Influence of Source of Information on Cotton Production among Smallholder Farmers in Bura Irrigation and Settlement Scheme, Kenya

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Abstract

Kenyan smallholder cotton production has remained low despite the spirited effort by the government and the private sector to revive the sector. Several factors combined seem to be responsible for this perpetual low production. Among the factors are constraints ranging from, inadequate extension services, limited access to information on production and poor marketing systems. The purpose of this study was to investigate how source of information on cotton production influence cotton production among smallholder farmers in Bura Irrigation and Settlement Scheme. The study utilized descriptive survey research design to collect primary data from farm households on the influence of selected factors on cotton production, while secondary data was collected from Cotton Development Authority and National Irrigation Board offices in Bura Irrigation and Settlement Scheme. The study population was all smallholder cotton farmers in Bura Irrigation Scheme.

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Proportionate simple random sampling method was used to select 120 farmers from 1022 cotton farmers in 11 villages within the scheme, who were included in the study. A validated questionnaire was used to collect data. Descriptive and inferential statistics was used to analyze the data to determine association and relationships using Statistical Package for Social Science (SPSS) version 20.0. The findings showed that 71.7% of the respondents rely on other farmers for information, 83% don't get information from preferred sources, 63% of the respondents indicated that cotton production information in not readily available, information on pest management practices is mainly obtained from private companies, 78% disagree with the statement that information provided on cotton production is accurate and relevant, and all the respondents indicated that they do not have access to web based information. Cotton farmers in Bura Irrigation Scheme have very limited sources of cotton production information and majority of them rely on other farmers.

Keywords: Cotton Production; Cotton Seeds; Seed cotton; Smallholder; Sources of information.

1. Introduction

Cotton is the largest revenue earning of the non-food crops produced in the world. Its production and processing provide some or all of the cash income of over 250 million people worldwide, including almost 7 percent of the available labor force in developing countries [6]. These activities are becoming highly concentrated over time; today, 77 percent of global cotton output and 73 percent of the cotton hectares are accounted for by China, the United States, India, Pakistan, and the Central Asian Republics. India accounts for approximately 21 percent of the world cotton area but the average productivity of cotton is markedly low, at about 293 kilograms of lint cotton per hector compared to 600 kg per hector of world average per year [12]. Cotton production faces crucial challenges such as: escalating costs of production, low cotton prices, inefficient pest management, stickiness, yield variability within the same location, late cotton picking, subsidies in the developed countries, diminishing production capital and competition from other crops. These obstacles diminish the benefits from continuing cotton cultivation [5]. Even though the challenges are numerous, all the parties involved in cotton production are optimistic that Kenyan cotton will regain and even surpass its former position through the enhancement and implementation of site-specific and low-input technologies. Significant improvements in institutional, policy and financial aspects must also be made in order to achieve competitiveness in the global economy. These challenges have to be taken up by the whole spectrum involved in the cotton sector, that is, researchers, extension workers, production agronomists, economists and policy makers (Kenya Institute for Public Policy Research Analysis [9]. According to [6], poor yields from smallholder cotton in Africa have been a long standing problem that has not been greatly altered by release of new varieties or by other recommendations made on the basis of research findings and consequently there seems to be a number of problems in translating the outputs from research into the farmers' fields; farmers are consistently not taking up the recommendations. In response to African Growth and Opportunity Act (AGOA) and the expectation of declining cotton subsidies in developed countries, a number of Sub-Sahara African countries are embarking on programmes to stimulate cotton production. The focus is mainly on the provision of subsidized seed, fertilizer and insecticide but missing factors are both the development of sustainable integrated crop management practices and similarly sustainable mechanisms for the delivery of technical support services to the producers [5]. In South Africa, relatively low prices, high input costs, exchange rates, cheap import of cotton fibre and international subsidies are all factors

