operated by men is larger than farmland operated by women, and that income differences between male and female farmers was substantial (see fig.2).

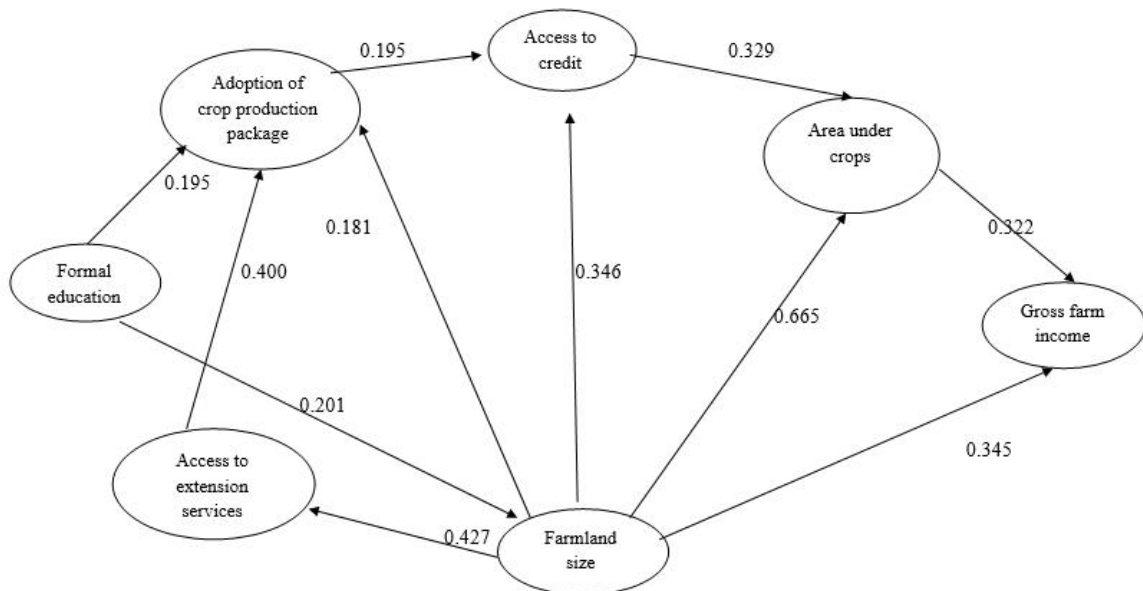


Fig. 2: Revised path model of causes and impacts of access to agricultural production resources and services in Sennar State

Conclusion and Recommendations

Conclusion

From the study findings, it can be concluded that there are no significant differences between female and male farmer in terms of access to agricultural extension and services in Sennar State. The majority of farmers (95.8%) have little or no access to extension services. The relatively lower scores received by women on extension service access might be due to the lack of awareness of women farmers of the benefits associated with enrolment in community farmer groups/cooperatives, or to the prevailing socio-cultural restrictions imposed on women by members of the community. There is significant difference between female and male farmers in terms of farmland size and area under crops. The scores received by women on these variables were significantly lower than those received by the male farmers.

There is significant difference between male and female farmers with regard to access to extension training opportunities. The larger farmers have more access to agriculture production resources and services in Sennar State, and the gender differentials in areas under crops and gross farm income are significant.

Recommendations

The following recommendations, if followed, would be helpful for the agencies concerned with improvement of farmers' access to services and the opportunity of increasing farm income in Sennar State.

Recommendations for Development Projects in Sennar State

- a. Supporting services and investment activities in rural areas in the direction of empowering women and the improvement of women's living and working conditions.
- b. Encouraging the disadvantaged women to get more involved in educational programs and awareness-raising development activities.
- c. Encouraging more women farmers to participate in the activities of community-based organizations (CBOs).
- d. Adoption of gender-sensitive policies that render equitable access to production resources and services, and faire distribution of development benefits.

Recommendations for Extension Institutions in Sennar State

- a. Use of participatory approaches in extension and rural development programs, particularly those targeting rural women.
- b. Arranging for allowing sufficient time for women farmers' to engage in training in order to enable them to acquire new skills.
- c. Providing women and men with opportunities for gaining practical field experience in use of improved crop production innovations.
- d. Linking extension with input supply and marketing services, especially in programs targeting women farmers

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