affecting cotton production negatively [2]. The Kenya's cotton sector performance declined substantially in the 1990's at the height of trade liberalization; both cotton production and the textiles garments industry suffered due to continued synthetic fibre competition, diminishing world prices, introduction of cheap imports of second hand clothes and diminished cotton profitability aggravated by inefficiencies in the production system and supply side constraints . The decline in cotton production in the last two decades has also coincided with increase in poverty levels in areas designated as major cotton belts. The gradual cotton decline has also affected other parts of the value chain including ginners, textile mills and manufacturers [7]. Cotton in Kenya is mainly grown by small-scale farmers in marginal and arid areas, on small land holdings. It is estimated that Kenya currently has 90,000 small-scale cotton farmers compared with over 200,000 farmers in the mid-1980s when the industry was at its peak [1]. The Cotton Development Authority estimates that countrywide, 350,000 hectares is suitable for rain-fed cotton production with the potential to produce about 260,000 bales of lint annually, and 34,500 hectares for irrigated cotton with the potential to produce 108,000 bales of lint annually. However, only about 25,000 hectares is currently under the crop, and the total annual lint production stands at only about 20,000 bales [1]. Despite these efforts, issues affecting cotton production have not been adequately addressed as most of the cotton production regions are yet to embark on its production despite the local markets available for the same. Given that the average yield is only 500 kg/acre profitability would be greatly improved even with production at 50% of the yield potential of the commercial varieties [13]. Kenyan cotton is produced under both irrigated and rainfed conditions. In Bura Irrigation and Settlement Scheme where the study was conducted, cotton is the major crop which is grown in rotation with maize [11]. According to [3], by 1985, Bura Irrigation Scheme was responsible for 45% of the total country's cotton production where on farm average production stood at 3,600 kg/acre of seed cotton and thus, the Scheme was recognized as the pillar of cotton sector in Kenya. The current average seed cotton production in the scheme stands at 1,000 kg/acre against the potentials of 4,000 kg/acre under irrigation of the current HART 89M variety grown [14]. Currently, the area under cotton production stands at 1,800 acres against the potential of 16,000 ha of land which has been opened up by National Irrigation Board and is under irrigation [11]. One strategy for lowering the cost of cotton production would be to increase yields, which currently stands at about 21% of the potential for the varieties grown in Kenya [8]. However, according [1], cotton production in Kenya is currently faced by constraints ranging from erratic weather patterns, weak cooperative movement, high cost of inputs, lack of rural credit, poor seed quality, inadequate extension services and inappropriate extension approaches and poor marketing systems. Cotton Development Authority [2] further indicated that efforts to release a new variety of genetically modified cotton seeds to farmers has been halted by the government's ban on genetically modified organisms, consequently farmers have to wait a little longer to benefit from the recent break through.

2. Research Methodology

Descriptive survey research design was used for the study. Descriptive survey research design was appropriate for this study because it allows one to obtain information concerning the current status of the phenomena to describe 'what exists' with respect to variables or conditions [10]. The study was carried out in Bura Irrigation and Settlement Scheme of Tana River County, Kenya. Bura Irrigation Scheme is located in Tana River County. The scheme is situated on the right bank of River Tana within the lower Tana River basin. The population for this research was all cotton producing households in Bura Irrigation and Settlement Scheme. A sample of 120

farmers was sampled for the study. A sample size of 120 respondents was considered appropriate for the study as it way above   the minimum recommended sample size of 100 in consideration of the level of accuracy required and the accessible population [10]. The extra number of 20 households was to cater for dropouts and non-respondents during the study. Proportionate simple random sampling was used to select the farmers to be studied from each of the Villages. With the aid of table of random numbers, participating farmers were identified where the sampling unit was the head of the household. A questionnaire was developed along the objectives and used to collect data from farmers (research participants). Secondary data was collected from National Irrigation Board and Directorate of Fibre Crops offices at Bura Irrigation and Settlement Scheme. Data from questionnaires was organized, collated and coded for possible errors according to study objective and variables. Summarized data was keyed into the computer for analysis using Statistical Packages for the Social Sciences (SPSS) version 20.0. Descriptive and inferential statistics was used to analyze the data, multiple regression analysis model was used to determine the extent of the influences of the various independent variables on cotton production among smallholder farmers.

3. Results and Discussions

The study sought to determine the influence of source of information on Cotton production in Bura Irrigation Scheme. The study investigated the sources of information, the preferred sources of information, frequency of obtaining information and sources of specific information on cotton production in the recent past and their influence on cotton production. On the source of information, majority of the respondents (71.7%) said that the source of information for cotton production practices and marketing was largely from other farmers while 21.7% get their information from private company as 5.8% obtained information from Cotton Development Authority and only 0.8% of the respondents indicated that they never get information on cotton production (Figure 1).
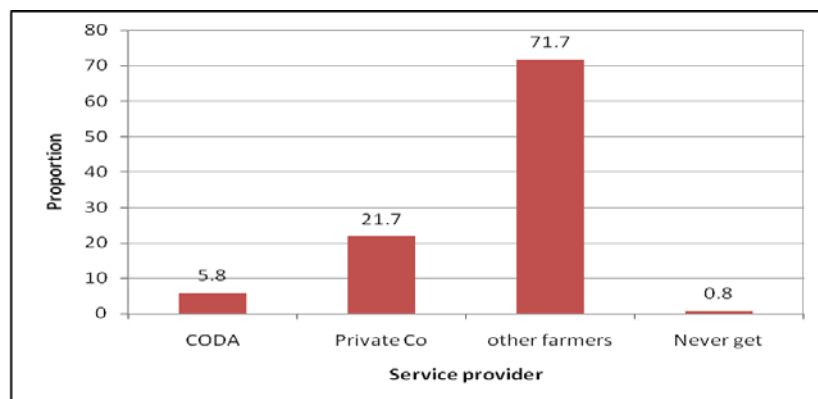

Figure 1: Response on the sources of Information for production and marketing by the respondents

The respondents were required to indicate whether they obtain information from preferred source and to provide a reason to that effect. Analysis revealed 83% of the respondents were not getting information from preferred source as 17% of the respondents indicated that they were getting information on cotton production from the preferred source (Table 1).

Table 1: Preferred Source of information

Preferred Source	Frequency	Percentage
Yes	21	17
No	99	83
Total	**120**	**100**

Although majority of the respondents get information on cotton production practices, the study revealed that they do not always get information from the preferred source.

A significant proportion of 71% said they fail to get information from the preferred source because the said sources of information are not within their reach. Others (19%) said the government officers who they prefer are inaccessible due to the distance of their location (Figure 2). This only reaffirms what Cotton Development Authority stated in [1] that cotton production in Kenya is currently faced by constraints which include inadequate extension services and inappropriate extension services.

Figure 2: Proportions of the preference to sources cotton production and marketing information

The respondents were required to provide information on the frequency of obtaining cotton production information, upon which 70% said they rarely get this information as 25% indicated that at least they get some information yearly (Figure 3).

Accessibility of extension packages to cotton farmers is crucial, particularly if productivity is to be increased. toward the goal of increasing diversification and intensification of farming systems, especially those involving small-scale and women farmers, all farmers will need access to relevant and current technical and market information that reflects these emerging domestic and international market opportunities for the different agro-ecological areas within each Ward, Sub-County and County within the country. This was well captured by World Bank [15] which noted that as the agricultural sector moves toward the goal of increasing diversification and intensification of farming systems, especially those involving small-scale and women farmers, all farmers

will need access to relevant and current technical and market information. The respondents were requested to indicate where they obtain specific information on cotton production. Analysis of the responses established that Cotton Development Authority is the major source of information for planting material for cotton; this was according to 84% of the respondents. On the other hand, information about the time of planting is mainly obtained from the Ministry of Agriculture, this was according to 26.7% of the respondents. However, a significant proportion (95.8%) said they get information about pest identification and management from Private Company probably due to the fact that crop protection services are business oriented. Likewise, majority of the respondents (25% & 28.3%) obtain harvesting of cotton seed and post harvesting handling information from Private Company. Cotton Development Authority is a major source of information on marketing channels; this was according to 56.7% of the respondents (Table 2).
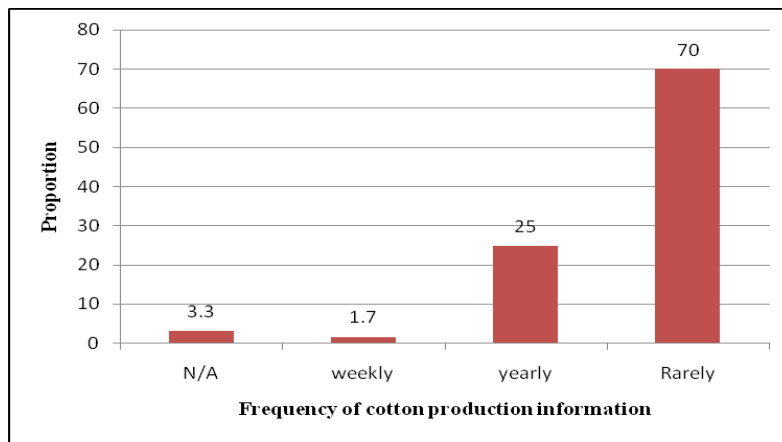

Figure 3: Proportions of the respondents' frequencies to receiving information

Table 2: Proportions of sources of specific information on cotton production

Service provider	Planting material	Time of planting	Pest Mngt	Harvesting	Post Harvest	Marketing Channels
MoA	13.3	26.7	0.0	2.5	0.8	3.3
CODA	84.2	17.5	0.0	10.0	9.2	56.7
P/Company	0.8	15.0	95.8	25.0	28.3	38.3
NGO/CBO	0.0	2.5	0.0	1.7	0.0	0.0
Never get	1.7	38.3	4.2	60.8	61.7	2.0
Total	**100**	**100**	**100**	**100**	**100**	**100**

The different Sources of information were analyzed to determine how well they contribute to the variability of area under cotton. The R score was 0.305 and the contribution to variability was determined to be 9.4% (R^2-0.093). (Table 3)

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.305	.093	.035	.5120

a. Constant: Sources of information (MOA, CODA, Private Company, CBOs and Never get)

The F-test (, F [7, 112] =1.639, $p > 0$ .0005) indicates that statistically there is no linear relationship between the independent variables and the dependent variable in this case area under cotton. (Table 4)

Table 4: Analysis of variance for the prediction of dependent variables from independent variables

ANOVA[b]

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	11.153	7	1.593	1.639	.132
Residual	108.847	112	.972		
Total	120.000	119			

a. Constant: Sources of information (MOA, CODA, Private Company, CBOs and Never get)

b. Dependent Variable: area under cotton during last season

Individually, no independent variables can satisfactorily predict the variability of the dependent variable in this case. This is captured by the beta analysis of individual independent variables in the table below.

The respondents were required to agree or disagree with the statement that cotton production information is readily available; cumulatively, 63.3.3% disagreed while 36.7% agreed with this statement (Table 6). Similarly, 78.4% disagreed with the statement that information on cotton production is accurate and relevant, however,

21.6% agreed with the statement. Sadly, all the respondents disagreed with the statement that they have access to web based information (Table 6).

Table 5: Coefficients of independent variables for prediction of the dependent variables

Model	Standardized Coefficients		df	F	Sig.
	Beta	Std. Error			
MOA Source	.027	.028	2	.977	.380
Private Company	.343	.051	2	45.599	.000
CODA	-.029	.081	1	.128	.721
CBOs[a]	.	.	.	.	.
Never Get	-.027	.092	2	.089	.915

Dependent Variable: area under cotton during last season

a. The selected or specified sign pattern results in quantifications that are all zero for this variable

Table 6: Proportions of respondents on response about Effectiveness of information on cotton production.

Variable	SD	D	A	SA	Total
Information readily available	5.0	58.3	36.7	0.0	100
Information accurate & relevant	24.2	54.2	20.8	0.8	100
All knowledge & skills provided	24.2	55.0	20.0	0.8	100
Access to web based information	99.2	0.8	0.0	0.0	100

4. Conclusion and Recommendation

Cotton farmers in Bura Irrigation Scheme have very limited sources of cotton production information and majority of them rely on other farmers. The government agencies providing extension service in the scheme are

either not available on demand or are not within the reach of most of the farmers in most cases because of the distance involved. The frequency of the visit by extension officers to the farms is also very low hence farmers are most likely to lose out on getting timely interventions Private extension providers though present in the area, they only provide specific information on pest management and the credibility of the information provided is not known. There was evidence for unavailability of the extension officers at times when needed by farmers. The unavailability of extension officers has to be addressed accordingly. There ought to be an increase in the frequency of visits by extension officers to cotton production sites to provide technical support promptly when sought by the farmers in the irrigation scheme. Farmers appeared to be in need of technical and market information for the emerging domestic and international opportunities for cotton production.

Acknowledgement

References

[1] Cotton Development Authority. "Status Report on Cotton Industry in Kenya"; For ICAC Plenary meeting, Interlaken, Switzerland, October 7-12, 2015.

[2] Cotton Development Authority. Annual National Cotton Production Status Report, Unpublished 2016.

[3] Cotton Lint and Seed Board [CL&SB]. Status Report on Cotton Industry in Kenya. Unpublished 1992.

[4] Food and Agriculture Organization of the United Nations (FAO). "Farmer innovation and new technology options for food production, income generation and combating desertification," Progress report, Nairobi: Food and Agriculture Organization of the United Nations, 2013

[5] International Cotton Advisory Committee. (2014 December 31). Cotton World Statistics. [On-line]. Available: http://www.icac.org [October 28, 2016].

[6] International Cotton Advisory Committee. (2015 December 31). Cotton World Statistics. [On-line]. Available: http://www.icac.org [November 4, 2016].

[7] Institute of Economic Affairs. "Trade policy reforms and poverty in the Cotton sub-sector," Challenges and policy Issues; Policy brief, Issue No. 11.2014

[8] Kenya Agricultural Research Institute. "Participatory Technology Development for Soil Management by Smallholders in Kenya". Proceedings of the Second Scientific Conference of the Soil Management and Legume Research Network Projects, Mombasa, Kenya, June 2015.

[9] Kenya Institute for Public Policy Research Analysis. International trade liberalization and economic

growth: The role of regulatory policies, 2016.

[10] B. K. Mutai. "How to write quality research proposals; a complete and simplified recipe," Edinburgh. Thelley Publications, 2013

[11] National Irrigation Board. Annual report for Bura Irrigation and Settlement Scheme, Unpublished, 2015

[12] Sen, A. (2013, September) "The Cotton Scenario in India", Global Business Network [On-line]. Available: www.IndiaOneStop.com [Nov. 1, 2016].

[13] J. Wakhungu & D. Wafula. Introducing BT Cotton: Policy Lessons for Smallholder farmers in Kenya. Nairobi: Kenya, 2013.

[14] C. N. Waturu. "Role of KARI in enhancing cotton production in Kenya through biotechnology," Proceedings of a stakeholders meeting by the African Biotechnology Stakeholders Forum KARI. Nairobi, Kenya, 2014.

[15] World Bank. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Agriculture and Rural Development Discussion Paper 44 2013.